TIDeS Student Post-survey

About the TIDeS Student Survey: Informed consent

Please read the following information about this research study and select “I accept” at the bottom of your screen if you consent to participate.

The following survey is a part of a multi-year research study called Teaching with Investigation and Design in Science (TIDeS) funded by the National Science Foundation (NSF). The purposes of this project are (1) support participating faculty in implementing high-quality curricula for the introductory science courses, (2) collect information about participating faculty’s knowledge, beliefs, attitudes and practices of teaching, (3) conduct research about how the newly developed teaching materials impact students’ understanding and performance in the classrooms of their respective faculty. You have been selected to participate in this study because you are enrolled in an introductory science course. This is a research study; the data collected from this survey will be used to assess change in students’ beliefs and attitudes about learning and teaching based on investigation and

design.

This web-based survey will take approximately 15-20 minutes to complete. You must be 18 years or older and enrolled in a university level introductory science, technology, engineering and mathematics (STEM) course to participate in this survey. By choosing to participate you will help expand the knowledge about teaching and learning. Examining how introductory science courses can be centered around design, investigation and inclusive practices will have an impact on generations to come. Thus while we are not able to predict if you will benefit from this study, future teachers and students may benefit from your participation.

Your decision to participate is strictly voluntary, and there are no anticipated risks, physical discomforts, or psychological stresses associated with these research procedures. You may withdraw from participating at any time and to do so you simply close your internet browser. Declining to participate will involve no penalty to you. Pre and post-survey data will be aggregated centrally using Qualtrics, a web-publishing platform that supports collecting data directly from participants through online forms. When you submit a survey, your responses are recorded without any personal identifiers, so your responses are completely anonymous and will remain

confidential. Your responses will not be shared individually with your instructor. Access control and anonymization features will ensure data is stored and used in accordance with institutional IRB requirements. The survey is being sent to approximately 1000 individuals. Data will be stored on a secure server and can only be accessed by the research team.

Reasonable and appropriate safeguards have been used in the creation of the web-based survey to maximize the confidentiality and security of your responses; however, when using information technology, it is never possible to guarantee complete privacy.

You can ask questions about the research by contacting the Principal Investigator, Dr. Anne Egger (Central Washington University, Anne.Egger@cwu.edu, (509) 963-2870). You may also contact the CWU Human Protections Administrator if you have questions about your rights as a participant or if you think you have not been treated fairly. The HSRC office number is (509) 963-3115.

Please select "I accept" if you are 18 years or older and wish to participate.

○ Yes, I accept and agree to participate in this research study

- ○ No, I do not want to participate in this study

What is your Student ID number?
This will be used to match your pre- and post-survey responses and to inform your instructor that you have completed the survey.

Select the institution you are currently enrolled in for which you are completing this survey. *If applicable, please also select the course content area.*

Have you formally declared a college major yet?

- ○ Yes
- ○ No

Please indicate whether you have or intend to declare a major in each of the following areas of study.

	Will not choose	Might choose	Definitely or have chosen
Arts & Humanities	○	○	○
Biological Sciences, Agriculture, & Natural Resources	○	○	○
Business	○	○	○
Communications, Media, & Public Relations	○	○	○
Computer Science, & Mathematics	○	○	○
Education	○	○	○
Engineering	○	○	○
Health Professions	○	○	○
Physical Sciences, Chemistry, Physics, & Geosciences	○	○	○
Social Sciences	○	○	○
Social Service Professions	○	○	○
Other	○	○	○

Enter the name of your major(s). If you don't know, you may write "I don't know".

The statements below describe different attitudes and beliefs about science and engineering. Reflecting on this science course, please indicate the extent to which you agree with each statement.

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
I do not feel comfortable voicing my own ideas in science class.				
Everyone can contribute useful ideas in a scientific investigation or engineering design process.				
Talking about data with other students helps me develop explanations.				
The most important thing you need to teach science is to know a lot of facts within a discipline.				

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
The most important thing you need to teach science is how to do science.	○	○	○	○

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Science and engineering can address questions and problems in my everyday life outside of classes.	○	○	○	○
I have a hard time using big ideas and theories in science to help me understand specific concepts.	○	○	○	○
I can use my skills to figure out how to investigate a scientific question even if I don't know that much about the details.	○	○	○	○
Science classes are primarily about learning what we already know in a discipline, as opposed to actively investigating questions or solving problems.	○	○	○	○

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Similar approaches to conducting investigations are used in all science disciplines (biology, chemistry, Earth science, physics).	○	○	○	○

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
When I am asked to explain data, I don't really know how to start.	○	○	○	○
Learning science and engineering that is not directly relevant to or applicable to my life is not worth my time.	○	○	○	○
Science teachers should help me understand how the scientific concepts are relevant to me today.	○	○	○	○

The following items describe science and engineering-related tasks. Don't actually try to complete the tasks. Instead, rate your confidence in being able to address the task, or if you do not understand it.

	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios	○	○	○	○
I can use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time	○	○	○	○
I can analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects	○	○	○	○
I can construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object	○	○	○	○

	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons	○	○	○	○
I can collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions	○	○	○	○
I can plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object	○	○	○	○

Highly confident | Somewhat confident | Not at all confident | I do not understand the task

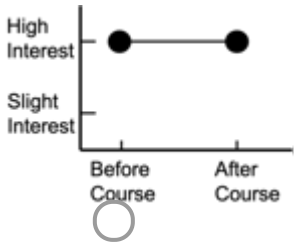
	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem	○	○	○	○
I can use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media	○	○	○	○
I can apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population	○	○	○	○

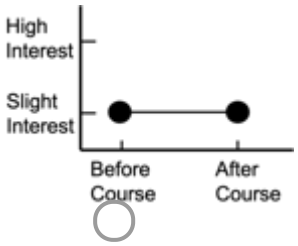
	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity	○	○	○	○
I can develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere	○	○	○	○
I can evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce	○	○	○	○
I can use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate	○	○	○	○

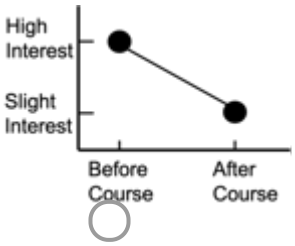
	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past	○	○	○	○
I can design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity	○	○	○	○
I can evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter	○	○	○	○

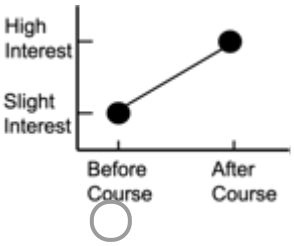
	Highly confident	Somewhat confident	Not at all confident	I do not understand the task
I can use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms	○	○	○	○
I can apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision	○	○	○	○
I can construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms	○	○	○	○

Which of the following graphs most accurately depicts your level of interest in a career in science or engineering before and after taking this course?

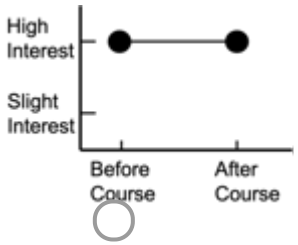
A. 

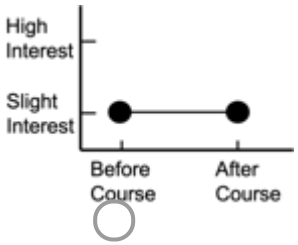
B. 

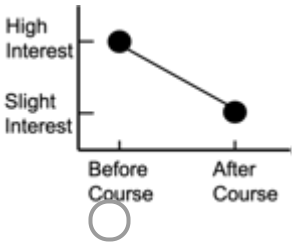
C. 

D. 

Which of the following graphs most accurately depicts your level of interest in a career in **teaching** science or engineering before and after taking this course?

A. 

B. 

C. 

D. 

As you think about your future, can you envision ways in which you use the skills you learned or practiced in this course to address questions and solve problems that are relevant to you, your family, or your community?

- ○ Yes
- ○ No

How do you envision using the skills you learned or practiced in this course to address questions and solve

problems that are relevant to you, your family, or your community? Please name the skills in your response.

Why not?

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