

Work-In-Progress: Addressing Student Attitudes and General Study Skills through a New Hybrid Distance Learning Model, or NHDLM.

ABSTRACT:

This paper will describe efforts to impact student attitudes and basic study skills through the application of a new hybrid distance learning model, or NHDLM. The program tries to impact Native American students participating in a pre-engineering program while attending widely separated institutions. The critical factor is not only the advancement along Bloom's taxonomy from memorization to synthesis in the particular engineering and basic sciences, but it also includes the development of intrinsic reward system leading to perseverance and adaptability within the engineering-student environment. Compounding this challenge is the under resourced status of the individuals involved, that is to say many of the students started in a school system with opportunity problems. The application of NHDLM is a way to get across the fundamentals of engineering sciences, much like a YouTube podcast might, but adding a dimension of personalization, direct communication and relatively quick feedback in an arena that celebrates personal efforts while maintaining system wide standards and professional attainments

BACKGROUND:

It has been recognized since the late-1970s that representation of minority students in engineering is a problem [1]. Even last year [2] enrollment for Native American students in US postsecondary education was less than 1% of the population, where Native Americans makeup approximately 1.5% of the US population [3]. This small section of the population has options to offer the engineering profession far in excess of what their mere numbers might imply. As with other minorities, simply having Native American engineers as part of the solution team leads to a more diverse set of solution opportunities for the engineering process. However there is a value set within many culturally aware Native Americans that may be of particular value in the engineering process, for example: a strong cultural heritage of observation and inclusive discussion as well as a great respect for sustainable practices. In an effort to perhaps increase the numbers of Native American students who might consider the opportunities of an engineering career, a collaboration was established in North Dakota that allowed the development of a pathway for Native American students from Tribally Controlled Colleges / Universities, TCU's, to obtain an engineering degree at North Dakota State University, NDSU. The details of this program are covered in another publication [4].

This collaboration functions across the entirety of North Dakota, which means distance between collaborators can be in excess of 300 miles. And for nearly half of the academic year this distance is made more tortuous by some of the most challenging weather in the lower 48 states. As a result technology was brought to bear to find ways to allow students to begin their journey on this career pathway without leaving their local TCU. These institutions have the advantages of a more personalized size, recognition of cultural background and family and mentor support. But they don't have is ready access to engineering professionals, nor the funding to offer competitive salaries for them to teach basic classes. Also typically, class size is very small, perhaps 3 to 8 students per institution. Initially it was believed that the solution was lots of windshield time. It was soon realized that a more effective use of technology was needed. What was available was an interactive video network that allowed two-way synchronous participation in classes. Locally, this system, referred to as Interactive Video Network, IVN had been used for high school, community college, extension service and specialty courses and training. Thing about using IVN is that it is a virtual connection, but in reality an argument could be made that it is a typical correspondence course with updated technology. During the utilization of this resource within this collaboration of schools it became obvious from observation of students leaving engineering, significantly beyond 50% in some classes, and then listening to their stories it became apparent that for improvement to happen efforts had to be made to support the student beyond the classroom. This is particularly true for minority students coming from locations that may be radically different from the campus at NDSU.

This IVN was the medium chosen to present to all of the students an introduction engineering course that would help them understand what they were getting into and to prepare them for success, as they saw it, in an engineering curriculum away from their home on the reservation. This particular course was composed of traditional introduction activities as defined in the textbook *Studying Engineering a Road Map to Rewarding Career* [5]

ISSUE:

The issue in this particular situation is how to offer an introductory course to pre-engineering students that touches upon issues going beyond academics in the context provided by IVN or any comparable distance education medium.

STRATEGY:

The strategy involved in this program was to use a hybrid combination of IVN sessions conducted twice a week with periodic face-to-face sessions. It was decided that these face-to-face sessions should occur at different TCU's within the collaborative. This would allow the development of a personal rapport with the students in the classroom

that would allow an increase in the efficacy of the learning process and being able to impact sites over very large distances, while not evolving to a massive open online course, a MOOC.

Critical to the process was being able to use the long distance IVN system that provided synchronous viewing of students at all sites and to take advantage of that trait. This meant that as the instructor went through the non-academic skills contributing to student success, this situation required slightly different approaches than the normal classroom to draw the participants into discussion and contemplation. The instructor had to be much more than a semi active observer of the process, the instructor had to be an active catalyst to move things along and draw out students personalities that would facilitate engagement with the material.

ENACTMENT:

As a course was enacted, there was a required consensus among students participating that was initiated through the discussion in the first session about some of the ground rules and things to do in case of equipment malfunction. A secondary benefit was that the course became more portable than initially anticipated because the IVN system allowed for remote dial-in from laptops or other devices wherever the students could connect, both literally and figuratively.

RESULTS TO DATE:

The intuitive sense of the instructor and associated TCU engineering mentors is that the results to date are positive. But this has not been quantitatively confirmed at this writing. It is perceived that although numbers may only be slightly larger, there seems to be a better persistence with the students participating. That perception is embodied by students that are able to put up with temporary tribulations and still being able to move forward. It is freely conceded that work is needed to quantify this perception through application of attitudinal surveys or other tools to get a better understanding of what is actually occurring. It is planned that in future months this will occur.

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