

Quantitative and Qualitative Indicators of Student Interest in STEM Careers

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INTRODUCTION

Grade 8 students (n = 41) participated in two sessions of technology-infused, space science engagement activities such as exploring the solar system with VR and flying drones in a path that simulated the journey of the Parker Solar Probe around the sun.

Examining the interrelationship between student attitudes towards their career plans, their mastery of content, and their answers to the importance of studying solar wind and space weather. Epistemic Network Analysis (ENA) was used as the primary analysis tool.

METHODS

Question	Coded
Why are solar wind and space weather something we should think about on Earth?	1 = Relevant (e.g. "So that we can protect Astronauts; "It can help us survive") 0 = Not Relevant (e.g. "The movement or shipment"; "idk")
Why are solar wind and space weather something we should think about on Earth?	(Second round, among the Relevant answers) 1 = Insightful (e.g. "They can affect many important aspects of our lives such as electronics. They can also create cool auroras.") 0 = Not insightful (e.g. "It could kill us"; "Storms")
I plan to have a career in:	1 = STEM (e.g. "Science"; "Technology"; "Engineering"; "Mathematics"; "Other: Aeronautics"; "Other: Medical Field") 0 = Not STEM (e.g. "Other: Sports"; "Other: Marketing"; "Other: Hospitality as a cruise director")

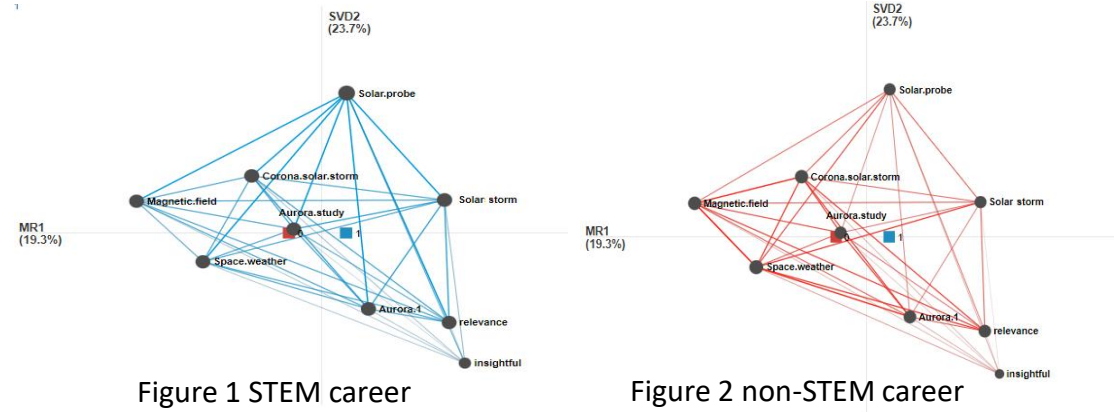


Figure 1 STEM career

Figure 2 non-STEM career

Epistemic Network Analysis (Shafer, 2017)

RESULTS

The size of the dots in Figures 1 and 2 correspond to the frequency of the answers (i.e. values of 1 for the multiple-choice items and for the *relevant* and *insightful* ratings of the open-ended items) for middle schoolers interested in a STEM career, or those not interested in STEM. The STEM-group (Figure 1) shows bigger dots hence a higher proportion obtained a "1" on the questions than for the non-STEM group (Figure 2). The thickness of the lines connecting the dots represents the co-occurrence of the data, implying a possible pattern between answers in the two groups.

A Mann-Whitney nonparametric test showed a significant difference in the networks of participants at their centroids, according to their choice for a STEM or non-STEM career ($p < .01$, $r = 0.4$). Findings suggest a significant relationship between middle schoolers' interest in space science (as investigated through the multiple-choice and open-ended items), and their possible choice of career.

Findings imply that teachers can trust different kinds of middle school signals of STEM career interest, and provide encouragement to students according.

RESEARCH QUESTION

To what extent is there a connection between middle schoolers' interest in space science (qualitative data), their proficiency in space science content (quantitative data), and their intentions for a career in STEM (quantitative data)?

IMPLICATIONS

