

Funding formula  
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Regarding the funding formula and the teaching of science courses in community colleges.

1. There is a great need to promote STEM education and research in science curricula. All schools, whether at the community college level or the University, are now focusing on STEM and the educational standards of making all science classes into research focused classes. The most recent scientific and science education meetings have emphasized a need for a research based curriculum overhaul both in the lab but also in the lecture portion of science courses. As a result, the objective need must be for all common courses in Nevada to modify course outcomes to reflect this new emphasis. Currently the learning outcomes for science courses at Nevada community colleges and Universities are the same as they adhere to the common course numbering format with objectives unique for each course number.
2. As all colleges and universities are charged with adapting their curricula to reflect the research based outcomes, CSN has already begun the process of including research based outcomes to address fundamental research goals in their science courses. These include but are not limited to hypothesis development, experimentation and analysis, and interpretation and modification of hypotheses, all of which are fundamental to our science courses. Extensions allow students to address each of these aspects of learning research methodology in many of our science courses. Other research problems that CSN currently uses, that fit the criteria of research based, include student problems that may be as simple as identifying an unknown environmental organism but with an experimental design of their own. And CSN also offers special topics courses that allow students to develop their own research problem. In fact, some students work with funded faculty in early research work using common laboratories.
3. The National Science Foundation (NSF) supports the work of community colleges as educators of research design and experimentation. NSF staff attends most meetings of professional organizations and presents a seminar on funding for community colleges. This is not specifically for science education at the community college level but for conducting research with students. In fact, NSF has specific categories of funding for community college research. They particularly want to encourage integrated research programs like one currently being developed at CSN. This program integrates botany, chemistry and microbiology in the study of desert plants and biofilm formation. Of course, common laboratories at CSN are fundamental to the success of these projects. Other CSN programs currently supported with grant funding from NASA include extremophile research and others in physics.

4. Discipline integrated research programs are also promoted by the Howard Hughes Medical Institute and American Academy for the Advancement of Sciences, as well as, individual professional organizations such as, the American Society of Microbiology and the American Society of Human Genetics. These organizations support and promote introducing students to research at the community college level as a way to bring more students to the research experience. These integrated programs at the community college level are successful in helping students understand science and how it works as a whole which is an important concept missing in science education.
5. Not all students choose to attend Universities during their first two years and opt instead for a 2-year college for various reasons. Often these students are not sure of their goals and need mentoring, something community colleges are very good at doing. We have the ability to reach more students on a personal level in small lab settings and promote the research experience in this way.
6. The National Science Foundation also supports in writing and in funding applications science education that relies on both community college and university combined research projects. This process of Universities working hand in hand with community colleges to bring about the best possible education for all students is very successful and is followed in states such as Texas and California. Ideally, these programs are developed together by both institutions, and allow students to learn fundamentals of research at the community college and then transfer into a functioning research lab at a higher institution. These programs and the grant funded from NSF and even NIH are documented and accessible online for verification of these funding locations. These combined research programs are throughout the United States.
7. The community college is not here to steal away students in any particular field. While working in specific research labs such as at UNLV is important for students to see how a true research lab functions, this should not take away from more fundamental introductions to research that students can and do receive at CSN. The first two years are crucial in students learning of science. Some students are confused as to what to do and we can provide mentoring that is not currently available with faculty at some Universities.
8. A good portion of the faculty at Community Colleges have doctoral degrees with specialties in a particular area and have published papers listed in their curriculum vitae. Most faculty are currently active in their professional scientific organizations. A portion of community college faculty members have also had post-doctoral training and are technically competent and cognizant on how to run a lab. Many of these faculty members have experience training research assistants and students

in research design. Additionally, a portion of the Community college faculty participate in workshops to stay current in the most recent laboratory techniques and new paradigm shifts. In fact, in some instances, admissions officers have a preference for community college faculty in these types of workshops since there is a focus in the country now on training community college faculty in STEM education research as well.

9. Also, faculty at community colleges spend a great deal of time developing active learning techniques that are very conducive for a research or inquiry based education. These techniques are used by community college faculty in order to engage students in higher order and critical thinking skills. Only then will our students be prepared to compete on the national and international level. To facilitate this focused learning, community college faculty members attend education workshops to learn and develop new inquiry-based pedagogical techniques to implement into their classes. While graduate assistants may be experts in their particular area, they are not necessarily trained in education techniques. It is one thing to understand a particular field of science and another to help students understand science.
10. Finally, community college faculty members have an active role in the community serving as scientific judges for events such as the International Science Fair, the Nevada Bowl and various science fairs. Community college faculty are active in recruiting young students into science through exciting avenues such as future college days and the Science and Technology Expo which are held several times a year. Community college faculty also participate in events where the design of the event is left up to the faculty member such as with the science Olympiad which is a science analysis based competition, and the NIH funded Idea Networks for Biomedical Research Excellence which introduce students to science as a field and include research as a component.

In closing, an ideal situation would be if UNLV served the role of a sister school to CSN and we worked together to introduce science to all students in various formats. There is definitely a need for the community college in early research training of STEM students.