

Investigating Student Views of Relevancy in Introductory Astronomy

Project Summary

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This Wisconsin Teaching Fellow project focuses on the views of students as they enter a General Education course in Introductory Astronomy. Education research suggests that students are more likely to engage with material and retain concepts if they feel the material has relevance in their lives. By relevance, we mean "connections / links to life outside class - personal, future careers, media, society". The objective of this project is to explore the links / connections students see between astronomy class and their lives outside that class, as well as how the students' views of relevance correlate to their content knowledge in the course. The results will allow instructors to better 'meet students where they are', and encourage them to engage with the course material.



The Problem

- General Problem:** Students tend to "tune out" unless they view the material as personally meaningful, relevant, or useful to them
- Specific Context:** "Astro 101":
 - Introductory Astronomy for non-majors, taught around the country
 - Astronomers see connections and links between course material and life outside class.
 - Little Research exploring whether students see these relationships
 - Existing work on general attitudes towards astronomy as a science
 - Example: "Survey of Attitudes Towards Astronomy" (SATA; Zeilik & Morris 2003). Probes *very general* views on
 - relevance & worth of astronomy & science (9 items)
 - positive / negative attitudes about science & astronomy, student competence, and subject difficulty (25 items)
 - No existing survey explores student perceptions of the relevance of specific aspects of astronomy.
- Goals:**
 - Investigate student attitudes about the relevance of astronomy at the beginning of the semester.
 - Investigate whether they change at the end of the semester.
 - Explore whether students' content gains in the course are related to their attitudes.

Methods

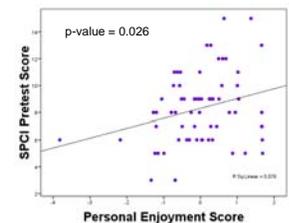
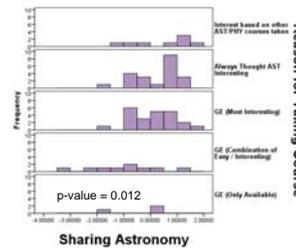
- UW-L Spring 2009 "Stars, Galaxies & Universe" class; First & Last Day
 - Administer survey to investigate student attitudes on relevance of astronomy
 - Administer *Star Properties Concept Inventory* (SPCI; Bailey 2007) to evaluate students' content knowledge
 - First-day surveys and SPCI collected for 65 students
 - End-of-semester surveys and SPCI collected for 46 students
 - Explored coded responses using SPSS for trends & correlations
- Developed survey investigating the following *Aspects of Relevancy*:
 - how much they enjoy learning / hearing about astronomy, and sharing their understanding with others
 - whether / how they anticipate connecting course material to news items / popular portrayals of astronomy
 - whether they're aware of technological spinoffs (e.g. CCD chips in digital cameras etc.)
 - whether they connect material like 'Phases of the Moon' to viewing the sky in their life outside class
 - are there any skills they expect to develop in class that might help them elsewhere in their life
- Survey involves:
 - Open-ended questions (5) about aspects of relevance
 - "How often do you notice/encounter..." aspects of astronomy (5)
 - ("Daily or almost daily", ..., "I can't think of a time")
 - Likert-scale (12) items about how important astronomy is to them
 - ("I would enjoy...", "I would like...")
 - Questions (4) about their astronomy background (both formal & informal)
 - 5 Demographic questions (e.g. major, class standing, 1st-gen. college)

- References:**
 - Bailey, J. 2007, *Astronomy Education Review*, 6(2), 133
 - Zeilik, M. & Morris, V.J. 2003, *Astronomy Education Review*, 2(1), 101
- Thanks To:**
 - OPID for providing Wisconsin Teaching Fellows & Scholars Program
 - UW-L for sponsoring us as Wisconsin Teaching Fellows

Preliminary Results & Conclusions

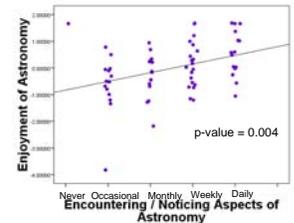
Pre-Course Importance of Astronomy to Students

- Students generally rated "I like / would enjoy..." questions quite positively
 - Only one item had a mean below neutral (mean = 2.92, Std. Dev. = 0.84)
- Factor analysis suggests all 12 items are well-described by two dimensions
 - Sharing / Using Astronomy* and *Personal Enjoyment of Astronomy*
 - Both factors significantly related to "Reason for Taking course" (1 shown)
 - SPCI pre-test scores significantly correlated with *Personal Enjoyment* score
 - Students who score more highly on *Personal Enjoyment* also scored higher on the SPCI Pre-test
 - Neither related to issues like how well students could see night sky as children

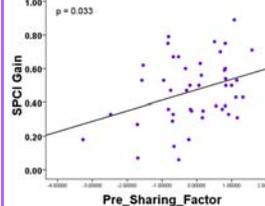


How often students Notice aspects of Astronomy Prior to Course

- Significantly (but weakly) associated with both SPCI Pretest Score (p-value = 0.006) and *Personal Enjoyment* score (p-value = 0.004; shown at right)
- Students who enjoy astronomy are also those who are more aware of its presence in their lives



Relationship of Incoming Attitudes to Performance in Course:



- No significant relationship to performance gains on SPCI, or course grade
- Marginally significant trend (p = 0.068): students scoring highly on the Pre-enjoyment factor obtained a higher course grade.
- Students who scored highly on the Pre-sharing factor had greater gains in content as measured by the SPCI (p = 0.033; shown)

Change in Attitudes during course:

Importance of Astronomy:

- Factor analysis reveals that the Sharing/Enjoyment factors which describe the Pre-course data are not appropriate to the Post-course data
- No significant changes in most individual items of "I like/would enjoy..." questions, or in mean of items:
 - Marginally significant (p = 0.07) decrease in appreciation of astronomy-related book or equipment as a present (Change = 0.3)

How often students notice / encounter Astronomy:

- Significant (positive) changes were found in how often students reported encountering "aspects of astronomy" (p = 0.068), encountering items/technology originally developed for studying astronomy (p = 0.01) and using general skills that astronomers apply in their research to make decisions in their life outside of class (p = 0.034), as well as in the median of all similar items (p = 0.033; shown)

