Leech Lake Tribal College
Program Assessment/Curriculum Development
May 11 and 12, 2009

A joint initiative by the Partnership for Environmental Technology Education (PETE)
and the Advanced Technology Environmental and Energy Center (ATEEC).
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A National Collaboration to Strengthen the Advanced Environmental Technology Education Programs at Tribal Colleges

NSF DUE Project Number: 0702247

Partnership for Environmental Technology Education (PETE)
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South Portland, ME. 04106

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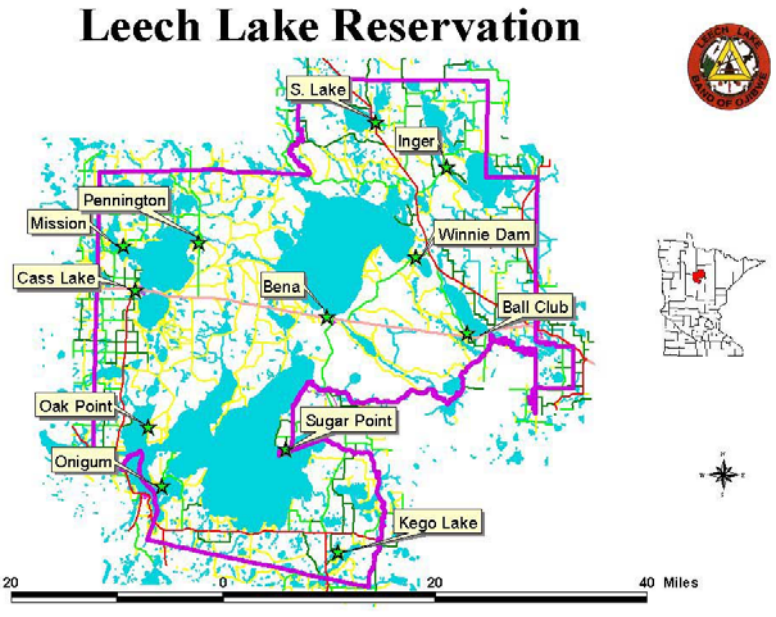
Overview

On May 11 and 12 of 2009, the Advanced Technology Environmental and Energy Center (ATEEC), representing the Partnership for Environmental Technology Education (PETE) Tribal Grant (DUE Project Number: 0702247), visited Leech Lake Tribal College (LLTC) located on the Leech Lake Reservation in Minnesota to facilitate a program assessment and curriculum development workshop in the field of natural science on the reservation. LLTC is one of four Tribal colleges in the nation selected to receive technical assistance through the grant this year.

LLTC indicated they would be interested in receiving program planning guidance for their proposed new Associates of Science degree in Natural Science. They additionally expressed an interest in curriculum development methods and in exploring career pathways with the new degree, from high school to community college to university. The facilitated discussion at the workshop, which is gathered in this report, forms a solid basis for ensuring that the new program's implementation is well thought out and planned from the start and thus has an excellent chance for success. LLTC's Dean of Instruction, Dr. Sue Glidden, invited representatives to the workshop from reservation high schools, workforce development office, the Tribal College itself, and area four-year universities. One of the main intentions of the workshop is to ensure that the new program's STEM curriculum will align with curricula being taught at other educational institutions and provide students with career pathways available on the reservation and surrounding areas.

Reservation Area Covered

Leech Lake Reservation and surrounding areas of Minnesota.



PETE/ATEEC Partnership

ATEEC, a strategic partner with PETE, provides guidance on program development in the fields of environmental science and energy technologies. Their *Best Practices: A Guidebook for Environmental Technology Credit Programs* was developed by successful environmental technology educators and includes the curriculum development experience of the ATEEC instructional design group. It is available as a free download on ATEEC's Web site (www.ateec.org). The guidebook is currently under revision and will include best practices from tribal college programs. In the case of LLTC, considering the reservation and the unique needs of this community, it was recognized that a more focused program development discussion could be utilized to meet their needs more accurately.

The Workshop

Facilitator: Melonee Docherty

Attendees: This report reflects the thoughts of the group who were present at LLTC. The group represents several educational organizations, interests, and concerns in the area and on the reservation.

Attendee	Organization
Fu-Hsian Chang	BSU, Director, Dept of Sciences
Sue Glidden	LLTC, Dean of Instruction
Sarah Larson	ABE, Director
Phil Leen	LLTC, Math Instructor
Harvey Lueck	LLTC, Science Instructor
Clem Nason	LLTC, Carpentry Instructor
Kelly Nipp	LLTC, STEM Instructor/Chairperson
Shirley Nordrum	U of MN Extension Office
Russ Schoeck	LLTC, Electrical Instructor
Steve Smith	LLTC, Science Instructor
Karen Thompson	LLTC, Business Instructor
Colleen Wells	LLTC, Biology/ITECH Instructor

ATEEC opened the first day of discussion at LLTC with an interactive presentation on program planning and curriculum development, with an emphasis on using an occupational analysis, in particular the DACUM (Developing A CurriculuM) process, to achieve program goals and better meet the specific needs of the local workforce and employers. The initial discussion focused on LLTC's STEM faculty efforts to initiate the new Natural Sciences A.S. degree curriculum, and centered around the following questions:

1. What's been done?
2. What still needs to be done?
3. What's important to include?
4. How will the new program fit as a transfer to a 4-year school?

The second day's discussion continued with LLTC faculty, with the addition of representatives from local educational institutions and organizations, to gather and share pertinent data in the following areas:

1. Introduction to LLTC and Overview of STEM
2. What are the high school student profiles that LLTC can expect to see entering the college program?
3. What is the level of high school STEM courses (examples)?
4. What is the participation and success of Native American students in STEM programs?
5. What should a successful LLTC science department look like?
6. What type of partnership activities could LLTC participate in?
7. What data is available in career testing in science related areas and among the Native American student population?
8. What is MCA testing showing? (Are the average students ready for pre-calc?)
9. Are there any new high school programs/clubs/activities in STEM?
10. Are there any new high school personnel changes, student/teacher ratio, etc.?
11. What recommendations do guidance counselor give for LLTC? (How can we help them?)
12. How has BSU restructured their department(s) within the science area?
13. How does the BSU articulation process work?
14. What other A.S. programs have transferability to BSU?
15. Will MNSCU transfer curriculum be adjusting credit categories?
16. How can LLTC do more networking with the departments/instructors at 4-year schools?

Following are the results of these discussions and a list of action items to initiate a process to achieve the goals discussed.

LLTC Internal Discussion Results (Day 1)

1. What's been done?

- Degree will be an A.S. in Natural Science designed for articulation.
- Tentative outline of suggested study plan (See Appendix B.)
- Degree for A.A. in Science, Technology, Engineering, and Math (STEM) will remain as is.

2. **What still needs to be done?**
    - Needs analysis (substantially completed)
        - Provide documentation of work thus far for the administration, advisory board, and grantor.
        - Research potential need for future Natural Science terminal A.S. degree.
        - Research where students are choosing to go to a 4-year school. (Take advantage of the 4-year need to recruit Native American students.)
    - Design/development phase
        - Check other MN Natural Science A.S. degree program curricula.
        - Meet with Bemidji State University (BSU) and other MNSCU schools for articulation talks.
        - Evaluate each course following MNSCU and BSU research.
        - Evaluate each course for whether it should be elective or required.
        - Evaluate the cultural balance of courses in the curriculum.
        - Refine "College Study and Life Skills" for students to research jobs.
        - Revise study plan to reflect above evaluations.
    - Evaluation phase
        - Student surveys
        - Faculty surveys
        - Advisory board consultation
        - Documentation of student matriculation
        - Documentation of student job success

3. **What's important to include?**
    - Cultural component requirement
    - Higher level (200) courses as bridge to 4-year school articulation
    - Research component (for possible Center)

4. **How will the new program fit as a transfer to a 4-year school?**
    - Check with 4-year schools about other A.S. programs.
    - Check on similar Natural Science A.S. curriculum that articulates to 4-year schools.
    - MNSCU transfer curriculum may be adjusting credit categories.
    - Eventual BSU & other articulation agreements
    - Step up student services for transferring students (including which 4-year schools best serve Native Americans).
    - Network with personnel (faculty, chairs, administration) at 4-year schools.

Group Discussion Results (Day 2)

1. **Introduction to LLTC and Overview of STEM**
   - Internships
   - STEM club – developing interest, giving info. on scholarships
   - New research focus at the college – climate change, water quality and wild rice
   - Level of achievement of students is increasing
   - Will keep Lib Ed, STEM Emphasis as well as A.S. in Natural Science

2. **What are the high school student profiles that LLTC can expect to see entering the college program?**
   - Adult/continuing education students
     - Many haven't taken science classes since 7-8th grade
     - Many have not taken algebra
   - Kelly estimates that about 20% of current students at LLTC have GEDs rather than high school diploma.
   - There are always some students who return to college after a few years break after high school/GED achievement.
   - Further sources of information:
     - Check on where are BJI NA student graduates are going? (Vince Gill BJI HS, Chuck (charter) could be contracted.)
     - Check on where are CLBHS students going?
     - The high school counselors will have information on where students intend to go when graduating.
     - Note: College entrance tests are a roadblock.
     - Native Education Coordinators are another source of information for student information.
   - May be losing some students to Itasca due to student housing and other life issues (e.g., Gerald White (Deer River Indian Ed Coordinator)).
   - Many high school students don't yet see the value of higher education due to 1) no family support for higher education and 2) contentment in lower paying jobs
   - Many high school students have a limited awareness of the workforce, jobs and the business world.
   - Area employment trends indicate that hours worked per week are down. Non-traditional students may be looking to change careers.
     - Discrepancy in wage scales between LLBO and BJI. HS diploma may earn 40,000/yr or $12/hour on LLBO but only $8/hr in Bemidji. Many don't see the ceiling on this until they hit their 30s.
     - Economic downturn affecting casinos too – no layoffs but working less hours
     - Bruce Baird is a contact in addition to Holly Evans.

3. **Level of High School STEM courses—Examples**
   - Pine Point has experimental programs to build interest at a young age.
   - White Earth Summer Academy for 9th graders is probably already too old. Need to start building STEM interest in 3rd grade and continue on up through college.

4. **What is the participation and success of Native American students in STEM programs?**
    - Need to research data from Department of Labor, Native American organizations, etc.

5. **What should a successful LLTC science department look like?**
    - Should we consider block/modular courses?
    - What is LLTC value added or where do we fill the gap?
    - Student interest in environmental stewardship is a strength. Develop a focus/emphasis that will attract students for needed careers, e.g., geology, hydrology, environmental technician, environmental engineer.
    - Add physics later on in program. Initially focus on water, fire, local research needs.
    - Note: Future follow up needed in this area.

6. **What type of partnership activities could LLTC participate in?**
    - Collaborate on science fairs.
    - Add a science element on career displays.
    - LLBO career fair; do a STEM focus career fair.
    - Brush up math and computer skills coursework with ABE and/or OCCE in summer, taking advantage of the free services they offer.

7. **What data is available in career testing in science related areas and among the Native American student population?**
    - Conservation is the number one career choice/preference for adult/continuing education students. This is also a major job source for this area. There are many who will be retiring from these jobs so new employees are needed (350,000-shortage in USA in environmental areas). Find documentation for this information.
    - Gather data from Minnesota Career Information System.
    - Minnesota Chippewa Tribe does testing too.
    - Counseling depends on individual student interest and the counselor interest in the area of career guidance.
    - High school teachers are point people on career guidance too.
    - Science fairs are indicative of interest areas:
        - Native American science fair at MN Museum, but no LLBO displays
        - LLTC should connect to these and host them when we have a building.
        - Schedule display creation/usage so that the display can be used both locally and then at state level.
        - BSU has a Regional Science Fair every March with several hundred student submissions.

8. **What is MCA testing showing? (Are the average students ready for pre-calc?)**
   - Testing results are cyclical. Currently statistics are high for failure rates.
   - 85% of those passing are still not up to college level skills.
   - BSU has new student entrance exam on math. Many still need 080 remedial math, and then college algebra. LLTC finds the need for 093 remedial math too.
   - There are supplemental monies for last two years and for one more year for remedial skills at adult/continuing education level, with one-on-one coursework.
   - Some MNSCU schools have students using up PELL grant funds just on developmental courses, as a money maker for the school. Luckily BSU doesn't follow this path.
   - At BSU, all students are required to get to Concepts of Calculus or CALC I
   - The Accu-placer test is different than Compass in that it's self-regulating.
   - For MCA testing, students cram, then don't use the information after the test, and lose the knowledge. A brush-up class might be helpful. OCCE is a site for offering the class in the summer
   - For AYP (Adequate Yearly Progress), the emphasis has been on reading.
     - CLBS has a gap between 3 and 4th grade performance (and two other grades) due to this.
     - There will be a major restructure of the curriculum this summer for 5th, 8th, and 11th grade levels, with 10th grade level testing.

9. **Are there any new high school programs/clubs/activities in STEM?**
   - Need to contact high school teachers to further research this.

10. **Are there any new high school personnel changes, student/teacher ratio, etc.?**
    - Restructuring of curriculum at CLBS to address identified performance gaps.
    - Fond du Lac, Red Lake, and White Earth link through ITV.
    - White Earth may become a state school rather than tribal college due to funding constraints.

11. **What recommendations do guidance counselor give for LLTC? (How can we help them?)**
    - Need brochures that link STEM studies to available and needed jobs
    - Need to document that lack of native student applicants for posted jobs
    - How do we market for students?
      - Need to address the idea that a "casino job" is enough.
      - Work with casino managers to keep offering employees continuing/college education.
    - Need materials like that from ATEEC that define career fields to show students the options. (Download free materials from the ATEEC Web site at www.ateec.org or order/purchase print material.)
    - Promote career fairs for younger students, not just high school
    - Show salary scales in science-related careers for technician level and up (4-year degree, graduate school, etc.). See DEED Web site.

- Need to develop materials to show photos of interesting jobs and use other attractive marketing materials to attract students.
- ABE (Adult Ed—Sarah) does recommend LLTC and knows to contact Rose when in need of brochures.
- LLTC recruiter needs to strengthen the link with high school counselors.
- Need to organize a meeting at LLTC with all high school counselors, similar to a successful meeting a few years ago.
- Emphasize LLTC as an alternative if students don't successfully test into BSU. Promote the open enrollment policy. Also note that LLTC does enroll others than LLBO members.
- Create new posters. Check out Sitting Bull College posters for good examples. Offer these to high school counselors to post in their offices.
- Request that Rose provide a monthly update on activities.

12. How has BSU restructured their department(s) within the science area?

- Department is more interdisciplinary. Physics merged for awhile into College of Technology and Communication, but is now back within Natural Sciences (College Social & Natural Science).
- More scholarship opportunities are available for STEM for graduate students across the USA.
- BSU chancellor's budget matches St. Cloud State and Mankato (60% non-instructional activities; 58% non-instructional at BSU; needs oversight audit).
- BSU claims to be a university of sciences and arts, but administrative accountants don't see the whole picture when they cut low-student count courses.
- There is a need to build the students to the high level courses needed for new career paths in environmental sciences and a need for creative ways to address student developmental needs in math and foundational science knowledge. (For example the Math department can build extra funding through summer courses. The high student count some summers helps with low student count other summers.)
- There is an Environmental Center including physics, computer science, toxicology (bio/chem), industrial tech, math, quality management. (Chemistry is a separate department.) Environmental management includes chemistry, physics, industrial science, geo-hydrology, environmental policy and planning, outdoor education, and an environmental social science emphasis.
- Articulations are best worked out with directors of departments and then passed on up to the dean level.
- Miscellaneous notes:
  - Competition among 4-years for students
  - The "debt" issue- don't want to leave college in debt.

13. How does the BSU articulation process work?

- Two-year colleges send curriculum which is reviewed by the department chair to establish a comparison with BSU courses.
- BSU faculty review course syllabi and send review comments according to their specialization.
- The review report is sent to the 2-year college.
- The BSU department reviews the entire 2-year degree program of study.
- After department agreement, the material is sent to the BSU Dean and VP.
- The articulation process usually takes around six months.
- Articulations are then reviewed and renewed every two years.
- Copies of existing articulation agreements can be obtained at BSU's Academic Affairs Office (755-2016). The Interim VP is Nancy Erickson.
- Note: A focus for LLTC is to enter agreements with as many 4-year colleges as possible.
- Note: LLTC needs to beef up student services for transferring students (particularly those 4-year schools which best serve Native American students).

14. What other A.S. programs have transferability to BSU?

- Vermillion
- Hennepin
- Environmental sciences with field work fits in BSU's People and the Environment course.

15. Will MNSCU transfer curriculum be adjusting credit categories?

- 120/80 program being modified for Fall 2010
- Note: Waivers needed for programs over 120/80 such an engineering
- Two-year colleges with articulations usually fill the liberal ed. credits (40 cr.) and basic science/math courses (math, biology 1100, or 1200 (ecological systems), chemistry (4 cr. 1100 or 1200 level depending on student specialization), and general ecology.
- The articulation needs to be by specialization, not just by department.
- Note: Statistics courses are not consistent. They're done by specialization and with a general one in Math Department.

16. How can LLTC do more networking with the departments/instructors at 4-year schools?

- Field courses in common (Ex. Boundary Waters in August, J Term in Hawaii) Patrick Welle, 755-4103, Tim Kroeger (space grant)
- Example: (NE or KS) State mandate to have community college and state university conference. Requirement for CCs to have articulations to universities
- Consortium of Math and CS Dept. annual meetings (ST. Cloud, Fergus Falls, LLTC, etc.)
- Suggest fall meeting for coordination and information sharing.

LLTC Action Items

Action	By Whom	By When
Ensure all LLTC personnel are satisfied with needs assessment.	Kelly	May/June 2009
Connect with HS counselors, charter and alternative learning centers to establish a list of points of contact, data on student declarations of intentions after graduation, and reasons for/against coming to LLTC. (Kelly to follow up.)	Roselynn	May/June 2009
Follow up with contacts in items 3, 4, and 5 of Day 2 discussion.	STEM Department	May/June 2009
Develop focused campaign on current LLTC program realities. Develop and implement a marketing plan per item 11 of Day 2 discussion. Keep a log of activities by month according to grant objectives. (Kelly and Steve to follow up.)	Rose and Mark	May/June 2009
Organize science fair collaboration for next academic year.	Shirley	December 2009
Obtain information from Sarah Larson on tutoring students in remedial courses.	Sue	May/June 2009
Develop a brochure/poster. Mark to hang the posters.	Sue/Mark	May/June 2009
Check Web site for data/stats on student career selection on Minnesota Career Information System, Minnesota Chippewa Tribe, DEED.	Phil	Summer 2009
Contact Pernell Knutson and inquire about CLBS curriculum changes for next year (tests used and outcomes).	Sue	Summer 2009
Organize another meeting at LLTC with all high school counselors per item 12 of Day 2 discussion.	Roselynn	Fall 2009
Obtain BSU syllabi in environmental science programs.	Phil	Summer 2009
Meet with BSU chair to plan articulation routes and start the process. Goal: Complete articulation by end of fall 2009 term (at least to the stage of getting signatures).	Kelly/Sue	Fall 2009
Obtain copies of existing articulation agreements at BSU's Academic Affairs Office per item 13 of Day 2 discussion.	Sue	Summer 2009
Meet with Trio Director to obtain plan on how they will beef up student services for transferring students per item 13 of Day 2 discussion.	Kelly/Sue	Fall 2009
Check on boundary waters field course for fall 2010. Check curriculum and organization.	Phil/Steve	Fall 2009

Arrange fall meeting of faculty/students with BSU.	Kelly	Fall 2009
Lead evaluation of A.S. degree plan, course by course, following MNSCU and BSU results. Consider research component, cultural component, and courses included.	Harv	August/Sept. 2009
Request that curriculum committee consider revising EDU 100 to include career discovery and planning.	Kelly/Sue	Fall 2009

Recommendations from ATEEC

ATEEC recognizes its role in this case is that of a facilitator to a process that will be used to develop a successful program and improve curriculum. In this role, we can offer recommendations; however it is understood that achieving these objectives can be more complex than we realize. With this preface, we have a few recommendations to LLTC based unilaterally on what we observed during our visit and the experience we possess in curriculum development.

- ATEEC was very impressed with the commitment to STEM education at LLTC. Continuing to introduce these types of programs and to integrate STEM across the curriculum for students will only enable them to be better prepared to enter the workforce.
- ATEEC was also very impressed with the quality and enthusiasm of the LLTC STEM faculty. In all discussions, it was obvious that student success is the focus of the planned curriculum.
- ATEEC recommends that a more extensive labor market assessment be conducted to ensure that the reservation and surrounding area will support the subject occupation of natural resources technician, whether an A.S. or B.S. is intended as the terminal degree.
- ATEEC recommends that an occupational analysis (preferably using the DACUM process) be conducted to ensure that curriculum is aligned with real-world workforce needs for knowledge and skills.
- ATEEC recommends that an Advisory Board be assembled specifically for the new degree to meet at least twice each school year and offer support and guidance from the business arena and community leaders.
- ATEEC recommends that this workshop discussion be continued with the wider educational and Tribal community on the reservation and surrounding area to ensure information is gathered from as many stakeholders and potential partners as possible.
- Finally, ATEEC recommends that faculty, staff, and administration involved in implementing the new Natural Science degree review the program development guidance provided in “Best Practices - A Guidebook for Environmental Technology Credit Programs*” (available as a free downloadable material at www.ateec.org/store/catalog/Multimedia-1-1.html) to ensure that the program is

as successful as possible and achieves its full potential for both students and the community.

*Note: This workshop was extremely helpful in providing ATEEC with necessary information for an upcoming revision of this guidebook, to include special considerations and case studies of Tribal Colleges.

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