



ATTITUDES, BARRIERS, & OPPORTUNITIES CONCERNING
STEM EDUCATION IN IDAHO
STATEWIDE AND COMMUNITY SURVEY RESULTS

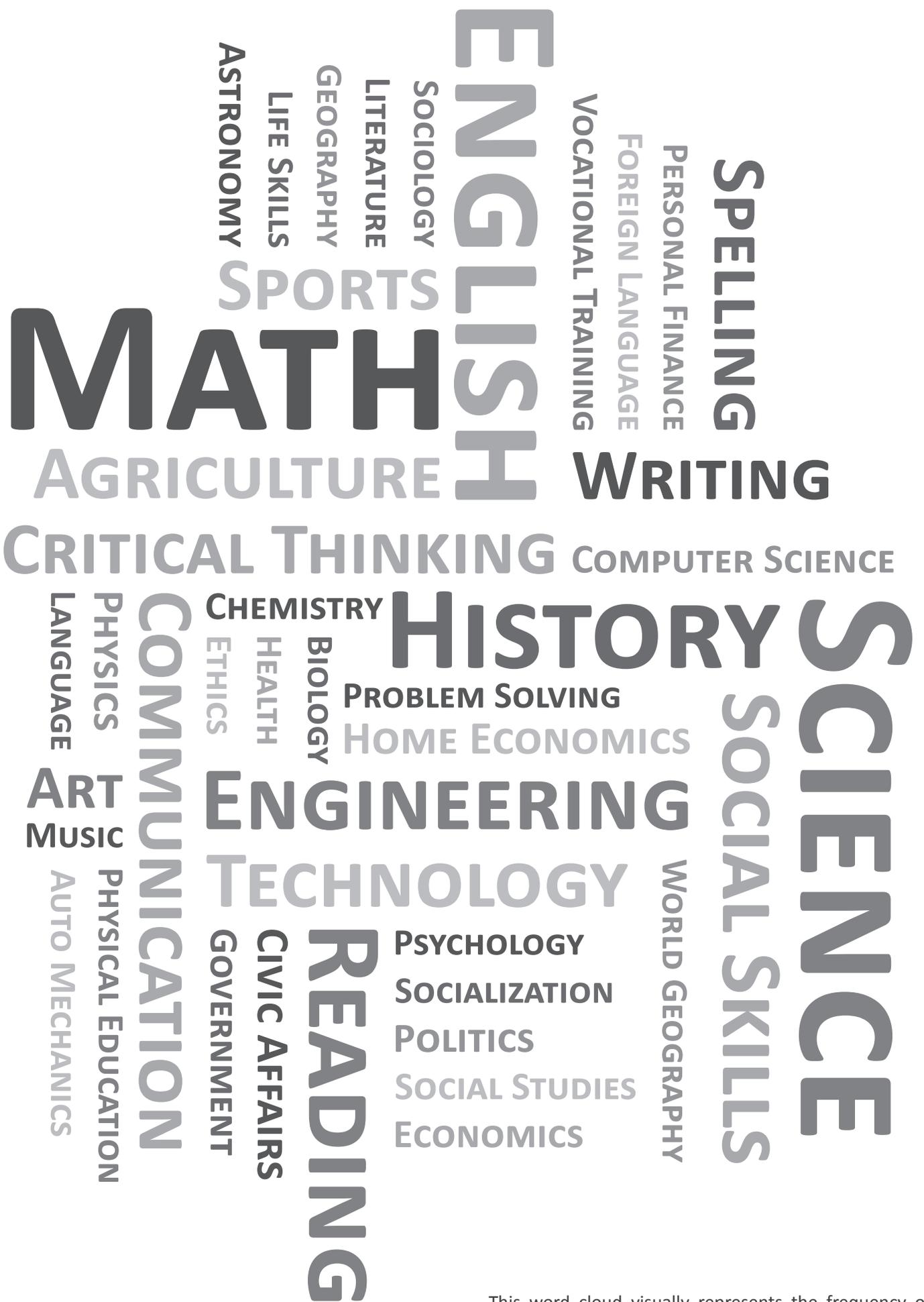
EXECUTIVE SUMMARY



DEBBIE STORRS
LEONTINA HORMEL
JOHN MIHELICH



University of Idaho



This word cloud visually represents the frequency of subjects identified as one of the "four most important subjects taught in K-12 schools" by survey respondents.

ATTITUDES, BARRIERS, & OPPORTUNITIES CONCERNING STEM EDUCATION IN IDAHO

STATEWIDE AND COMMUNITY SURVEY RESULTS

EXECUTIVE SUMMARY

Debbie Storrs
Leontina Hormel
John Mihelich

University of Idaho
Moscow, Idaho

CONTRIBUTORS

AUTHORS

DEBBIE STORRS

Associate Dean of the College of Letters, Arts and Social Sciences
and Professor of Sociology

LEONTINA HORMEL

Associate Professor of Sociology

JOHN MIHELICH

Chair and Associate Professor in the Department of Sociology & Anthropology

OTHER CONTRIBUTORS:

STEPHANIE KANE

Project Manager and Statistician, Social Science Research Unit in
the Department of Agricultural Economics & Rural Sociology;
provided statistical analysis and contributed to the methodology content.

MICHELLE HOWARD

Graduate student, Department of Geography;
contributed to community profile descriptions.

ACKNOWLEDGEMENTS

This study was funded by a gift to the University of Idaho by Mircon Foundation, Inc.

The authors thank **Susan Stauffer** (STEM Research Associate) and **Sarah Koerber** (Proposal Development Specialist), at the University of Idaho for their review and input on previous versions of this report.

Graphic Design: **Jocelyne Helbling** (Art & Design Student)

EXECUTIVE SUMMARY

INTRODUCTION

Micron Foundation plays a significant role in the promotion of science, technology, engineering, and math (STEM) education programs in Idaho. The Foundation partners with K-12 and university educators to provide learning opportunities and supports research to further STEM knowledge and training in recognition of the need for a skilled and trained workforce and a scientifically-literate community.

With Micron Foundation's support, the UI-Micron STEM Education Research Initiative seeks to explore STEM attitudes, scientific literacy, and educational outcomes in Idaho. The five-year, longitudinal study will collect and analyze data from parents, students, teachers, and community members across the state. The research will help identify the complex factors that shape interest in STEM at the community level, and STEM learning and academic performance at the K-12 level. Findings will enable partnerships across the state develop and implement innovations that increase academic STEM performance and workforce competitiveness.

RESEARCH ACTIVITIES

Year one of the study focused on conducting focus groups in Idaho communities to develop an understanding of local contexts of STEM education. Twelve communities from different counties in Idaho were selected to provide data on STEM attitudes given the regional differences in economic base, geography, and population demographics (see Appendix I for sampling methodology). In year two a statewide survey was designed and conducted to investigate

- public support for education and STEM education in particular;
- degree of parental engagement and abilities for supporting children's educational success; and
- public attitudes and perceptions about science, scientists, and STEM education.

The results reported here are based on two survey samples. The first survey sample was drawn from the entire state of Idaho through random selection of phone numbers, both from landlines and wireless phones. We randomly sampled 900 household landlines and 1,500 wireless phone numbers. Out of these sampled phone numbers, we completed a total of 407 telephone interviews across the state, for a response rate of 22.5 percent. The second survey sample was drawn from Idahoans with phone numbers (either landlines or wireless phones) from the counties that the twelve communities selected to participate in this study were located. The number of respondents sampled in each community's county varied depending on the county's population size (for more detail, see methodology section in Appendix I). Of the sampled phone numbers in these counties, we completed a total of 1,661 telephone interviews, with response rates ranging from 19.3 percent to 32.2 percent. Between the two samples, we telephone interviewed 2,068 Idahoans. Given the probability of being selected for the study based on the type of phone service each household had (wireless, landline, or both) and (for the community oversample) the population size of the county, we weighted frequencies which ensures our findings are more representative of Idahoans regardless of where they live or what type of

phone service they have. It's also important to note there are general patterned responses for those who agree to participate. The focus of this survey, STEM education, likely led to lower participation rates among some populations, particularly those with lower levels of education. In addition, younger respondents are more likely to decline to participate because they are busy with work and families or are less likely to answer the phone or to agree to participate. As such, caution should be taken when extrapolating findings from our survey samples to all Idahoans due to the age and educational attainment of our respondents. Both of our survey samples had fewer survey respondents from the younger age demographic (18-24) and more from the older age demographic (65-84) than reside in Idaho (see Appendix I for more detail per community). In addition, fewer respondents with a high school diploma or less participated in our survey than expected and more with college degrees, including graduate degrees, than expected (see Appendix I for more detail per community). This report first summarizes data from the state-wide sample and then provides survey findings for each of the twelve communities collected in Fall 2011-Spring 2012 (Year Two of research design).

KEY FINDINGS

FINDING 1: IDAHOANS SUPPORT EDUCATION AND HOLD POSITIVE ATTITUDES ABOUT LOCAL SCHOOLS.

- Respondents to the statewide survey view math and science as two of the top four most important subjects taught in schools.
- Local public schools in Idaho are viewed as doing a good job providing students with an education, including STEM education.
- The majority of respondents support efforts to enhance STEM education in their communities.
- State expenditures to support public education, including K-12, higher education, and STEM education, are supported by the public more than expenditures for health and human services, natural resources, and law enforcement.



FINDING 2: PARENTS REPORT HIGH LEVELS OF ENGAGEMENT IN THEIR CHILDREN'S EDUCATION BUT DESIRE MORE RESOURCES AND KNOWLEDGE IN ORDER TO HELP CHILDREN SUCCEED AND PROGRESS IN EDUCATION.

- Parents in the state say their children are performing above average or excellent in math and science.
- Parents say they communicate regularly with their children's teachers and feel very comfortable communicating with schools about their children's educational needs.

- Self-reported behavior of parents indicates significant support for children’s home learning environments, including reading regularly to their children when they are young and ensuring there is a set time for children to complete their homework.
- Parents think it is most important to be involved in their children’s education when they are in elementary school; importance of involvement diminishes as students progress through middle school and high school.
- More financial security and time were desired by parents to increase their ability to engage in their children’s education.
- A significant number of respondents do not know what classes a high school student should take in order to be successful in college, and over a third are unsure how to help someone apply to a four-year college. Almost half also do not know how financial aid works in a four-year college.

FINDING 3:

IDAHOANS CHARACTERIZE THEMSELVES AS SCIENTIFICALLY AND TECHNOLOGICALLY LITERATE BUT HOLD CONFLICTING ATTITUDES ABOUT SCIENCE AND SCIENTISTS.

- Most respondents say they are fairly well-informed about science and technology.
- More than half of respondents report scientists have had “very positive” or “positive” influences in their community.
- About a fifth of respondents report scientists have had “both positive and negative” influences in their community.
- Scientists are viewed by respondents as sometimes having a political agenda in their research.
- The fast pace of scientific discovery makes it difficult for half of respondents to know what scientific findings to trust.
- The vast majority of respondents say students should be able to choose what to believe and what not to believe from the scientific knowledge they learn at school.
- Almost half of respondents feel science and religion are often in conflict.
- There was overall support by respondents for teaching both evolution and the human impact on global climate change in traditional public schools.

RECOMMENDATIONS

Survey results from the state and twelve counties provide important insights on contextual factors that influence student educational aspiration and success. A noteworthy finding is the high degree of public support for education, including STEM education and higher education, across the state. We offer the following broad recommendations based on our analysis of data from the statewide and community surveys. Recommendations are contingent on additional findings from future research phases. The following proposals are not listed in order of importance but rather reflect the complex factors that must be addressed if Idaho is to improve STEM education outcomes and STEM literacy among its population.

- Policy makers, educators, and other stakeholders should consider data when implementing future innovations or legislation. The significant body of research literature on STEM, nationwide data, and the rich data we have and will continue to collect for Idaho should inform innovations and legislation.
- Parents, policy makers, and other stakeholders must clearly understand that Idaho's children are underperforming in math and science in Idaho. While it is important to acknowledge when successes occur, accurately communicating about Idaho students' underperformance in math and science is an important first step in creating a sense of urgency regarding the educational challenges facing Idaho.
- The state should devote adequate resources to support education at all levels and expand partnerships beyond higher education and industry to include teachers, K-12 schools, parents, and communities to foster educational success.
- Stakeholders in Idaho must support families in order to increase their engagement and support of students' education. Specific communication and educational campaigns regarding higher education preparation, application, and financial processes must be a priority. Structural constraints parents face must be addressed through various innovations that are sensitive to local community needs and demographics.
- Researchers and scientists must be more thoughtful on how to effectively communicate their findings in ways that resonate with community needs and values. This includes consideration of and respect for local experiences.
- Increasing the public's scientific literacy must also be a central goal of the state rather than simply focusing on student STEM performance in K-12 and higher education. Improving the public's understanding of scientific knowledge and relationship to scientists in their community will provide a more scientifically and technologically literate citizenry. In turn, this will provide a community context that can positively influence and reinforce students' interest and knowledge of STEM.
- Specific innovations should attend to the local context in which students learn. Analysis of statewide and community responses reveals that rural communities are each unique, as are urban communities. Indeed, we found little urban-rural differences in our survey. As such, while one strategy would be to develop broad-based approaches to improving STEM literacy and STEM education, approaches, where possible, should be adapted locally as data-driven, specific, place-based, targeted innovations for different groups (e.g. parents, teachers, students, industry leaders, the state, policy makers, researchers, etc.).

NEXT STEPS

Year three research efforts will include the collection of student surveys from fourth, seventh, and tenth grades in the same 12 communities to measure students' math and science interest and attitudes, self-reported academic outcomes in math and science, and family and peer support for educational success. Parents of these children will also be surveyed to measure family context and support for educational success. Finally, a statewide survey of teachers in Idaho will be conducted to measure teachers' attitudes, needs, and concerns regarding math and science student educational outcomes. Analysis of all research data will inform innovations implemented by educational, corporate, non-profit, and community stakeholders.