Ensuring and Assessing the Learning in Applied and Experiential Learning Assignments

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Participant Outcomes

- Describe applied and experiential learning
- Formulate applied and experiential learning outcomes and assessments
- Increase the learning value of applied and experiential assignments with reflective meta-assignments
- Compose appropriate reflection probes and assess student responses

Applied & Experiential Learning

- "Real world" problem solving, whether occupational, civic, or personal
- Real or simulated experience
- Cognitive & affective (doing & feeling)
- Key to deep learning is *reflection*, ≈ "self-debriefing"

Common Types - Real

- Clinicals
- Internships
- Service-learning
- Community engagement
- Field trips/travel
- Collaborative capstone project

(Real, but like problem-based learning because corporate teams are different.)

Common Types - Simulated

- Role plays
- Simulations
- Simulation-like games
- Problem-based learning
- Case method

Capstone Assignments:

Recommendations in Kuh, G. D. (2008). *High-impact educational practices.* Washington, DC: AAC&U.

- Application to real-world situations
- Significant time and effort
- Abundant interaction with instructor and among peers
- Cyclical instructor feedback and student response
- Reflection and integration of learning

The Logic of Alignment

Teaching Methods/Learning Experiences to Help Students Achieve Outcomes

(the means to the ends)

Inform ↗   ↘ Improve

Learning Outcomes = Performance Assessments
(the foundation, the ends)   *(measurements of students' progress to the ends)*

Assessments Should Mirror Outcomes.

Outcome   Assessment

Assessment Guidelines
———————————————

Golden Rule of Assessment

- If you want your students to be able to do X, Y, and Z, have them do X, Y, and Z to assess whether/ how well they can.

- Each outcome → formal (graded) or informal (ungraded) assessment

- Set performance standards: acceptable/ unacceptable, grades, or point ranges.

- Don't move on until almost all students have made acceptable progress.

- Before assessing summatively (for a grade), assess formatively to:
  – Give students *practice* w/ feedback from you, peers, computer program, your colleagues, etc.
  – Get frequent *feedback* for *yourself* on their progress ("classroom assessment").

Practice in performing outcomes
= class activities & short HW assignments = students' learning experiences = your teaching methods

Therefore, outcomes = assessments = teaching methods

2 Types of Outcomes and Assessments

- Ability to perform an applied task

- Ability to abstract the experience to make it personally meaningful, evaluate impact, or identify decision-making rules and patterns; *awareness* of the process
  - Important for transfer
  - Role of reflection

Ability to Perform Applied Task

- Directions and rubric criteria should mirror learning outcomes for the applied or experiential assignment.
  - Course outcomes (Why you are giving the assignment? What is its point?)
  - Program outcomes, especially for a capstone project (What do you want your graduates to be able to *do*?)

Task #1

Let's examine your program learning outcomes to see whether they are assessable. You cannot design an assignment and rubric to assess students' achievement of your outcomes if your outcomes are not assessable.

Task #2

Think of an applied or experiential assignment that you give now or plan to give in the future. Draft the directions and rubric criteria, mirroring some of the course and/or program learning outcomes (for a capstone project, *program* outcomes).

Ability to Abstract Experience

- Requires written reflection

- Reflective meta-assignment must be carefully directed to tell students:
  - What to look for through the experience
  - What is important to get from it
  - What will help them achieve the outcomes

- Metacognition + self-regulated learning
  - Plan and set goals
  - Self-observation
  - Self-monitoring
  - Self-analysis
  - Self-evaluation
  - Willingness to change strategies

What Reflective Probes to Ask and Assess

- Depends on the experience
- What you want students to get out of the experience, to be able to do after it. What are your **learning outcomes?**
  - **The experience & reflection require corresponding outcomes.**

Think about what learning outcomes are implied by these reflective probes.

Reflections on "Fuzzy" Problem Solving Process

- How did you decide how to define problem?
- How did you determine what principles & concepts to apply?
- How did you develop alternative approaches & solutions?
- How did you assess them to identify the best one? On what criteria (e.g., feasibility, trade-offs, costs, payoffs)?

Reflections on Role Plays or Simulations

- How did you initially set & then modify your goals & strategies?
- How did you decide your actions & responses to other players?
- How well did you achieve your goals?
- How well did your strategies work? Evaluate your performance.

General Reflections

- Describe your decision-making/ research process? What steps? What strategies? Problems encountered? How overcome?
- What skills did you gain or improve?
- When & how will these skills be useful in the future?

- How does the experience connect to the course learning outcomes & content? What concepts & principles does it illustrate?
- What self-regulated learning behaviors did you use: goal-setting, self-monitoring, using feedback, self-assessing?
- What risks did you take, and why?

- How would you assess your progress, growth, strengths, weaknesses?
- How valuable was this experience to your learning? What did you learn through it?
- What would you do differently?
- What advice would you give next year's students on this experience (goals, preparation, strategies, pitfalls, value)?

Task #3

Go back to that applied or experiential assignment you worked on earlier. Draft the directions for a reflective meta-assignment that mirrors some of the course and/or program learning outcomes (for a capstone project, *program* outcomes). (Think *detail.*)

How to Assess Reflections

- Grade pass/fail on these bases:
  - Complete; all questions answered
  - Good faith
  - Meet length requirement
- Grade with a rubric

Task #4

How will you assess your reflective meta-assignment ?

Reflection

- What is (are) the most useful or valuable thing(s) you learned during this session?

Detailed Probes for Simulations or Role Plays

- In view of your role, how did you define your goals?

- What was your initial strategy for achieving your goals?

- At what points did you see your strategy working well?

- At what points did you see your strategy falling short?

- When, how, and why did you modify or change your goals or your strategies to reach your goals, if you ever did?

- What were your key decisions and actions in working towards your goals? Which of them, if any, did not work out as you expected? Why didn't they?

- How did you respond to the actions of other characters/players?

- How did your feelings towards yourself and other characters/players change during the experience?

- What principles or concepts that you learned in this or another course did you see illustrated during the experience?

- How would you evaluate your performance overall? How successfully did you achieve your goals (initial or modified)? How effective was your strategy (initial or modified)?

Adapted from Nilson, L. B. (2013). *Creating self-regulated learners: Strategies to strengthen students' self-awareness and learning skills.* Sterling, VA: Stylus, pp. 53-54.

QUESTIONS FOR SERVICE-LEARNING JOURNALS OR DISCUSSIONS

Course theory focus questions
- How does the service experience relate to class material?
- Did the experience contradict or reinforce class material?
- How did course material help you overcome obstacles or dilemmas in the service experience?
- What aspects of your learning may be due to your service experience?

Issue focus questions
- Why is there need of your service?
- What do you perceive as the underlying issue, and why does it exist?
- Who is involved in this issue? (in helping solve it, or perpetuating it)
- Do you see connections to public policy at the local, state, or national level?
- What social, economic, political and educational systems are maintaining and perpetuating it?
- What would it take to positively impact the situation (from individuals, communities, education, and government)?

Client focus questions
- What similarities do you share with the people you are serving? What differences?
- What are their strengths? What can you learn from them and their strengths?
- How are you perceived by the people you are serving?
- What do you think a typical day is like for the people you serve? What pressures do they confront?
- How does their situation impact their life socially, educationally, politically, recreational, etc.?
- What stereotypes are you confronting about the people you serve? Have you reconceptualized these stereotypes? What new information lead you to do this?

Self focus/personal development questions
- In what ways is your involvement with your service program challenging? What about your personality helps you move past these challenges?
- What personal qualities (e.g. leadership, communication skills, compassion, etc.) have you developed through service-learning? How will these qualities help you in the future?
- What happened that made you feel you would like to pursue this field as a career? Or not?

Civic focus questions
- What can you do with the knowledge you gained from the experience to promote change?
- How is what you study preparing you to address this issue?
- How do your lifestyle choices affect this issue? Is there anything you are doing/not doing that perpetuates the situation?
- How has your orientation to or opinion about this issue changed through this experience?

Pre-professional questions
- Is there a difference between the way [engineers] views problems and the way they are viewed by people you are working with? What are the differences? Why do these differences exist?
- What non-technical information did you learn about the project from the people you worked with? Is this information relevant to your work? If so why?
- How can [engineers] work with other citizens together to solve problems? Why should they?
- Do you have any ethical dilemma about taking on this project? Have you been asked to do something that contradicts your values or beliefs? Are there social issues which affect or are effected by the project you have been assigned and, if so, how will you take then into account? What is the ultimate outcome of your project? Who will benefit?
- If you put this project on a resume, would you list it as community "service"? Does the [engineering] community value volunteer work? Why is this important?
- Think of a [engineering] principle that can be applied to help understand a social problem. How does your thought process as a [engineer] affect the way you view social issues? Can social issues affect the way you do science?
- What is the responsibility of a person in this field to address this issue?

"Pre-professional questions are adapted from Decker, R. and Moffat, J. (2000). "Service-learning reflection for engineering: A faculty guide" in Tsang, E. (Ed.). Projects that matter: Concepts and models for service-learning in engineering. Washington, D.C.: AAHE.

School of Mechanical, Aerospace and Civil Engineering
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MACE 62002, Semester 2: 2013/4: Project Managing Humanitarian Aid
Professor Bland Tomkinson

Assessment

INIDIVIDUAL REFLECTIVE REPORT

Your final reflective report may include copies of feedback from the case studies. For <u>every case study</u>, each individual is expected to write 1-2 pages reflecting on what they have learned from the experience, both in terms of generic professional skills and also in terms of aspects of understanding and enabling change towards humanitarian aid. Part of this will be a reflection on the group assignments, your contribution to these and the results fed back by the tutor for that assignment.

Guidance is provided on the topics that should form the basis of your reflective report. These prompt questions are designed to help the process of reflection however each individual should feel free to record their own reflections in whatever manner seems most appropriate.

The individual reflective report is intended to be undertaken as an ongoing, continuous process throughout the course-unit, rather than something only to be addressed at the end of your experience. It records your analysis of the journey you and your team have undergone, what you have learned and how you have proactively addressed issues that have occurred each week. The reflective report is an important part of the learning process as well as the assessment.

Your reflections should be anchored to each of the tasks your team undertakes. Individual reflection should include not only reflection upon the knowledge learned as a result of the exercise or task, and how this could apply to sustainability and enabling change in other contexts, but also the personal and professional skills developed, including the nature and extent of contributions to the group process. Reflection should identify (i) any learning needs at any stage of the process, (ii) the actions taken by the team or individual to remedy those needs and (iii) evaluation of the outcome of those actions.

Summary of Reflective Report Assessment Criteria

The five reflective report assessment criteria are:

- Completeness and presentation of report and quality of reflective practice
- Demonstrating comprehension of underlying learning points
- Demonstrating development of self-directed learning skills *(analysing problems, researching literature, evaluating sources, critical appraisal of information, accurate referencing)*
- Awareness of and contribution to development of the team dynamics
- Awareness and development of effective team processes

INDIVIDUAL REFLECTIVE REPORT – STRUCTURE AND PROMPTS

You should start drafting your reflective report by Week 3 at the latest. You should reflect on your experiences and observations and make notes on a weekly basis. This process will help you to develop your abilities and provide you with the initial framework for the Reflective Report.

The process of reflection should you lead to set out what actions you aim undertake as a result of your learning in relation to, for example, the management of the task or team communication. You may wish to reflect upon the supplementary exercises as well as the principal tasks.

REFLECTIVE REPORT STRUCTURE (5000 Words Maximum)

Your Reflective Report must include the following components. (The word limit is 5000 words.)

A short introductory paragraph, setting the scene, explaining why you chose the course-unit and what you hoped to achieve from it (100-300 words).

Your reflections about your experiences undertaking each task. Guidance is given below on the topics that should form the basis of the reflective report. These, in general, will promote reflection on what has been learned from the experience and how your abilities have developed, both in terms of dealing with problems in the context of humanitarian aid and also in terms of professional skills. You should also refer to the assessment criteria in Appendix 'A'. Each individual, for each exercise, is expected to write 500 to 1000 words.

A final conclusion (500 to 1000 words), developed from but not merely repeating your reflections on each task and each discussion. This should explore questions as described in the reflective writing prompts.

PROMPT QUESTIONS

The following list provides examples of questions you might ask yourself as a basis for reflection. Do not restrict yourself to considering only these questions - include others. Reflections should ideally flow from events you experience rather than from a pre-determined model.

Generic Questions

What went well? Why was this? What didn't go well? Why was this?
What have I learned about humanitarian aid from working on this task that would be relevant in a wider context or to other specific situations?
What have I learned about enabling change and about overcoming barriers to change from working on this task?
What have I learned about myself and my skills from working on this task?
What have I learned about working as part of a team with other people?
What have I learned about methods for efficient and effective group-working, communication and problem solving?
What specific things have I learned about literature research and critical analysis of information sources?
ACTION POINTS: What, with hindsight, could I have done differently? What specific actions will I aim to undertake in future as a result of reflecting on my experiences during this task? What was the outcome of implementing my previous action points?

Introduction: *100-300 words*

- How would you describe yourself in 1 or 2 sentences?
- Why did you choose this course unit? What did you hope to achieve?
- What were your preconceptions about teamwork and humanitarian aid?

Task 0: c*500 words*

This is your first experience of working in this team, so you will be getting to know each other as well as learning to apply this learning approach, supported by a facilitator.

- What did I learn about forming a new team?
- How much did I contribute to the discussions in general?
- How useful was my contribution to the progress of the task?
- Did I: Provide factual information? Ask questions? Offer advice? Try to keep the group in harmony?
- What did I learn about finding appropriate information?

Task 1: *500-1000 words*

You may well have been assigned to a new team for this task, so you will be getting to know each other as well as developing the skills learned in the previous week.

- What did I learn about the new team?
- How much did I contribute to the discussions in general?
- What was my contribution to the task and how useful was it?
- What was my reaction to the feedback to Task 1 and what did I learn from it?

Task 2*: 500-1000 words*

By now the group should be getting into its stride and building upon the previous exercise. You are now ready to tackle a more complex problem, making use of your experience and lessons learned in the first task to improve your performance in this task. Pick up any more ideas about how the group works and also to reflect on how these will affect the way that you tackle issues in the future, and in your future professional career.

- What did I learn about how to support successful team-working?
- How might I act differently in future to be more effective?
- What did I learn from discussing co-operative problem solving?
- What was my reaction to the feedback to Task 2 and what did I learn from it?

Task 3*: 500-1000 words*

By now the group should be comfortable with working together and have begun to understand individual strengths and use these to the best advantage. You will now have received feedback for the first two tasks, so it would be of benefit now to consider how the feedback has promoted the development of your abilities.

- What has changed in the way that I now approach the tasks that is different from the way I approached the task at the beginning of this unit? How do I use the feedback from the previous task to inform my future work?
- How do I now plan my work and the team's work to promote collaboration within the team and enhance individual contributions?
- What was my reaction to the feedback to Task 3 and what did I learn from it?
- How prepared do I feel to undertake the final task without the support of a Facilitator?

Task 4: *500-1000 words*

In this final scenario you will have had the pressure of knowing that your group report counts more significantly towards your results and that you are relying on the contributions of your colleagues. You will also have faced the challenge of tackling an ill-defined problem.

- How has working in a multi-disciplinary team affected my view of problem-solving? What have I learned about working with individuals from other disciplines?
- How do I feel about the contributions that I have made to the group process and team dynamics?
- Looking back over the whole course-unit, how do I think that my knowledge and skills have developed? Where are my weak points? What am I going to do about them?
- What have I learned in terms of knowledge, skills, techniques or perceptions that may be of use in my future professional career?
- How has my understanding of processes of change and project management, towards humanitarian aid, developed over the course of this unit?

Conclusion*: 500-1000 words*

A final conclusion, developed from but not merely repeating your reflections on each task and each discussion. This should explore questions such as the following:

- How have your own abilities and professional skills developed and how do you intend to further build on these skills in the future?
- What have you learned about enabling change and humanitarian aid that could be applied to other situations or projects?
- How has your perception of project management changed as a result of considering this in a humanitarian context?
- What have you learned about how to research and critically analyse literature sources and practical problem solving?
- What have you learned about working in a team with people with different personalities, from different backgrounds and different academic disciplines?
- What are the key lessons you have learned during your experience in this course-unit; from your team, your tasks, your own contributions and feedback given? How do you intend to apply these lessons in your future endeavours?

Possible Rubric for Assessing Reflections on Fuzzy Problem Solving

Level 1

Offers a superficial definition of the problem or no definition at all.

Brings only a few of the relevant concepts and principles into the problem-solving process.

Presents only two alternative problem solutions, one or both of which is not credible or does not address many aspects of the problem.

Provides a superficial assessment of the alternative solution or uses too few or inappropriate (not that important/relevant) criteria to assess them.

Describes one's analysis and decision-making through the experience, but gives little or no evaluation/critique.

Level 2

Offers a credible definition of the problem but one that fails to capture all aspects of the situation.

Brings most of the relevant concepts and principles into the problem-solving process.

Presents more than two alternative problem solutions, some which are credible and address many aspects of the problem.

Provides a fair assessment of the alternative solutions, but leaves out one or two important/ relevant criteria.

Provides a limited/partial evaluation/critique of one's analysis and decision-making through the experience.

Level 3

Offers a credible definition of the problem that captures all or almost all aspects of the situation.

Brings all or almost all the relevant concepts and principles into the problem-solving process.

Presents several credible alternative solutions to the problem that address most or almost all aspects of the problem.

Provides a fair and nuanced assessment of the alternative solutions on all the most important/ relevant criteria.

Provides a cogent evaluation of one's analysis and decision-making through the experience.

Writing Objective Test Items That Assess Thinking Skills

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Learning Outcomes for You

- Prepare students for a test in the most helpful way
- Identify the types of objective items that can assess lower- and higher-level thinking
- Distinguish between multiple choice and multiple true-false items

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- Define and explain the advantages of multiple true-false items
- Compose cleanly designed matching, multiple choice, and multiple true-false items that can distinguish the knowledgeable from the poorly prepared students
- Compose matching items that can assess higher-level thinking

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- Explain what stimulus-based items are
- Compose stimulus-based multiple choice and multiple true-false items that can efficiently assess higher-level thinking
- Select from a wide variety of stimuli to compose these items

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Assessments should *mirror* outcomes.

Outcome   **Assessment**

If you want your students to be able to do X, Y, & Z, assess them doing X, Y, & Z.

To prepare students for a test, tell them what they will have to be able to *do/demonstrate* on the test (your "micro" learning outcomes).

- Use "active" verbs.
- Avoid internal states you cannot observe ("know," "feel," "understand," "appreciate").

Types of Objective Items

- Fill-in-the-Blank/Completion
- True/False
- Matching
- Multiple Choice
- Multiple True/False

Most types of objective items can *require* and *assess* these higher-level thinking skills*:*

- Interpretation
- Generalization
- Inference
- Problem solving
- Conclusion drawing

- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Fill-in-the-Blank/Completion

- Focus on memorization (which you may want)
- Too many options possible for computer scoring
- Good for foreign languages and math (can't work backwards)

True/False

- Focus on memorization, trivia
- Encourages guessing (50/50 chance)
- Good to have students correct F statements, but then grading corrections takes time
- Can assess higher-level thinking **IF** "stimulus-based" (defined later)

Matching Items

Homogenous items within set–every option plausible for every item in list

- *"Match each theory with its originator"*
- *Cause with effect*
- *Definition with term*
- *Achievement or work with person or author*
- *Foreign word with translation*

- *Symbol with concept*
- *Organ/equipment/tool/apparatus with use or function*
- *Pictures of objects with names*
- *Labeled parts in a picture with function*
- *Processes, sequences* (less known and used)

To assess higher-order thinking:

–*Causes with* likely effects
–*Concepts with* new examples *of them*
–New, hypothetical problems *with tools, concepts, or approaches needed to solve them*

Guidelines for Writing Matching Items

- Imperfect match between columns: *"Some options may be used more than once, and others, not at all."*
- Short options *(1-3 words, phrase)*
- Up to 15-17 items, all on one page
- List options logically (alphabetically, chronologically, or numerically).

What two sets of items can you have your students match to assess higher-level thinking in one of your courses?

Guidelines for Writing Multiple Choice Items

- ⊙ Avoid phraseology and distracters that would prevent a knowledgeable student from answering the item correctly.
- ⊙ Avoid giving clues that would help a poorly prepared student answer the item correctly.

More specifically:

- List options logically (alphabetically, chronologically, or numerically).
- Make all distracters plausible, grammatically parallel, and just as long as correct response.
- Create distracters from elements of correct response.

- Use carefully:
  - **_no, not, never, none, except_**
- Use generously (not just when correct):
  - all of the above
  - none of the above

Multiple True/False

- Each option below stem is a T/F item.
- Superior flexible, efficiency, reliability
- Easier and quicker to develop
- More challenge, no process-of-elimination
- Stem must be clear.

To assess higher-order thinking

Compose *stimulus-based* multiple choice or multiple true/false items

= a *series* of items around a new*, realistic *stimulus* that students must interpret or analyze accurately to answer the items correctly.
* *New to the students*

Possible Stimuli

- *Text:* claim, statement, passage, mini-case, quote, report, text-based data set, description of an experiment

- *Graphic:* chart, graph, table, map, picture, model, diagram, drawing, schematic, spreadsheet

These items *require* and *assess* one or more of these higher-level thinking skills:

- Interpretation
- Comprehension
- Generalization
- Application
- Inference
- Analysis
- Problem solving
- Synthesis
- Conclusion drawing
- Evaluation

Guidelines for Writing Stimulus-Based Items

- New stimulus, but students must have **prior practice** in the thinking skills

- Few interlocking items

- Length/complexity of stimulus ≈ **#** MC or MT/F items possible

- Be creative with stimulus! chart, graph, map, picture, diagram, drawing…

- To approach the writing task:
  - Start with your learning outcomes.
  - Choose a (type of) stimulus.
  - Write stem and options.

What kinds of stimuli would work well in your courses?

Strengths and Limitations of Stimulus-Based Items

+ Assess more skills more efficiently than student-generated work

- Can*not* assess abilities to communicate, create, organize, define problems, or conduct research
  - For these outcomes, assess with student-generated work

Simple Item Analysis
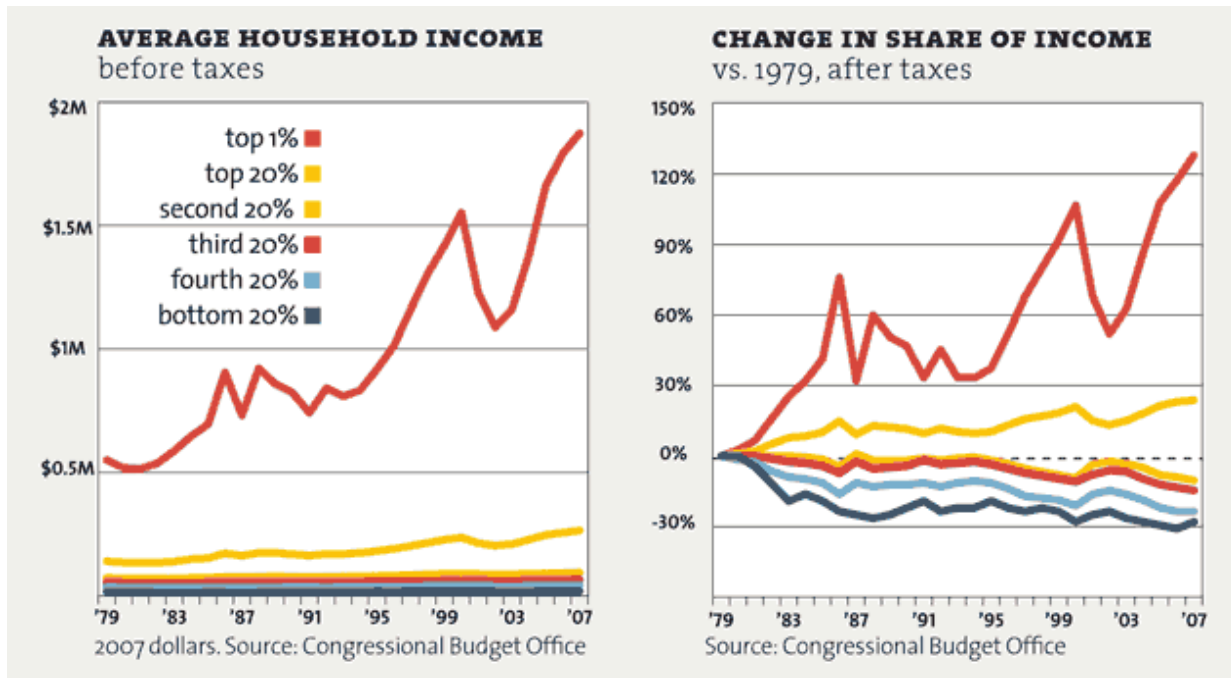
- Best test items are **highly discriminating** and **moderately difficult**.
  - Programs calculate Discrimination Index and Difficulty Index for each item.
- An item is *poor* if:
  - it fails to differentiate among the stronger (more able, better prepared) and weaker students, **and**
  - almost all students get it either right or wrong, especially if the stronger students get it wrong.

Matching Test on Teaching Methods

Match the **defining** descriptor with the teaching method. *Some methods may be used more than once and others, not at all.*

__ Less mature students often dislike the lack of guidance   1. Case Method

__ Practice in factual recall and comprehension only   2. Classroom assessment

__ Teaches team skills   3. Clinicals

__ Known to increase attendance in large classes   4. Cooperative learning

__ Community outreach with reflection   5. Discussion

__ Imitations of real situations with students as acting agents   6. Inquiry-based learning

__ Based on a good story, either real or realistic   7. Interactive lecture

__ Team learning is a highly structured version   8. Problem-based learning

__ Usually conducted in medical or public health settings   9. Recitation

__ Students must conduct independent, out-of-class research   10. Service-learning

__ Relies on questions with multiple respectable answers   11. Simulations

__ Students discover knowledge by pursuing questions   12. Student-peer feedback

__ Relies on brief student activities every 15-20 minutes   13. Writing exercises

__ For feedback to the instructor on student learning

__ Requires "debriefing" at the end

__ Mainstay of the "seminar"

AVERAGE HOUSEHOLD INCOME
before taxes

CHANGE IN SHARE OF INCOME
vs. 1979, after taxes

top 1%
top 20%
second 20%
third 20%
fourth 20%
bottom 20%

2007 dollars. Source: Congressional Budget Office

Source: Congressional Budget Office

The following items are **multiple true/false**. To the left of each statement, put "T" if it is true and "F" if it is false.

Which of the following statements is/are valid conclusions you can draw from the graphs above:

___ 1. From 1979 to 2007, household income inequality increased among the bottom 20%, fourth 20%, and third 20% of the U.S. population.

___ 2. From 1979 to 2007, the change in the share of income dropped for all but the top 1%.

___ 3. In terms of income, both the top 20% and top 1% benefited from the bull market in technology.

___ 4. The graphs supply evidence in support the trickle-down theory that President Reagan espoused.

___ 5. The graphs supply evidence of increasing polarization between the highest-income classes and the rest of society.

___ 6. The graphs supply evidence that the wealth of the bottom 80% dropped from 1979 to 2007.

Which of the following statements is/are valid conclusions you can draw from the graphs above?

___ 7. One graph analyzes income data before taxes and the other after taxes. They show that taxes have the effect of redistributing income from the higher paid to the lower-paid households.

___ 8. Because the share of income dropped for most households, the U.S. economy has less money flowing through the system.

___ 9. The stock market crash of 2000 most lowered the household income of the top 1%.

___ 10. From 1979 to 2007, the sector that lost the largest share of household income was the bottom 20%.

_____

Nations	Birthrate (per 1000 females)	Infant Mortality Rate (per 1000 births)
Uganda	51	104
Somalia	50	122
Angola	47	137
Cambodia	46	112
Ethiopia	46	110
Pakistan	40	109
Canada	14	6.8
France	13	6.7
Denmark	13	6.6
Italy	10	8.3
Germany	10	5.9
Japan	10	4.4

Source: Information Please Almanac, 2006

The item below is a multiple true-false item. If the statement is true, put "T" for "True" in the blank space next to the number of the item. If the statement is false, put "F" for "False."

Which is a valid generalization based on the information in the table?

___1. In developing nations, the infant mortality rate decreases as the birthrate increases.

___2. Industrialized nations have lower birthrates and infant mortality rates than developing nations.

___3. Decreasing the infant mortality rate will limit population growth in developing nations.

___4. Industrialized nations have higher population densities than developing nations.

___5. Developing nations have ten times the infant mortality of industrialized nations.

___6. The lowest birthrates are found in Western Europe.

___7. The highest infant mortality rates are found in Latin America.

Political Science/History

The task of economic policy is to create a prosperous America. The unfinished task of prosperous Americans is to build a Great Society. Our accomplishments have been many; these tasks remain unfinished:

- to achieve full employment without inflation;
- to restore external equilibrium and defend the dollar;
- to enhance the efficiency and flexibility of our private and public economies;
- to widen the benefits of prosperity;
- to improve the quality of American life

-- Lyndon B. Johnson

Former President Lyndon felt that the most important first step in the war against poverty is

○ full employment

○ a sound dollar

○ private and public economics

○ our natural defense

○ efficiency in government

The speech implies that America's prosperity

○ is threatened

○ is at its peak

○ must be retained

○ must be broadened

○ threatened Johnson's war against poverty

Distribution of Expenses for Sales of
$240,000 Ace Manufacturing Company

Raw
Materials
$33\frac{1}{3}\%$

Net
Profit
$6\frac{2}{3}\%$

Labor
40%

Operating
Expenses
20%
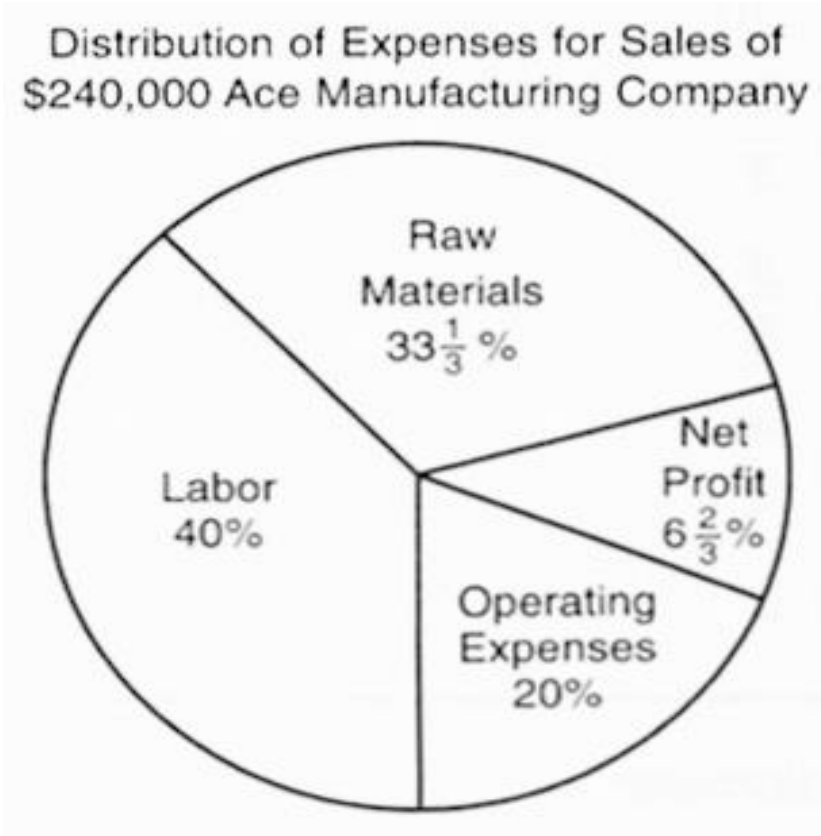
How many dollars were spent for labor?

○ $4,800

○ $9,600

○ $48,000

○ $96,000

○ $960,000

How many dollars were spent for Operating Expenses?

○ $4,800

○ $9,600

○ $48,000

○ $96,000   ○ $960,000

BARTER

by Sara Teasdale

Life has loveliness to sell --

All beautiful and splendid things,

Blue waves whitened on a cliff,

Climbing fire that sways and sings,

(5) And children's faces looking up

Holding wonder like a cup.

Life has loveliness to sell—

Music like a curve of gold.

Scent of pine trees in the rain,

(10) Eyes that love you, arms that hold,

And for your spirit's still delight,

Holy thoughts that star the night.

Spend all you have for loveliness,

Buy it and never count the cost.

(15) For one white singing hour of peace

Count many a year of strife well lost,

And for a breath of ecstasy

Give all you have been or could be.

The main idea of the poem is to urge us

○ to be cautious in life

○ to avoid strife

○ to despise the ugly part of life

○ to enjoy life's treasures

○ not to become involved

The beauty of nature is indicated in line

○ 3 ○ 6 ○ 10 ○ 12 ○ 16

There is a simile (comparison) in line

○ 2 ○ 4 ○ 8 ○ 10 ○ 16

The poet includes the spiritual in life with the words

○ "climbing fire"

○ "children's faces"

○ "arms that hold"

○ "holy thoughts"

○ "year of strife"

The word barter means exchange by trade without money. In the poem the exchange is

○ personal commitment for life's beauty

○ years of strife for brief ecstasy

○ spirit's delight for peace

○ children's faces for wonder

○ music for a curve of gold

Management Decision Making/Decision Science

A company has identified criteria C1, C2, and C3 playing a role in the final decision, with a respective weight of 1, 2, and 3. Moreover, it has identified three prospective providers--A, B, and C--whose offer may constitute a good solution. The information is laid out in the two histograms below, where the data sources are the *ratings* and *scores* of evaluated solutions.

WEIGHTS:

W1 = 1
W2 = 2
W3 = 3

SOLUTION RATINGS   SOLUTION SCORES
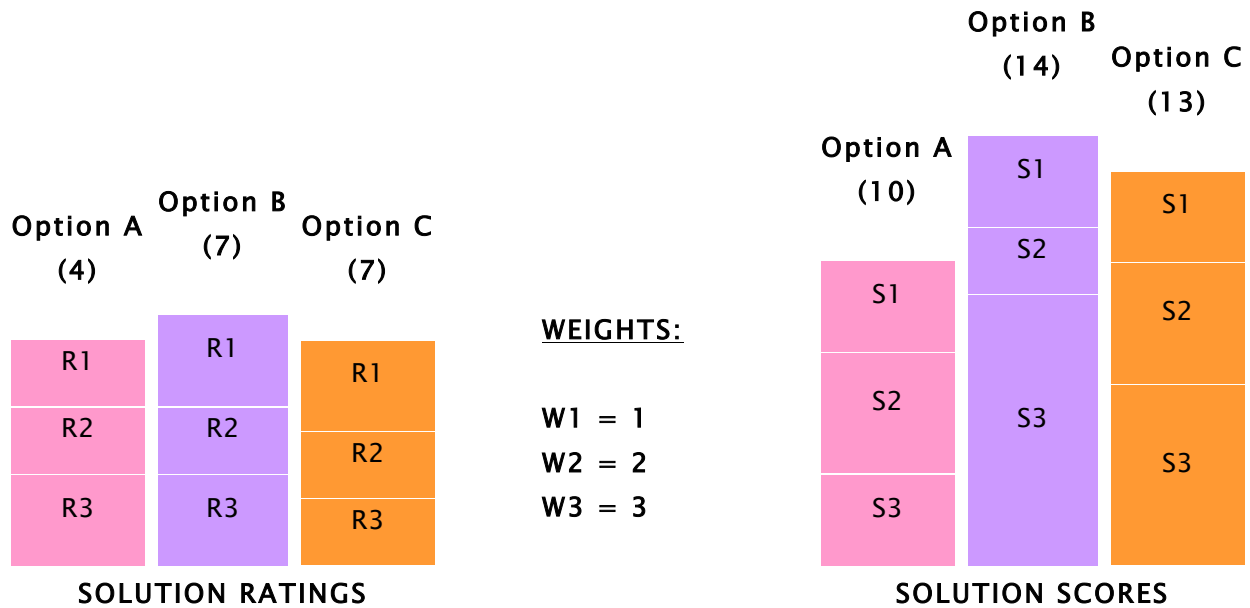
A valid generalization you can draw from the data in the histograms is:

¤ Solutions A and B are equivalent and outperform solution C.

¤ Solutions B and C are equivalent and outperform solution A.

¤ Solutions A and C are equivalent and outperform solution B.

¤ All the solutions are equivalent to one another.

¤ None of the above.

Another valid generalization you can draw from the data in the histograms is:

¤ Solution A is better than Solutions B and C on the criterion C3 but is weaker on C2.

¤ Solution B is better than Solution C on the criterion C3 but is weaker on C2.

¤ Solution B distributes its forces more evenly that do Solutions A and C.

¤ Solution C is better on criterion C3 that it is on criteria C1 and C2.

The "best-of-breed" solution is:

¤ Solution A

¤ Solution B

¤ Solution C

¤ No solution in the histogram qualifies as "best-of-breed"

The "suite" or "integrated solution" is:

¤ Solution A

¤ Solution B

¤ Solution C

¤ No solution in the histogram qualifies as the "suite" or "integrated solution."

Earth Sciences

Humidity is the amount of water vapor in the air at a given time. At warm temperatures, air can hold more moisture than it can at cold temperatures. Relative humidity is the amount of vapor the air is holding expressed as a percentage of the amount the air is capable of holding. For example, at 86 degrees Fahrenheit, air can hold a maximum of 30.4 grams of water per cubic meter. If the air at the same temperature is holding only 15.2 grams of water, the relative humidity is 50 percent. At the point at which the air becomes saturated (exceeds the level of water vapor it can hold), it releases water vapor in the form of dew or condensation.

If the air at 75 degrees is holding the maximum amount of moisture that it can, and the temperature suddenly drops to 60 degrees, what is likely to be the result?

○ The humidity will remain unchanged.

○ The relative humidity will decrease.

○ Precipitation will be released in the form of rain.

○ Precipitation will be released in the form of hail.

○ Precipitation will be released in the form of snow.

During subfreezing days in many parts of the country, the indoor relative humidity decreases when homes are heated. Furniture and skin dry out, and static electricity increases. For health reasons, doctors recommend the use of humidifiers. Which of the following best explains the lack of humidity in the air indoors?

○ The amount of water vapor in the air goes down.

○ The water vapor in the air evaporates.

○ The humidity in winter is lower.

○ The cold temperatures prevent humidity.

○ Dry air can only occur in warm air.

Statistics

Two researchers were studying the relationship between amount of sleep each night and calories burned on an exercise bike for 42 men and women. They were interested if people who slept more had more energy to use during their exercise session. They obtained a correlation of .28, which has a two-tailed probability of .08. Alpha was .10.

 1. Which is an example of a properly written research question?

   a.   Is there a relationship between amount of sleep and energy expanded?*

   b.   Does amount of sleep correlate with energy used?

   c.   What is the cause of energy expanded?

   d.   What is the value of rho?

2. What is the correct term for the variable amount of sleep?

a.   Dependent

b.   Independent *

c.   Predictor

d. y

3. What is the correct statistical null hypothesis?

a.   There is no correlation between sleep and energy expanded

b.   Rho equals zero*

c.   R equals zero

d.   Rho equals r

4. What conclusions should you draw regarding the null hypothesis?

a.   Reject*

b.   Accept

c.   Cannot determine without more information

5. What conclusions should you draw regarding this study?

a.   The correlation was significant

b.   The correlation was not significant

c.   A small relationship exists*

d.   No relationship exists

Biology

One day you meet a student watching a wasp drag a paralyzed grasshopper down a small hole in the ground. When asked what he is doing he replies, "I'm watching that wasp store paralyzed grasshoppers in her nest to feed her offspring."

1. Which of the following is the best description of his reply?

a.   He is not a careful observer.

b.   He is stating a conclusion only partly derived from his observation.*

c.   He is stating a conclusion entirely drawn from his observation.

d.   He is making no assumptions.

2. Which of the following additional observations would add the most strength to the student's reply in Question 1?

a.   Observing the wasp digging a similar hole.

b.   Observing the wasp dragging more grasshoppers into the hole. C.

c.   Digging into the hole and observing wasp eggs on the paralyzed grasshopper.*

d.   Observing adult wasps emerging from the hole a month later.

3. Both of you wait until the wasp leaves the area, then you dig into the hole and observe three paralyzed grasshoppers, each with a white egg on its side. The student states that this evidence supports his reply in Question 1. Which of the following assumptions is he making?

a.   The eggs are grasshopper eggs.

b.   The wasp laid the eggs.*

c.   The wasp dug the hole.

d.   The wasp will return with another grasshopper.

4. You take the white eggs to the biology laboratory. Ten days later immature wasps hatched from the eggs. The student states that this evidence supports his reply in Question 1. Which of the following assumptions is he making?

a.   The wasp dug the hole.

b.   The wasp stung the grasshoppers.

c.   The grasshoppers were dead.

d.   Paralyzed grasshoppers cannot lay eggs.*

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