Transparent Teaching: Clarifying Expectations in STEM

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Outcomes: By the end of this session, participants will be able to…

- identify the basics of transparent teaching
- understand the importance of clear learning outcomes and logical assignment design
- plan ways to implement transparent teaching in your STEM classroom

Equity vs. Equality in Education

Equality of access to education does not necessitate equity of experience.

In a study of first-year persistence in STEM programs at the University of Indiana, groups with lower rates of retention identified as female, underrepresented minority, and first generation. These students were also less likely to have completed calculus in high school. (Beginning College Survey of Student Engagement, http://cpr.indiana.edu/uploads/AACU%20STEM2.pdf)

When teaching a course, who are we teaching to? Are we teaching to only the students best prepared for success when entering the classroom? And how can we provide opportunity for all students to be successful in the same class?

Prior Knowledge

One way to proactively begin to assess this educational gap in your classroom is by evaluating prior knowledge.

Prior knowledge describes the educational knowledge, skills, beliefs, and attitudes that a student has upon entering the classroom. These will influence how students interpret and organize new information, and resultantly impact their ability to remember, think, and apply content from a course.

College curriculum is reliant on scaffolding of principles on top of existing knowledge, so the development of a strong framework early-on will best prime students for longitudinal success in their degree.

Evaluating Prior Knowledge

- **Concept Inventories** - multiple choice or short answer tests that target fundamental concepts within a domain.
- **Concept Maps** - these reveal the underlying structure or organization of students knowledge of a concept or constellation of concepts.
- **Self-Assessment Probes** - indirect methods of assessment that ask students to reflect and comment on their level of knowledge and skill across a range of items. These items can include knowledge and skills that are prerequisites for the course as well as items that will be addressed in the course.

After evaluating the students' entering skill set, time can be spent providing review exercises and addressing misconceptions for one or two classes before diving into the material for the quarter.

Teaching Transparently

Transparent teaching methods help students to consciously understand ***how*** and ***why*** they are learning course content in specific ways.

Transparent assignments include explicit statements on the following:

- **Purpose** - what skills will students practice? What knowledge will students gain?
- **Task** - definitions / instructions for activities; steps, guidelines, mistakes to avoid
- **Criteria for Success** - characteristics of a successful product; real-world examples

Transparent teaching methods that can be incorporated into the classroom include (adapted from *Transparency in Teaching & Learning Higher Ed*):

- Gauging students' understanding during class via peer work that requires application of concepts you've taught
- Engaging students in applying the grading criteria you will use on their work
- Debriefing graded tests and assignments in class

How does Transparent Teaching help?

Studies (e.g., Winkelmes et al., 2016, *AAC&U PeerReview*) show that transparent teaching methods help students by:

- Improving employer-valued skills
- Building academic confidence
- Increasing sense of belonging

Transparent teaching methods may also help instructors evaluate how well existing assignments address stated learning outcomes.

Resources

Additional introductory materials, example assignments, helpful tools for transparent assignment design, and more may be found on the *Transparency in Teaching & Learning Higher Ed* website:

https://tilthighered.com/