



# The UI-Micron STEM Education Research Initiative

## Overview and Summary Findings to Date

*"This is a core strength of the University of Idaho, through our land-grant mission: to develop comprehensive research and survey data and programs that can be used to effect change and better our state and the nation."*

~President M. Duane Nellis

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# Background

- STEM fields stand at the center of virtually all global conditions in the 21st century.
- At the same time, however, national- and state-level student interest and performance in STEM education is insufficient.
- Informed by and contributes to research on areas of influence that shape STEM attitudes, interest, and performance.



# Project Goals

*To investigate the complexity of cultural dimensions that shape STEM educational outcomes with a focus on local contexts, as well as state-level patterns, in Idaho.*

*To collect data which can inform policy makers, educators, and other stakeholders when STEM education and legislation are considered, developed and implemented.*

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# The Twelve Communities



Bancroft (Caribou Co.)

Boise (Ada Co.)

Fairfield (Camas Co.)

Idaho Falls (Bonneville Co.)

Jerome (Jerome Co.)

Kamiah (Lewis Co.)

Lewiston (Nez Perce, Co.)

Melba (Canyon Co.)

Mud Lake/Terreton (Jefferson Co.)

Pocatello (Bannock Co.)

Post Falls (Kootenai Co.)

Priest River (Bonner Co.)

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# Five-year Project Design

Year 1

- Thirty-nine focus groups of teachers, parents, and community members conducted in 12 counties

Year 2

- Statewide phone survey with 12 counties oversampled

Year 3

- Surveys of: students in grades 4, 7 and 10; their parents; random sample of teachers statewide
- UI retreat/workshop; pilot innovations

Year 4

- Beginning of the innovations implementation in partnerships with communities, school districts, industry, researchers, parents, etc.

Year 5

- Continued progress with innovations and survey students and parents to assess attitudinal changes

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# Highlights of Focus Groups and Statewide Survey Findings

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## High levels of support

*So much of legislation in politics, and even education decisions that are being made, go back to assuming that you understand what [the science is] they're even talking about. So, while we can't all be experts in everything, I think there's a certain level of literacy in these areas that we all need to be good citizens to be able to make responsible decisions.*

*-- 2011 Focus Group Response*

### Statewide Survey Response

- 77% support state budget increases in K-12 education.
- 74% support state budget increases in STEM education.
- 67% support state budget increases in higher education.
  
- For comparison, 42% support state budget increases in law enforcement/public safety.

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## Parental concerns

*...being a single mom, sometimes it's difficult to turn around and after a long day try to help your child. You're exhausted. If you're not always consistently every day involved, then somehow you kind of find yourself lost on where they're at. They do so well for a few months and then somewhere they start running into some problems. You're like, "How can I help you?" You don't know how or you don't know where exactly they're at in the book. You just know that there's a problem. You're trying to understand it.*

*-- Focus Group Participant*

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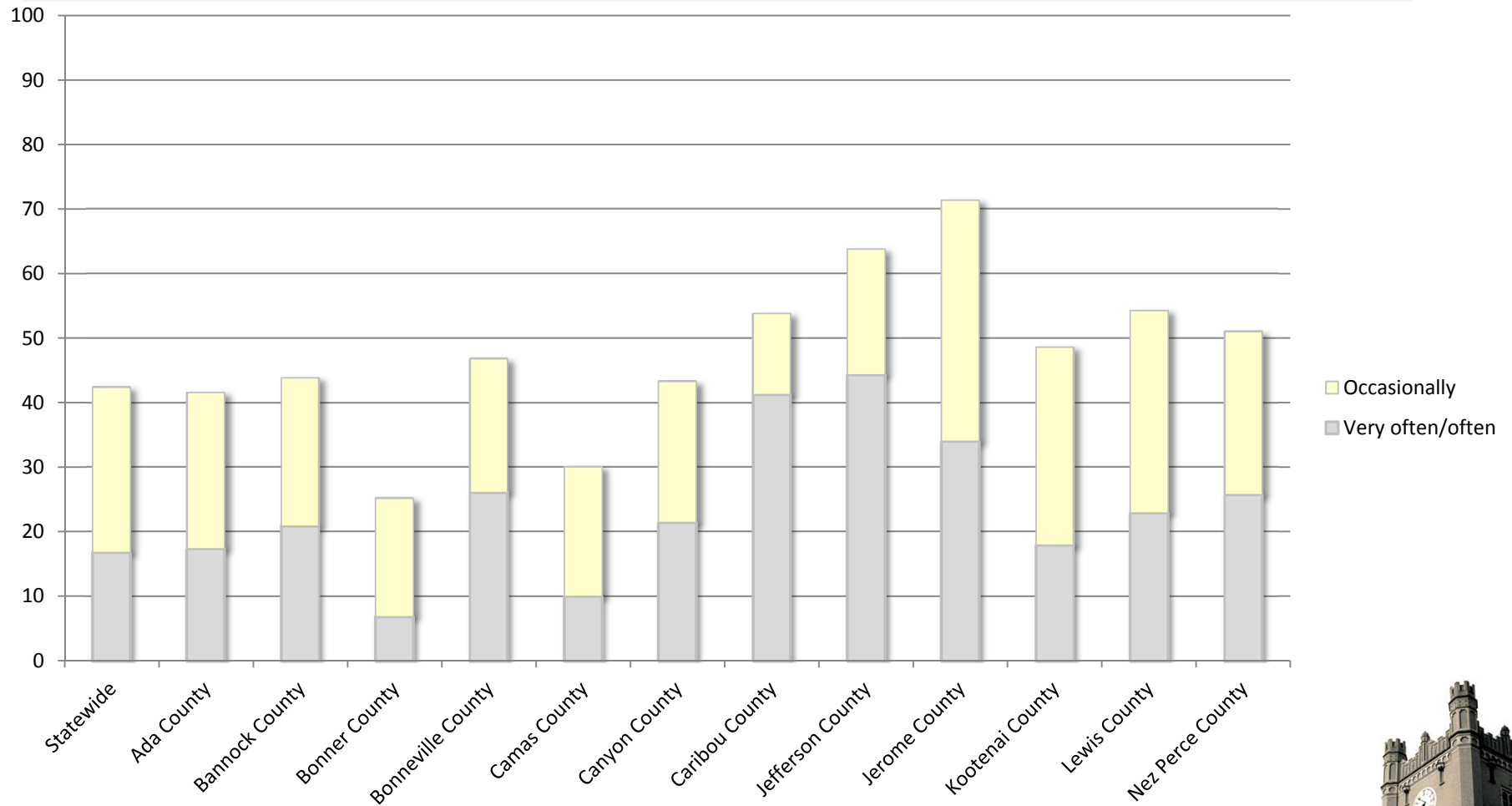


# Abilities in supporting children's academic preparation

- 43% of parents in the statewide survey felt their math and science abilities make it difficult to help their children with their homework.
- 48% of parents in the statewide survey felt they do not have as much time as they would like to be involved in their children's education.



# How often do you feel your own math and science knowledge makes it difficult to help your oldest child with their math and science homework?



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# Abilities in preparing children for college

- 41% of parents were unsure about what courses a child should take to be successful in college
- 36% of parents were unsure about how to help someone apply to college
- 43% of parents were unsure how financial aid works in college



## Distrust in science and scientists

*You can't even get the religions to all agree on one thing let alone try to get the science and the religions to agree on something. The scientists won't agree on anything together either. They're kind of like lawyers.*

*--Focus Group Participant*

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# Culture of science

- 46% said that science can be in conflict with their religious beliefs
- 49% reported that scientific knowledge changes so rapidly that it is hard to know what to trust
- 60% think scientists have had a positive influence in their communities



59% of respondents felt that scientists have a political agenda with their research

Some qualitative responses from the survey:

- “They want to take the government’s money and they don’t want to look at everyone’s perspective, just their own.”
- “[They] use ‘the science thing’ to prove that the dams shouldn’t be there, the fish should run wild, and that people should stay off the land to protect the water.”
- “It’s alright if they give the facts, but leave it to that. [They] don’t need to get on a high horse and press their agenda on others.”



# Summary of results

- Idahoans wish to support education to a greater extent than other traditionally identified areas of state concern.
- Parents demonstrated uncertainty in their abilities to assist their children with academics.
- Science is supported, but support is tempered by uncertainty.
- These perceptions, coupled with limited STEM literacy, suggest a real need for innovations.
- Less variation between rural & urban, yet considerable differences among rural communities and among urban communities in Idaho.



# Student Surveys Results

- Randomly selected 10<sup>th</sup>, 7<sup>th</sup>, and 4<sup>th</sup> grade classes in 12 communities/districts
- Total of 2,600 student surveys collected
  - 426 4<sup>th</sup> graders
  - 995 7<sup>th</sup> graders
  - 1,179 10<sup>th</sup> graders



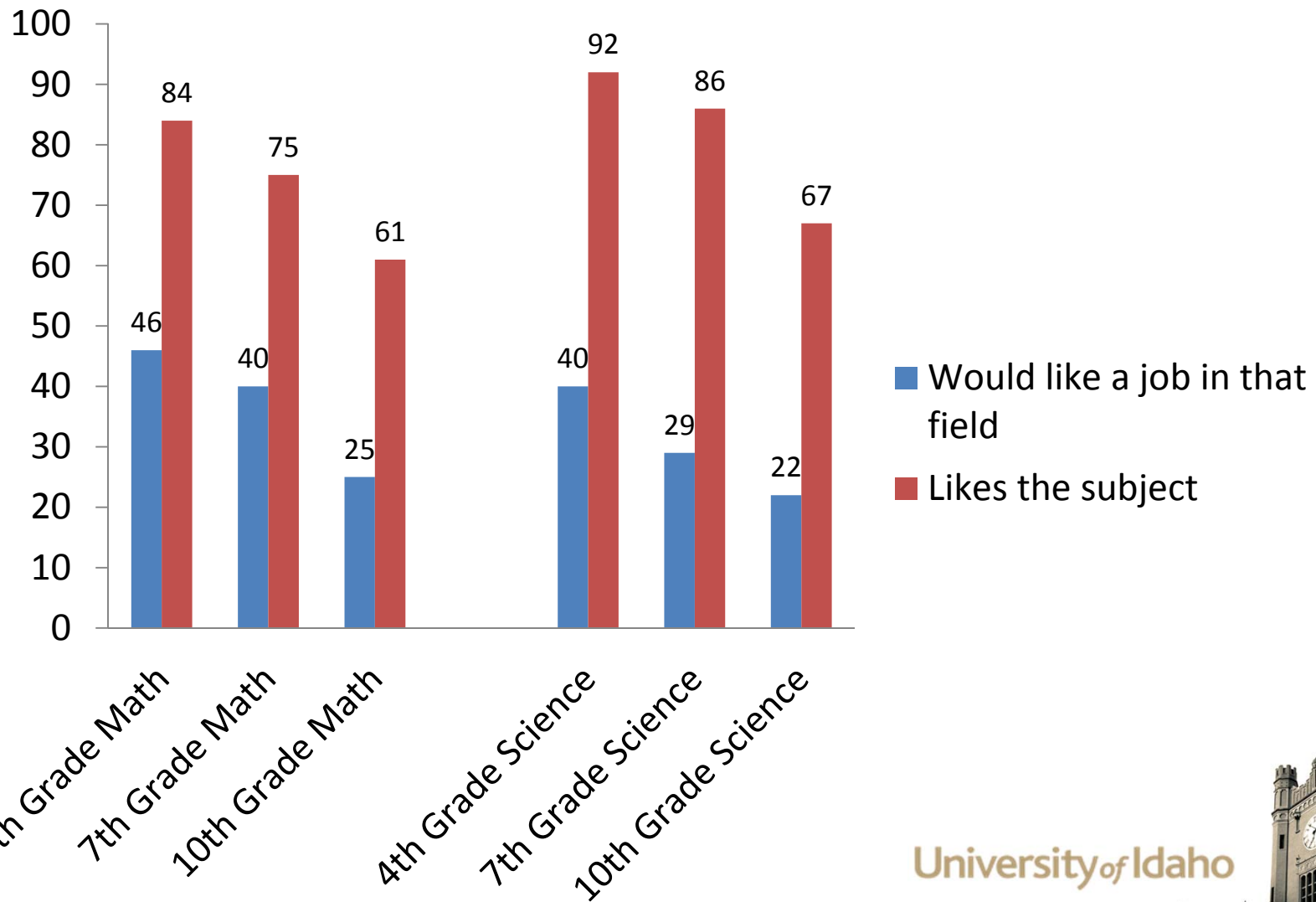


# 4<sup>th</sup> Grade Findings

- The majority of 4<sup>th</sup> graders like math (84%) and science (92%) yet....
  - over half (54%) do not want to have a job that uses a lot of math when an adult
  - over half (60%) would not like to be a scientist
- The majority (73%) think they will go to college (25% are not sure)
- Most (92%) report their parents are interested in what they learn in school
- Over half (57%) wish adults in their family had more time to help them with their homework



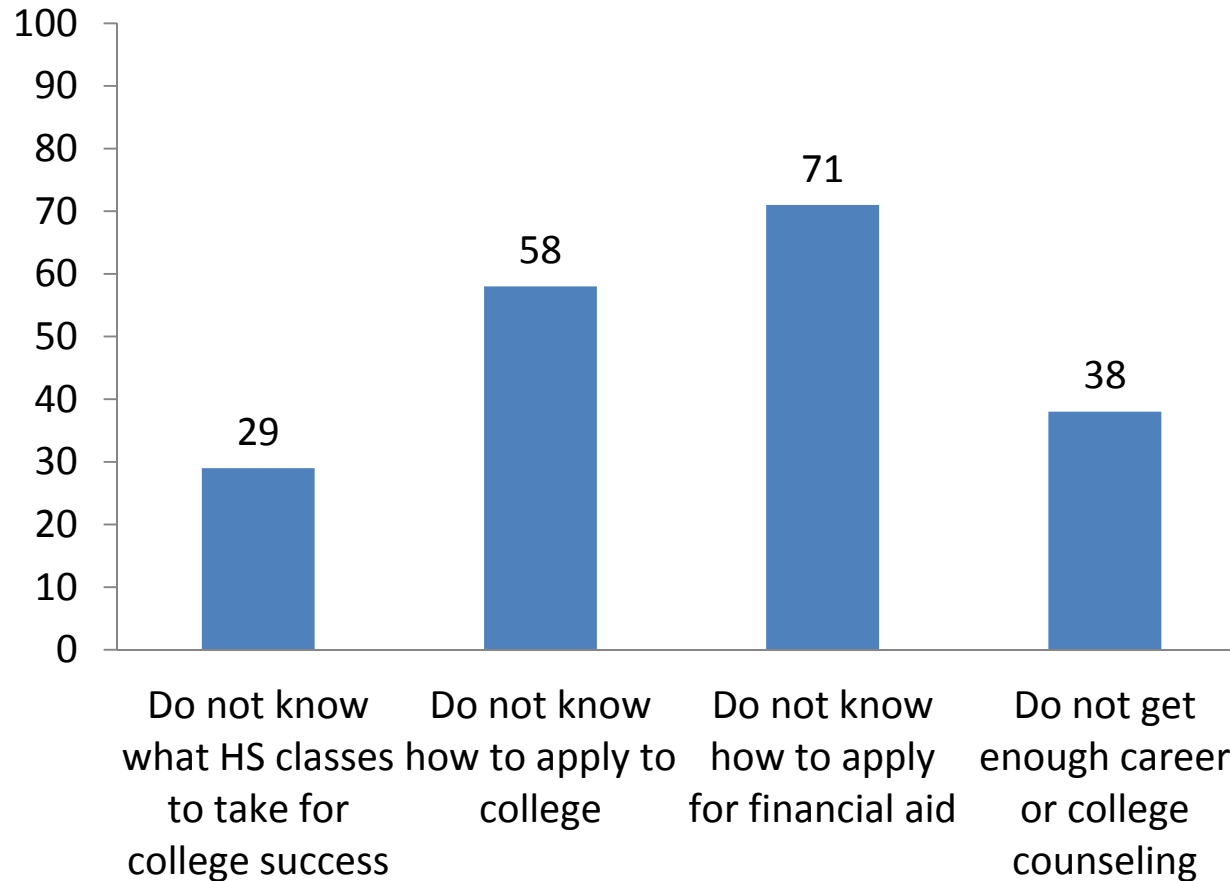
# Math and Science Attitudes and Career-Related Interests



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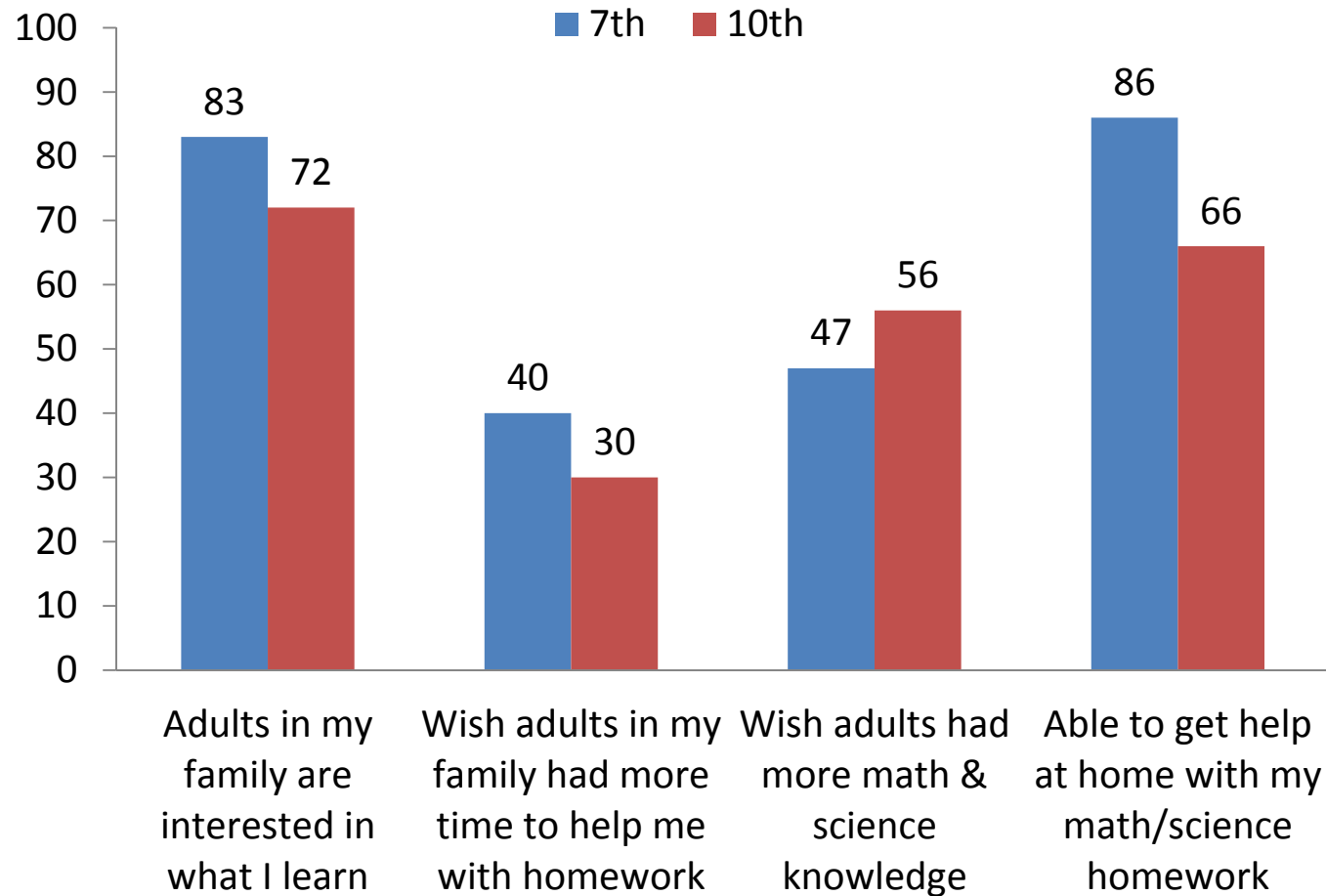
# 10<sup>th</sup> Grade College/Career Preparation



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# Parental/Family Support

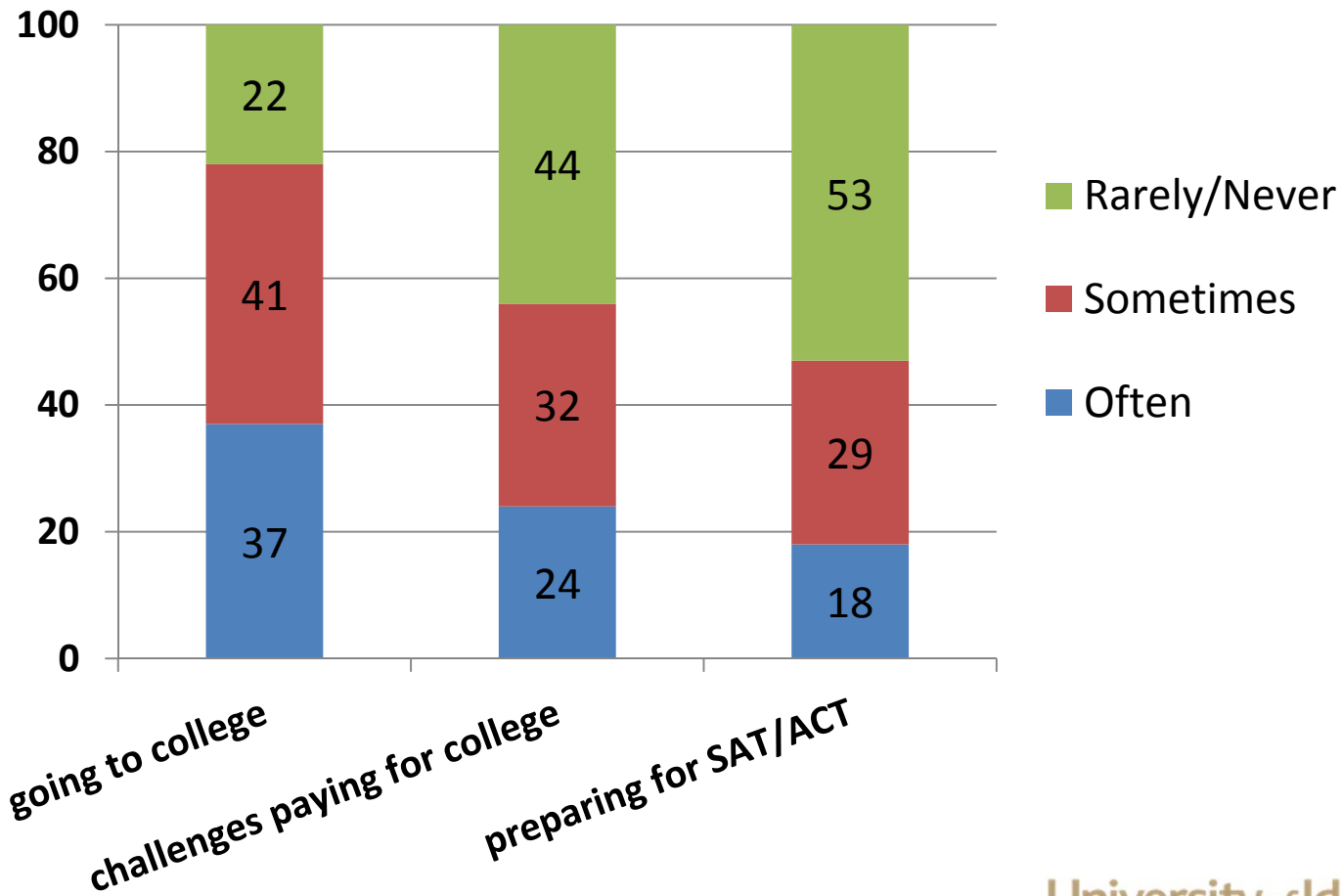


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# Family Support for College

## 10<sup>th</sup> Graders: My family talks with me about....



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# Significant Racial Differences Among 10<sup>th</sup> Graders

- White students more likely to have college plans than non-whites
- White students more likely to say they like math than non-whites
- White students are more likely than non-white students to report the adults in their family are very interested in what they learn at school
- Non-white students more likely to wish adults in family had more time to help with their homework



# Significant Gender Differences Among 10<sup>th</sup> Graders

- Girls more likely than boys to say they will go to graduate school
- Boys more likely than girls to say they like math and science
- Girls more likely than boys to report their family talks to them about going to college, paying for college, and preparing for ACT/SAT



# Significant Rural-Urban Differences among 10<sup>th</sup> Graders

- More rural students than urban students say they like math
- More urban students than rural students say their parents are very interested in what they learn in school
- More rural students than urban students wish adults in their family knew math and science better
- More rural students than urban students say having a job that requires work with hands/really physical is really important





# Next Steps for Research

- Parent and teacher surveys
  - Link student and parent surveys to further understand family context
  - Explore teacher support, attitudes, and opportunities
    - Teacher overall experience in community
    - Teacher training and knowledge in math/science
    - Teacher science attitudes
    - Teacher preference for professional development
    - Teacher knowledge and preparation of Common Core Standards
    - Teacher attitudes and experiences with students and parents



# Innovations and Advancements

- Additional Expertise:
  - Melinda Hamilton, UI STEM Education Director
  - Susan Stauffer, STEM Education Research Associate
- UI Fall Retreat and call for pilot innovations
  - Due Jan 30, 2013
  - Innovation implementation: Feb 18 - Dec 20, 2013
- External NSF proposal submitted “Advancing the \*E\* in STEM Education with Virtual Learning Environments”
  - Virtual learning modules to enhance 9-12<sup>th</sup> grade interest in STEM and learning of Algebra 1 to meet Common Core State Standards
- \$3 million dollar grant from Albertson’s Foundation to research and disseminate promising practices for integration of technology into teaching and learning.



*Thank you for attending!*

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