Closing the Loop: Connecting learning goals to assessment.


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Workshop Learning Goals:

After this workshop you should be able to …

1. Use guidelines provided to justify & construct learning goals.
2. Apply a three-part framework to build assessments that explicitly target goals.
3. Discuss implementation of assessment and feedback.
4. Constructively critique your (and peers') goals & assessments.

How many already use learning goals?

Workshop activities:

Some presentation … lots of practicing

1. Introduction: characteristics of useful learning goals.
2. Practice writing them.
3. Consider characteristics of assessments that work.
4. Discuss implementation, evidence and measurement.

Practice and collaborate in working groups

⇒ No substitute for discussion with peers & iteration.

⇒ General & small group discussion, and revisions.

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Activity 1: Brainstorming

- Write a few characteristics of learning goals that will make them useful to:
  - Students
  - Instructors

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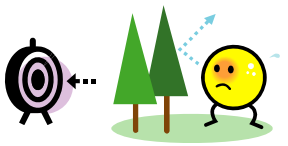
Goals at any level should emphasize students

- **Students** must do their *own* learning;
  We can not do the learning for them.
- Goals that will help students learn must focus on **what students do**, not instructors or content.
- Think:
  - *"How will students demonstrate achievement?"*
  - *"What should students remember 2-5 years on?"*

Are all your goals visible?

- Students miss important information if they are NOT explicitly looking for it.
- *Hidden* goals do not help students learn.
- As experts, we often forget what we did not know.

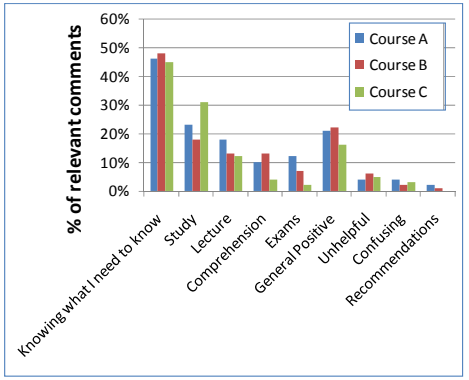


Context for learning goals:

- **Course level**: most useful for …
  - Defining the course (curriculum, Dep't, external…)
  - Students making choices
  - Helping with design of module goals
- **Lesson** or **module level**: benefits to
  - Students:
    Define what they should be learning, why, and how well.
  - Instructor:
    To better define, guide, check and transfer your teaching.

Why students like them:

- Example from *Simon etal* http://www.cwsei.ubc.ca/resources/learn_goals.htm
- 597 student responses from 3 classes
  - **Courses A & B**:
    - computing literacy.
  - **Course C**:
    - upper-level microbiology.



Topic-level learning goals

Check-list for creating topic-level learning goals (in handout)

1. Does the goal use a verb that clarifies what students will be able to *DO*?
2. Is terminology familiar/common? If not, is terminology a goal?
3. Is each goal unique and independent?
4. Are relevant contexts clear?
5. Is the Bloom's level aligned with your expectations for students' learning?
   - Eg: if you expect reasoning for "why", does the goal convey that?
   - Could you expect a higher level goal?
6. Is expected student performance evident?
7. Is it clear how achievement would be tested?
8. Are all goals visible? i.e. there should be no "hidden" goals.

Not every goal can achieve the following, but it is better if you can:

9. Is it clearly relevant and useful to students? (e.g. connected to their everyday life), or does it represent a useful application of ideas?

Developing learning goals

1. Exams → goals
   - Start with old exam questions
   - Investigate content details
   - Generate learning goals; Iterate ….
2. Topics → goals *(probably most common)*
   - Start with old topic lists
   - Generate learning goal equivalents
   - Consider assessments (followed by active learning)
   - Iterate ….

Activity 2: Example from EOS

- Course – EOSC 111 Introduction to Earth and Ocean Sciences
- Course Level Goal:

Bad: *"Learn how geoscientists use data."*

Make it better? …

Make interpretations and draw conclusions based on observations and evidence in an Earth System Science context

Activity 2: Example from EOS

- Course – EOSC 111 Introduction to Earth and Ocean Sciences
- Lab Level Goal:

Bad: "Understand how ground affects safety in earthquake prone regions".

Make it better:

Compare the benefits and drawbacks of buildings built on different types of ground in an earthquake prone region.

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Activity 3: Think/Pair/Share

Theoretically we should do some work now ….
But … 90 minutes is a short workshop!

- For one minute, list characteristics that you think make an effective assessment

- Pair up with a partner and discuss your thoughts

- Share with the larger group

Assessment fundamentals

- Clarity of purpose and meaning.
- Good assessments depend on clear learning goals
- Frameworks; as you develop assessments, consider aspects of the following:
  - ☑ 1. Conditions that support student learning
  - ☑ 2. Bloom's taxonomy
  - ☑ 3. Three learning domains

☑ 1. Conditions Under Which Assessment Supports Student Learning

Gibbs & Simpson; 2-pg. handout

Key points:

- From students' point of view …
  - What's important, feedback, marked assignments
- Marked assignments vs exams:
  - Assig. scores predict long term retention better than exams.
- Assess tasks related to learning goals
  - Time on task, frequent, appropriate forms of study/effort
- Clarity is key (tasks, how to learn, rubrics)
- Focus on Feedback!
  - Frequent, timely, focus upon performance & learning, be specific & detailed, assign student follow-up tasks.

☑ 2. Blooms Taxonomy of Learning

1. Factual Knowledge: remember and recall factual information
2. Comprehension: demonstrate understanding of ideas, concepts
3. Application: apply comprehension to unfamiliar situations
4. Analysis: break down concepts into parts
5. Synthesis: transform, combine ideas to create something new
6. Evaluation: think critically about and defend a position

See the handouts
also Google – many resources.

☑ 2. Blooms Taxonomy of Learning

1. Factual Knowledge: remember and recall factual information
   Define, List, State, Label, Name, Describe
2. Comprehension: demonstrate understanding of ideas, concepts
   Describe, Explain, Summarize, Interpret, Illustrate
3. Application: apply comprehension to unfamiliar situations
   Apply, Demonstrate, Use, Compute, Solve, Predict, Construct, Modify
4. Analysis: break down concepts into parts
   Compare, Contrast, Categorize, Distinguish, Identify, Infer
5. Synthesis: transform, combine ideas to create something new
   Develop, Create, Propose, Formulate, Design, Invent
6. Evaluation: think critically about and defend a position
   Judge, Appraise, Recommend, Justify, Defend, Criticize, Evaluate

These levels expect deeper conceptual understanding

Activity 4: More Examples from EOSC 111

Course level goal: Make interpretations and draw conclusions about Earth systems using observations and analyses.

Topic goal: Approximate the location of an earthquake using seismograph data provided, and consider possible errors.

Are question levels Low? Moderate? High? Cognitive? Skill?

1. Given three seismograms and their locations, estimate the location of the earthquake's epicentre.
   Low level, (cognitive & skill)
2. What is a reasonable way to "pick" the epicentre location IF your distance circles do not intersect exactly?
   Moderate level; (cognitive → implications)
3. If you only had two seismometers, could you determine the location of the epicentre? Explain.
   Higher level; (cognitive "what if …")

120mins

☑ 3. Three learning domains
Each question sends a message to students:

1. **Content Goal:**
   - Does the question test an essential aspect of the material?
   - Is it aligned with your learning goal?

   Defines students focus … what they think your goals are.
2. **Cognitive Goal:**
   - How do students use the content to arrive at the answer?
   - What does it mean to learn or "do" this subject?
   - What are the cognitive processes involved?
   - Are they comparing and contrasting phenomena, ranking, classifying, or performing a mathematical manipulation?
3. **Metacognitive Goal:**
   - Are students examining their own thinking?

Hidden? Implicit?

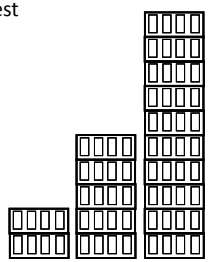
20

Activity 4 Example: Content? Cognitive? Metacog?

Goal: Compare how different sizes of buildings react during an earthquake

- If each of these buildings were shaking at their fundamental frequency (how fast they tend to shake back and forth), which building would shake back and forth most rapidly (highest frequency)?

A) The 2 story building
B) The 10 story building
C) They would all shake the same
D) It depends on the distance from the Earthquake
E) There is not enough information



Activity 4 Example: Content? Cognitive? Metacog?

Assessment (during the last few minutes of class)

- Without looking at your notes or from other sources, please explain what you consider to be the central issue that this lesson examined.

Activity 4 Example: Content? Cognitive? Metacog?

- I will identify five different topics. Please use the following scale as you answer.

1 = I can easily explain this concept to someone else

2 = I am quite sure I can explain this concept to someone else

3 = I can explain parts of this concept, but probably not everything

4 = I am quite sure I cannot explain this concept to someone else

5 = I cannot explain this concept to someone else

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Implementing assessments
Not just exams …

- **In class is important – why?**
  - Active learning
  - Rapid feedback for students AND instructors

- **Who has experience with**
  - in-class active assessments?
  - Tutored labs / recitations?
  - Team / group work?

Just in Time Teaching and **Peer Instruction**
(Eric Mazur, Harvard)
http://www.youtube.com/watch?v=IBYrKPoVFwg&NR=1

Implementing assessments

What are some options? (Any can be solo / pairs / group work.)

- Clickers
- Coloured cards to raise (multiple choice questions)
- 1 minute papers
- Team work with "instant" deliverables to enable compare & discuss
- Pre-test quizzes (solo and/or groups)
- Pre-test + Post-test. Fosters curiosity. Enables engagement.
- Google "*Classroom Assessment Techniques*" & "*Angelo and Cross*" for lots of simple formative assessments

Many options. Faculty teaching support are there to help with ideas.

Measurement

- How to **measure** & **evaluate** students' work?
  What **evidence** do we use?
  - What are we comparing their products against?
  - What is the criteria for success?
  - Is the measurement obvious from the learning goals?
- For short assessments these may be simple questions (or they may be formative).
- For larger assessments a rubric may be needed.

Activity 5 Your Assessments

- Specify a goal from a course you teach.
- Write 2 questions that determine if students have achieved that goal.

Guidelines to keep in mind:

- Student perspective; - Learning domains;
- Clarity of purpose; - What will students do?

Avoid rote memorization:

Try writing different styles of questions. Eg …

- "*Troubleshooting*" (what could cause a given change?)
- "*Redesign* … in order to … "
- "*Compare and contrast* …"
- other scenarios

Activity 5 Your Assessments

Compare assessments at your table.

- What level are your goals?
- What type of knowledge are you assessing?
- What else do you notice?
- What seems to need discussion with peers?

Summary

- One **key idea we covered** in this workshop was …
  Please list the idea & explain what you believe it means.
- One **new idea you will use** from this workshop was …
  List the idea & explain how you might use it.
- One **important question** I have about this workshop …

Questions ….

Homework ☺

- Refine the learning goals for your course.
- Try a range of assessments
- Use checklists and frameworks to optimize.

- Many reputable sources of resources.
- At UBC:

EOS-SEI	http://www.eos.ubc.ca/research/cwsei/
CWSEI	http://www.cwsei.ubc.ca/
TAG	http://www.tag.ubc.ca/