Recent Findings: Transparency and Problem-Centered Learning

A 2015 study identified transparent teaching about problem-centered learning as an easily replicable teaching method that produces learning benefits already linked with students’ success (McNair, Finley, Winkelmes et al, *Peer Review*, Winter 2016). This simple, replicable teaching intervention demonstrably enhanced the success of first-generation, low-income and underrepresented college students in multiple ways at statistically significant levels, with a medium-to-large sized magnitude of effect. The results offer implications for how faculty and educational developers can help their institutions to right the inequities in college students’ educational experiences across the country by contributing to efforts to increase underserved students’ success, especially in their first year of college (when the greatest numbers drop out).

In 2014-2015 a group of 7 Minority Serving Institutions launched a pilot project that included 1180 students and 35 faculty. Tia McNair and Ashley Finley at the Association of American Colleges & Universities led the project in partnership with Mary-Ann Winkelmes at the University of Nevada, Las Vegas Transparency in Teaching and Learning in Higher Education Project, with funding from TG Philanthropy. The main research goal was to study how faculty transparency about the design and problem-centered nature of student assignments would affect students’ learning experiences and the quality of students’ work. Faculty received training on how to make two take-home assignments in a course more transparent (accessible) and problem-centered (relevant) for students, and each instructor taught a control group and an intervention group of the same course in the same term. Results were measured via online surveys about students’ learning experiences before and after each course, and direct assessment of students’ work. Students who received more transparency reported gains in three areas that are important predictors of students’ success: academic confidence, sense of belonging, and mastery of the skills that employers value most when hiring. While the benefits for all students in the aggregate who received more transparency were statistically significant and small, the benefits for first-generation, low-income and underrepresented students were significant with a medium-to-large sized magnitude of effect. Important studies have already connected academic confidence and sense of belonging with students’ greater persistence and higher grades (Walton and Cohen 2011, Aronson et al 2002, Paunesku et al 2015), and recent national surveys identify the skills that employers value most when hiring new employees (Hart 2015 and 2013).

End of Term: Skills, Confidence, and Belonging - Less vs. More Transparent Courses

<table>
<thead>
<tr>
<th>First Generation College Students, End of Term</th>
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</thead>
<tbody>
<tr>
<td><strong>Amount of Transparency</strong></td>
</tr>
<tr>
<td><strong>Less Transparent N=246</strong></td>
</tr>
<tr>
<td><strong>More Transparent N=168</strong></td>
</tr>
<tr>
<td><strong>Employer-valued Skills</strong></td>
</tr>
<tr>
<td><strong>Less Transparent N=245</strong></td>
</tr>
<tr>
<td><strong>More Transparent N=168</strong></td>
</tr>
<tr>
<td><strong>Academic Confidence</strong></td>
</tr>
<tr>
<td><strong>Less Transparent N=242</strong></td>
</tr>
<tr>
<td><strong>More Transparent N=183</strong></td>
</tr>
<tr>
<td><strong>Sense of Belonging</strong></td>
</tr>
<tr>
<td><strong>Less Transparent N=246</strong></td>
</tr>
<tr>
<td><strong>More Transparent N=188</strong></td>
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</tbody>
</table>

N: number of students responding


**Less Transparent**: mean perceived transparency < 3.3/4  
**More Transparent**: mean ≥ 3.3/4

Questions: Strategies for best impact from transparent, problem-centered learning

What kinds of courses would help us achieve the greatest impact on underserved students?
- Introductory (large, small)
- Courses with high percentages of D/F grades and Withdrawals?
- Gateway courses for a major
- Majors/Pathways
- General Education

What kinds of networks would help us achieve the greatest impact on underserved students?
- Community Colleges
- Liberal Arts
- Research Intensive
- Regional
- Teaching/Learning Centers at colleges/universities (POD Network)
- STEM Education Centers at colleges/universities (NSEC)
EXAMPLES: Less Transparent

1. Who are the stakeholders and why?

2. What information did you learn from them that is most interesting?

Prepare a 5-10 minute face-to-face interview with an expert in your particular academic discipline/career field. Select an interview with the professional for a one-on-one that is convenient for both of you. Prepare 5-10 questions to ask the professional about their knowledge of a specific academic discipline/career field. Secure an interview with the professional for a one-on-one that is convenient for both of you. Prepare 5-10 questions to ask the professional about their knowledge of a specific academic discipline/career field. Secure an interview with the professional for a one-on-one that is convenient for both of you.

Sample A

Worksheet for Week 9: Sequencing Curves

Example B

At t = 0, the bug was located at x = 0. As the bug moved through the path x = 0 (the first and only time).

The scientist observes the bug's motion and records what he sees.

- At t = 1, the bug was located at x = 0.
- At t = 2, the bug was located at x = 0.
- At t = 3, the bug was located at x = 0.
- At t = 4, the bug was located at x = 0.
- At t = 5, the bug was located at x = 0.

The bug always stays within 5 units of x = 0.

A1. Locate the points where the bug will be at the next time.

- At t = 5, the bug was located at x = 0.
- At t = 6, the bug was located at x = 0.
- At t = 7, the bug was located at x = 0.
- At t = 8, the bug was located at x = 0.
- At t = 9, the bug was located at x = 0.

The bug always stays within 5 units of x = 0.

A2. Set up the slope table for the function given below at the points where the bug will be.

The bug always stays within 5 units of x = 0.

A3. Describe the bug's movement in the table above.

- At t = 1, the bug was located at x = 0.
- At t = 2, the bug was located at x = 0.
- At t = 3, the bug was located at x = 0.
- At t = 4, the bug was located at x = 0.
- At t = 5, the bug was located at x = 0.

The bug always stays within 5 units of x = 0.

A4. Describe the bug's movement in the chart above.

- At t = 1, the bug was located at x = 0.
- At t = 2, the bug was located at x = 0.
- At t = 3, the bug was located at x = 0.
- At t = 4, the bug was located at x = 0.
- At t = 5, the bug was located at x = 0.

The bug always stays within 5 units of x = 0.
Purpose: The purpose of this assignment is to help you analyze a research poster and answer questions about it.

Instructions: After completing this assignment, you will be able to identify and evaluate the evidence presented in a scientific poster. You will also be able to answer questions about the evidence and the conclusions drawn from it.

Task: Read through your sample scientific poster and answer the following questions:

1. Identify the key question(s) that is/are being asked.
2. Identify the evidence that is being used to support the conclusion.
3. Evaluate the evidence presented in the poster. How reliable is the evidence? Is it from peer-reviewed sources?

Criteria for success:

- You will have increased your understanding of how evidence is used in scientific posters.
- You will be able to identify and evaluate the evidence presented in a scientific poster.
- You will be able to answer questions about the evidence and the conclusions drawn from it.

Mary-Ann Winkelmes, Principal Investigator

mary-ann.winkelmes@unlv.edu
## Faculty Comments: gained clarity; domino effect

- “I explain assignments better, because my own clarity on their purposes, tasks and criteria is improved.”
- “I did not want unclear processes or instructions to stand in the way of their sociological imagination.”
- “These students are driven and engaged when they find meaning in their coursework; considering why and how they are learning the content can help them discover a meaning that resonates.”
- “It’s easier to grade the students’ assignments because the expectations are clearer.”
- Students demonstrated “higher completion rates for all their assignments, even the most difficult ones.”
- “This has not only changed how I approach each assignment, but also each class meeting. Incorporating the purpose/task/criteria framework helps me focus on the main goals for each day, which helps students see the purpose of every class session.”
- “I thought, naively as it turned out, that this was an easy fix. The implementation turned out to be much more challenging. … Like many college instructors, my courses had evolved over a number of years with many small changes. This process sent me back for a fundamental re-thinking of each week in the syllabus and what my specific learning goals were.”

## Student Comments: about the instructor -- gratitude

**Professor X was amazing and inspiring. She helped me remember my culture and background with her reading assignments and projects. Her lectures and discussion allowed me to learn about my culture and how I may contribute back to my community. Professor X motivates me to become a proud [institution name] graduate.**

**The professor was wonderful. She had so much knowledge and inspiring information about the topic!**

**He was very helpful and always let us express how we think and never put any of our opinions down.**

**For the first time I felt like I understood Biology a little bit more. Thank you professor X for being a great professor.**

**My Instructor is Great!**

## Student Comments about the course: relevant, challenging, satisfying

**This was a great class. Everything the instructor assigned to this class was very beneficial to my major.**

- **It was a great experience, though difficult. Looking back, I’m glad to be part of it. Because of this program, I took the initiative to help my community based on their need.**
- **I very much enjoyed this course. With the interactive coursework, it was very beneficial to my learning experience.**
- **This was a great class. Everything the instructor assigned to this class was very beneficial to my major.**
- **This is one of the most fulfilling and satisfying course that I have taken. :)**
- **I loved this class! Great professor and great information.**
- **I enjoyed this class immensely …! professor gave great feedback...I am an older student and truly enjoyed the positive feedback!**
- **Thoroughly enjoyed the course, and have been intrigued by how much the information offered mattered.**
- **This was an awesome class. I learned so much.**