

MICRON STEM EDUCATION RESEARCH PROJECT
FOCUS GROUP RESEARCH FINDINGS
Executive Summary

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by
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INTRODUCTION

With funding support from Micron Foundation, a team from the University of Idaho in 2010 began a five year research project designed to engage people around the state of Idaho in research and innovation directed toward enhancing STEM educational interest and achievement. STEM - an acronym for science, technology, engineering and mathematics - was first coined by the National Science Foundation in the early 2000's. In the past decade, significant national concern has been raised about student proficiency and public literacy in these fields. The Micron STEM Education Research Project is designed to generate understanding of the community and state specific factors that shape the interest in and pursuit of STEM education and careers among Idaho youth. Drawing from the research findings, the team, in collaboration with stakeholders, will develop, implement, and assess innovations in STEM education that are sensitive to locally-specific opportunities and constraints.

The project will be completed in five phases over a five year period. Phase one will take place during 2010 and 2011 and will utilize community focus group discussions. Phase two, the state-wide telephone survey, will begin in 2011 and run through early 2012. Phase three will be conducted in 2012 and 2013 and will survey educators, parents and students in selected classes. Phase four will begin in 2013 and run through 2014 and target the partner districts and communities with strategic implementation of STEM education focused innovations. Phase five will run from 2014 to 2015 and will resurvey the same populations as in year three and perform outcome assessments of implemented innovations and the overall project success.

In phase one, the team conducted and analyzed focus groups in twelve communities throughout the state selected through stratified random sampling. Within each community, three different groups of local people were assembled for focus group discussions: teachers from grades 4-12, parents of children in the local K-12 educational system, and community members who have no children currently participating in K-12 level education.

The research team's goal was to access community members' perceptions, beliefs, and attitudes associated with STEM fields and STEM education. Unlike surveys that are efficient because of their predominant reliance on closed-ended questions, focus groups enable researchers to ask open-ended questions and to probe for further description and explanation. The depth of the data collected through open-ended questioning, such as in focus groups, in most cases requires a relatively small sample size. In addition, selecting participants for each focus group often entails purposeful sample selection (rather than random selection) in consideration of certain population attributes relevant to particular research questions. For example, in the current study we limited participation in one focus group in each location to parents of K-12 children. During the recruitment process, the team sought parents with children from a wide variety of grade levels and who represented different socioeconomic and ethnic backgrounds. Although efforts were taken to randomly select communities in which to hold focus groups, the relatively small sample size of focus groups and the purposeful sample selection for participation in focus groups is such that the focus group results are not necessarily generalizable to the general population in Idaho.

The focus group process in phase one served a range of purposes central to the project. First, it compiled a deep and comprehensive data set of community attitudes and perceptions related to STEM education enabling ongoing analysis. Second, the data set helped direct the team in constructing questions for the statewide survey scheduled for implementation and analysis in phase two. Third, it established a presence in each of the communities upon which future support can be garnered and innovations or initiatives can be developed.

In coding and analysis of focus group data, the team aimed for “theoretical saturation” (or “redundancy”) which was identified when patterns of thought and experiences consistently emerged for different focus groups and communities. Further analysis both identified the parameters of themes vis-à-vis the research questions and also identified a set of unique issues arising in the focus group discussions for which survey data could be useful. As such, the team also considered seemingly anomalous responses in the focus groups to capture the range of perspectives and experiences across Idaho.

Summary results from phase one of the project (August 2010-August 2011) are described in this executive summary. The full report offers a broad overview of major themes or patterns that emerged in focus group discussions. In addition, the full report includes a selection of participant quotations demonstrating the nature of community, teacher, and parental experiences and perceptions.

FINDINGS SUMMARY

- Focus group participants displayed a wide-ranging understanding of STEM, from a good understanding of what STEM education refers to and its relevance to societal needs to a complete unfamiliarity with the STEM acronym. Levels of STEM understanding varied across focus group types.
- Focus group participants viewed STEM education and STEM fields as important to Idaho’s future as a global competitor and to the future of Idaho’s youth. Moreover, many participants felt that STEM education is necessary toward creating a more informed citizenry.
- Focus group discussions elicited a number of cultural themes that form the complex cultural context affecting STEM education and will impact any potential implementations to improve outcomes in Idaho.
- The educational skills, experience, and knowledge (i.e. cultural capital) of some Idaho families limit their ability to adequately support student academic success and pursuit of higher education.

- Focus group participants thought Idaho children have a capacity to learn and excel in STEM education, and they recommended more use of adult and peer mentoring to support, motivate, and encourage student academic success.
- Communities have a wealth of untapped STEM expertise and opportunities, including applied learning opportunities that can enhance what schools do to expose students to STEM discoveries, fields, and careers.
- Focus group participants supported cross-disciplinary pedagogical strategies and curricula that respond to and integrate the local context including the environment, natural resources, and relevant local issues.
- In conjunction with cross-disciplinary pedagogical strategies and curricula, participants called for a balance between STEM education and liberal arts education, noting the importance of the communication, critical thinking, and problem solving skills cultivated in the liberal arts.
- Significant challenges exist in providing students with contextually rich academic experiences that support 21st century skill development.
- Communities struggle with inadequate resources to attract and retain good teachers, offer a wide variety of STEM courses, provide sufficient and well-maintained classroom equipment, and develop opportunities for experiential learning within and outside of the classroom.
- Focus group participants believed online courses may not be appropriate for all students and subject matter.
- Focus group findings indicate a need to communicate more broadly with Idaho residents about the content and relevance of STEM education and STEM career fields.

CONCLUSIONS

The results of the first phase of the project clearly show that Idahoans are concerned about their children and their future. The results also suggest that STEM education is not fully understood by many in the population and there is concern about the role and balance of STEM and other curricular areas in the overall education of Idaho's children. Parents were noted as being significant partners in their children's academic success.

Focus group participants were able to vision possibilities where mentors, teachers, and parents could be part of the STEM education program in the schools but were cautious as they realized that students already have a full curriculum and new mandates may make it more difficult to enhance STEM fields in schools. The participants recognized the role and use of the local environment for extended learning activities and as a way to contextualize STEM with a local opportunities and expertise.

Focus group participants were well aware of the challenge of resources. The participants highlighted the need to make STEM education a priority and resource it correctly. The participants are aware of the resource discrepancies between districts and the challenges of bringing more resources to the rural and small schools. They also recognize that teachers are doing the best they can with the limited resources. They recognized the increasing difficulty in growing resources.

NEXT STEPS

The findings from phase one are being used to build the general population survey which will be administered to a sample of Idaho households beginning in October 2011. Part of the general population survey will include an oversampling of our partner communities to insure their representation. In developing the questions for the survey contextual considerations discovered through the focus groups will be key factor in selecting or designing questions which will elicit more representative information on STEM education in Idaho. As the project unfolds data from the focus groups will continue to inform the development of additional instruments and the design, delivery and evaluation of initiatives and innovations in our partner communities.