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Learning Retention through Glossary Development

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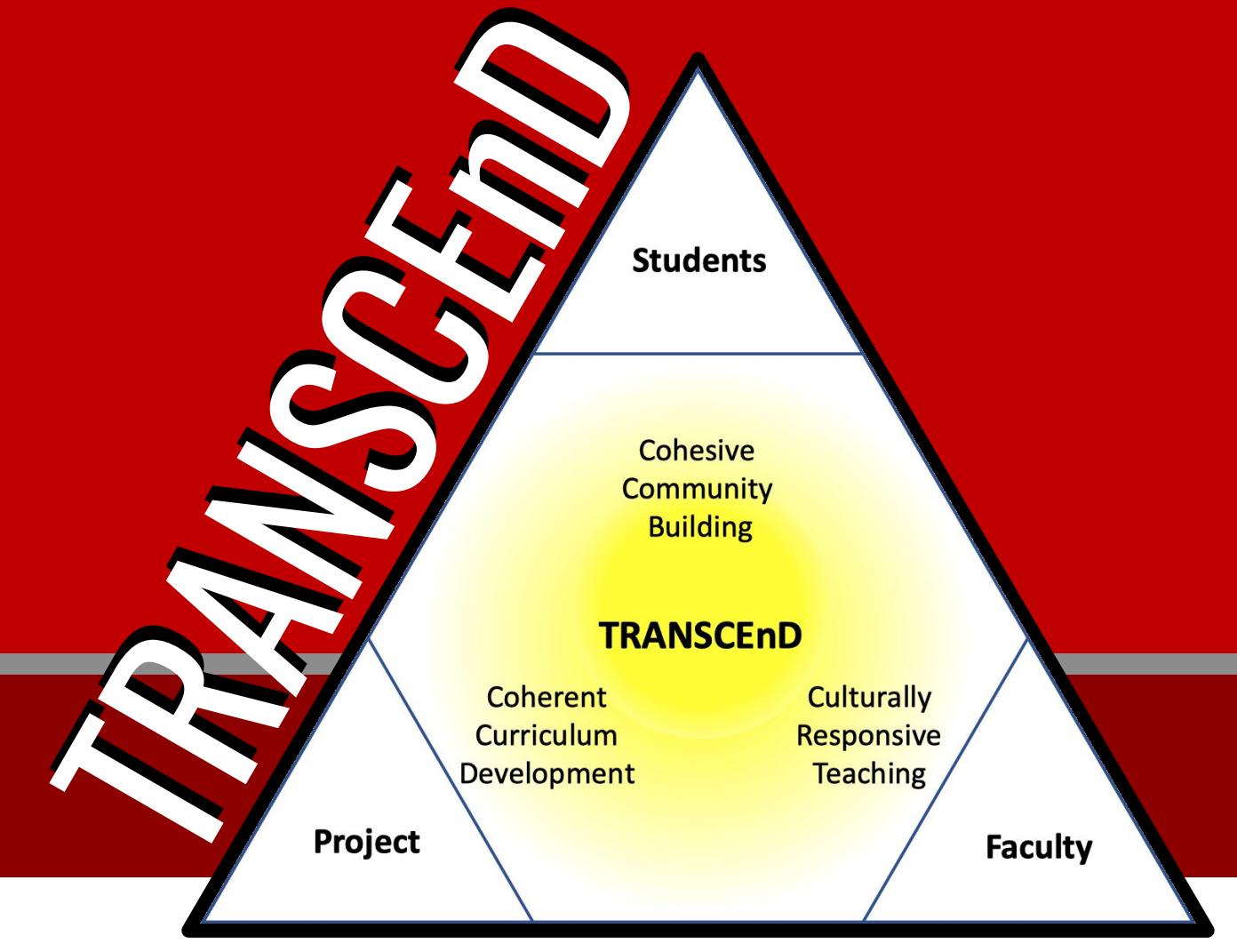
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Learning Retention through Glossary Development

Haroon Stephen, Civil and Environmental Engineering and Construction



Teaching Practice & Need it Addresses

The teaching practice is to engage students in glossary development. It is adopted to increase student learning retention of civil engineering terms. Learning retention is the process of transferring new information into long-term memory. The glossary development provides an opportunity for reflection, practice, and sharing immediately after the lesson. It addresses a need for civil engineering students to retain the technical terms and their definitions needed for comprehension of engineering concepts and contexts. This teaching practice was implemented in two courses during summer and fall 2021. The students (individually) developed a glossary of technical terms over the semester. They were assigned to add definitions to glossary after each lesson. By the end of the semester, the glossary was expected to contain at least 200 definitions for receiving full credit. The benefits of this practice were assessed using a post-semester survey.

CEE 367 – Fluid Mechanics
Instructor: Dr. Haroon Stephen

University of Nevada Las Vegas
Civil and Environmental Engineering

Classwork: Glossary Development (200 points)

Objective: Learning by Design

Develop a glossary to learn course technical terms and definitions

Importance of this Assignment

When learning a new topic, it is important to systematically explore and repeat the common terms. Glossary can help bridge many knowledge gaps and provide an opportunity to organize knowledge.

Criteria for Success

Include at least 5 Fluid Mechanics technical terms with correct definitions from each lesson. Writing more definitions is even better for you. For successful participation, you will attain 200 points towards your homework.

Glossary Terms Submitted by a Student

Lesson 1 (8-23-2021)

Lesson 2 (8-25-2021)

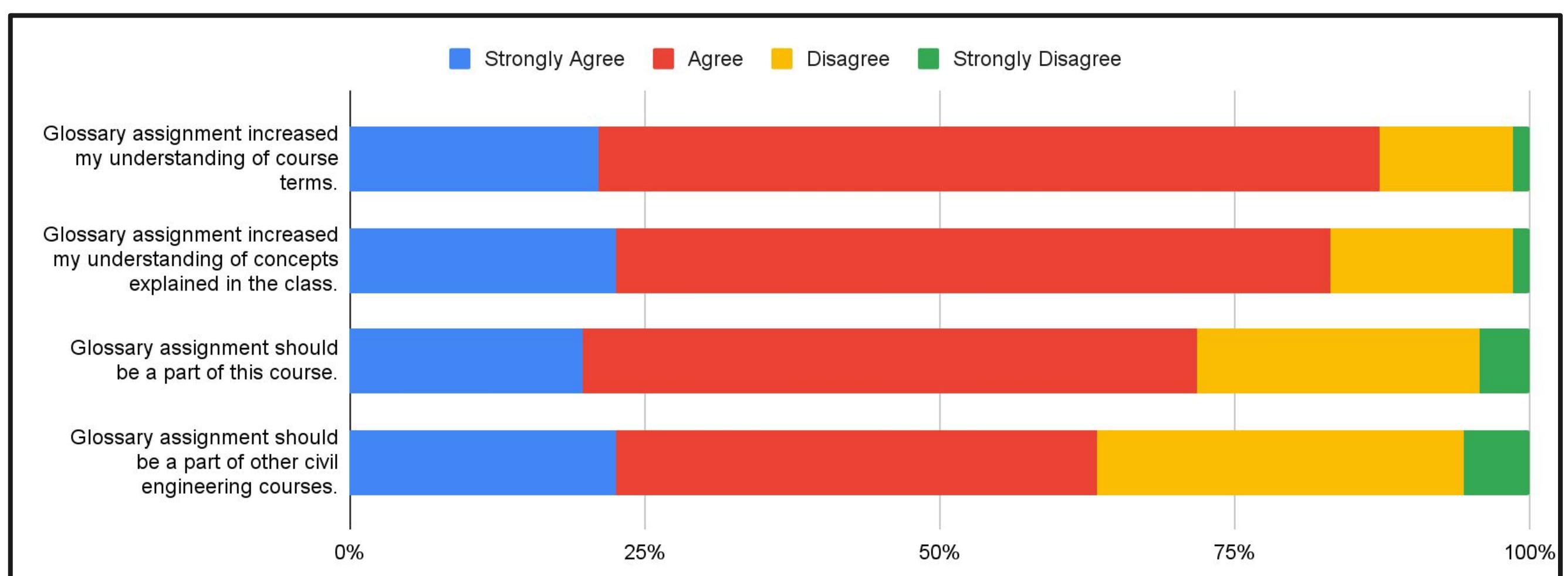
1. **Fluid:** a substance that deforms continuously under shear stress.
2. **Mechanics:** the behavior under the influence of a force/stress.
3. **Fluid Mechanics:** to understand fluid behavior at rest and in motion and use fluids in engineering applications.
4. **Dimensions:** fundamental terms, such as length (L), time (t), mass (M), force (F), temperature (T).
5. **Units:** a derived term, such as velocity (L/t), acceleration (L/t^2). There are different unit systems around the world, such as SI (International System of Units) and USC (US Customary Units).
6. **Appendix A:** the holy bible of this course. This appendix gives us information to work out problems for the class.
7. **Round Off:** the rules for rounding off values. If the value in front of a five is even, round down. If the value is odd, round up. For example, 1,275 > 1,28 and 1,285 > 1,28.
8. **Scientific Notation:** using the power of 10 to round numbers. For example, 12,596 N > 12,596 x 10^4 N.
9. **Engineering Notation:** using the power of 10 to round numbers with units of 3. For example, 12,596 N > 12.596 x 10^3 N or 12,596 kN. For example, 12,596 N > 0.012596 x 10^6 N or 0.012596 MN.
10. **Symbolic Manipulation:** using symbolic notation to solve a problem instead of writing down all of the mathematical values.

Evidence it Benefits Students

The survey responses were received collectively from 71 students out of 90 students enrolled in the two courses. The survey responses revealed that this teaching practice

- increased understanding of the technical terms of 87% of the respondents, and
- increased conceptual understanding of 83% of the respondents.

A 72% of respondents agreed to include this teaching practice in the course and 63% of respondents agreed to include it in other civil engineering courses.



Comment: I like doing glossary assignment because it helps me understand and memorize the concepts. I can easily relate words from one chapter to another.
Comment: The glossary assignment was an interesting assignment, and it might be useful one day in a student's future job or career.
Comment: The glossary assignment helped understand the terminology and what we were learning but at times it is hard to keep up with it. So with it being extra credit, it helps not have as much stress under it.

How Others Can Adopt This Practice

Other instructors can adopt this teaching practice as a graded assignment. The instructor can determine an appropriate number of definitions and terms to be added weekly with a minimum expectation by the end of the semester. In order to ensure consistency, the instructor may provide guidelines for the formatting of the glossary, which can be provided as a template. The instructor may also emphasize the importance of this assignment e.g., to help bridge knowledge gaps and provide an opportunity to organize knowledge.

Resources & Where to Find Them

Example of Glossary Development Homework:
(https://docs.google.com/document/d/1h9pBur_OlnwSPUD-Ba1fu6YiTb4h96tvT0uS0B8PGxA/edit?usp=ssharing)

Example Survey Questionnaire on Canvas Commons:
(<https://lrc.instructure.com/resources/d2294f3bc0d74e3c81d0fa7e8df08468?shared>)

References

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Pollard, J. K. (1999, November). Learning-by-teaching: student generated Web-based Glossary, Dictionary and Quiz of Information Technology terms. In *FIE'99 Frontiers in Education*. 29th Annual Frontiers in Education Conference. Designing the Future of Science and Engineering Education. Conference Proceedings (IEEE Cat. No. 99CH37011 (Vol. 2, pp. 13A4-1). IEEE.

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