DEVELOPMENT OF THE MAN IN THE MAZE INDIGENOUS EDUCATION MODEL

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Tohono O’odham Community College—The Land

[Map showing Arizona and Mexico with markers for Phoenix, Tucson, and Hermosillo.]

LEGEND
- Tohono O’odham villages in Mexico
- Traditional Tohono O’odham lands
- U.S.-Mexico border
- Tohono O’odham U.S. reservation

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Mission:
“As an accredited and land grant institution, TOCC’s mission is to enhance our unique Tohono O’odham Himdag by strengthening individuals, families, and communities through holistic, quality higher education services. These services will include research opportunities and programs that address academic, life, and development skills.”
O’odham Himdag is the culture, way of life and values that are uniquely held and displayed by the Tohono O’odham.

- Core Values or T-So:son:
  - T-Wohocudadag – Our Beliefs
  - T-Apedag – Our Well-Being
  - T-Pi:k Elida – Our Deepest Respect
  - I-We:mta – Working Together
My Story & Background

- **1994**—Francis Manuel (Elder)—learned stories, songs and history of the O’odham
- **2005**—Science Faculty Member to build a Science program based on the Himdag
- **2006-2009**—Graduate Courses in Indigenous Education
- **2015**—National Science Foundation Fellowship, Opportunities for Underrepresented Scholars 2015
- **2016**—Post graduate Certificate in Academic Leadership, Chicago School of Psychology
Problem Statement

• How do we unify our educational programs and align our programs with the mission to offer culturally-based curriculum?

• How do we know we are fulfilling our mission of “enhancing the O’odham Himdag and providing holistic, high quality education?”

• How do we tell our story and provide evidence to our accrediting body and funding agencies?
## 2013-2015 Program Level Assessment

### A.S. in Life Science Outcome 3: Display a sense of place
Service Learning Capstone Project

<table>
<thead>
<tr>
<th>Exemplary (40 points)</th>
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<tbody>
<tr>
<td><strong>Problem Identification</strong></td>
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<tr>
<td><strong>Problem-solving</strong></td>
</tr>
<tr>
<td><strong>T:So-son</strong></td>
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</table>
The Need for an Indigenous Education Model

- Shared cultural metaphors embody tribal epistemologies and worldviews and strengthen identity
- Indigenizing and Decolonizing Western education
- Unified and systematic approach to culturally-based education
- In the words of indigenous scholars:
  - “Comprehensive restructuring of culturally responsive education that takes into account Indigenous epistemologies and tribal communities” (Castagno and Brayboy 2008)
  - “Use of the cultural metaphors based on symbolic expressions “that reflect the metaphysical, ecological and cultural constructs of a tribal epistemology” and which reflect “common understandings and shared foundations for traditional ways of learning” (Cajete 2005)

- But, how do tribal colleges achieve this?
Purpose of Project

Development of an Indigenous Education Model for the Associate of Life Science Program at Tohono O’odham Community College (TOCC)

To develop an indigenous education model for TOCC based on a cultural metaphor

Apply the model to curriculum development and program assessment

To create a methodology for creating an indigenous education model for other TCUs
Methodology

Phase 1
- College-wide training in the Indigenous Evaluation Framework
  - Partnership with AIHEC Indigenous Evaluation Framework Project
  - May 2015

Phase 2
- Creation of Man in the Maze Model with elder and faculty
  - NSF AIHEC WIDER Project
  - Summer 2015

Phase 3
- Pilot Model Using PBL Units
  - AY 2015-2016

Phase 4
- Refine Model for A.S. of Life Science Program
  - Spring 2016
Indigenous Evaluation Framework

• Evaluation processes need to be based on a cultural framework unique to each tribal community (LaFrance and Nicholls 2010)
• In order to be robust enough and value different “ways of knowing”
• Four core values: people of place, recognizing our gifts, honoring family and community, and respecting sovereignty
Introduction to the Man in the Maze

- **Natural symbol for holistic educational journey founded on the Himdag.**
- **Represents a person’s journey through life and reaching for one’s dreams.**
- **Rich in multiple layers of meaning and is reflective on one’s journey to both inner and outer knowledge through life.**
Pilot Project—NSF AIHEC WIDER Grant

Using Problem-based Learning Model to Promote indigenous Sustainability and Improve Learning in Math and Science

• Appropriate application to create and apply the model
• STEM PBL units focused on themes of environmental sustainability, health and well-being and incorporated T-So:son
• Team PBL:
  • Camillus Lopez, Elder, Tohono O’odham Culture Faculty
  • Jorge Guarin, M.S., Mathematics Faculty
  • Adrian Quijada, Ph.D., Science Faculty
Teachings on the Man in the Maze

- The Man in the Maze/I'itoi Ki: is a life-journey that follows a person's life cycle. A visual map that can be utilized to give a person a measurement tool.

- The dark spot in the center symbolizes the four major life sacraments that every person must pass through to complete the journey. The path leads persons to four encounters with the dark spot. Birth, Puberty, Responsibility and Acceptance to the completion of a life.

- The symbol can be adapted to any process or format as it provides an assessment for all persons involved to amend the material as completion is attained. (C. Lopez 2015)
Each unit is framed by the cultural symbol and wisdom of the Man in the Maze.

Each successive journey represents mastery of a higher level of learning.

Based on Bloom’s taxonomy, these are:

- **First assessment: Knowledge**
- **Second assessment: Understanding**
- **Third assessment: Application**
- **Fourth assessment: Analyzing/Evaluating/Creating**

Each journey builds on the last.
MAN IN THE MAZE Model for Course or Unit Level
Based on the four journeys

- First assessment: Knowledge
- Second assessment: Understanding
- Third assessment: Application
- Fourth assessment: Analyzing/Evaluating/Creating
# Unit Level Application

## BIO 154N Global Change Biology: Climate Change on the TON-- the Water-Food Nexus

<table>
<thead>
<tr>
<th>Goals and outcomes</th>
<th>Assessment</th>
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</thead>
<tbody>
<tr>
<td><strong>First Journey (Knowledge)</strong></td>
<td></td>
</tr>
<tr>
<td>Describe traditional and modern uses of water on the Tohono O’odham Nation</td>
<td>Quizzes</td>
</tr>
<tr>
<td><strong>Second Journey (Understanding)</strong></td>
<td></td>
</tr>
<tr>
<td>Articulate indigenous perspectives and worldview of water, explain the relationship between water and food on the Tohono O’odham Nation,</td>
<td>Discussions, reflections, and short homework assignments.</td>
</tr>
<tr>
<td><strong>Third Journey (Application)</strong></td>
<td></td>
</tr>
<tr>
<td>Identify potential impacts of climate change on both traditional and modern water availability for the O’odham.</td>
<td>Individual written assignments</td>
</tr>
<tr>
<td><strong>Fourth Journey (Creating)</strong></td>
<td></td>
</tr>
<tr>
<td>Develop an adaptation plan for meeting the future water and food needs of the Tohono O’odham Nation that incorporates includes traditional ecological knowledge, indigenous viewpoints on water and T-So:son or cultural core values.</td>
<td>Collaborative Group Project to create a Climate Change Adaptation plan for the Tohono O’odham Nation</td>
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Problem-based Learning Units

MAT 220 Calculus I

Limits and their applications on the Tohono O'odham Nation
Understanding the limit concept by using a cultural framework

Students learn the concept of limit, apply its mathematical properties and explore how this central idea in Calculus could be presented via Pima. Students will have a discussion on how cultural values, such as the "titla na izna" would produce a connection with mathematical concepts like limits.

First journey: Knowledge
Describe the mathematical and intuitive definition of limits.
Describe the concepts used in this definition.
Describe the misconceptions in the limit definition.

Second journey: Understanding
Explain how limits are used in the limit idea.
Explain the parts involved in approaching the limit.
Interpret how the "titla na izna" can support an alternative way to define limits.

Third journey: Application
Identify applications of limits at the Tohono O'odham Nation.
Final journey: Analyzing/Evaluating/Creating
Analyze the idea of reaching a limit.
Develop a strategy for evaluation of limits.
Review the limit process. Create an approach to present this concept in your own words.
Evaluate your approach and modify the plan if needed.

BIO 100 Biology Concepts

Diabetes and Cancer risks on the Tohono O'odham Nation
Understanding the biological and cultural basis

Students learn the biological principles that make people susceptible to cancer and diabetes and explore why recently Native Americans are particularly vulnerable. Students will have a discussion on how the Pima people can help to reduce vulnerability.

First journey: Knowledge
Describe the medical and biological basis of cancer and diabetes.
Describe the current situation of cancer affecting Native Americans.
Describe the causes and habits that trigger cancer and diabetes.

Second journey: Understanding
Describe how diet and physical activity improve the balance in our body and body mass index cancer and diabetes.
Describe the factors and causes that are increasing on the Tohono O'odham Nation.
Interpret how Pima values can support a preventive attitude toward cancer and diabetes.

Third journey: Application
Identify the specific factors affecting vulnerability to cancer and diabetes at the Tohono O'odham Nation.
Final journey: Analyzing/Evaluating/Creating
Analyze current policies and actions at Tohono O'odham Nation to reduce cancer and diabetes risk.
Develop a prevention plan to be implemented among students and staff at TOCC that incorporates medical advice and health habits towards cancer and diabetes prevention.
Evaluate the reception of the plan, welcome feedback and modify the plan based on cultural options and views.

BIO 105 Environmental Biology

Ecological Relationships and Ways of Knowing in the Sonoran Desert

Students learn about Sonoran desert ecology. Western and traditional ways of knowing with a special emphasis on k'ingi or inter-relationships. Students investigate these relationships by applying their knowledge to an ecological question and reflecting on how this increased their understanding of k'ingi or inter-relationships.

First journey: Knowledge
List the 5 rules in the process of Western Science.
 Know the three rules for scientific experimental design.
Define ecology.
Describe k'ingi and abiotic interrelationships.

Second journey: Understanding
Describe an independent and dependent variable.
Compare and contrast O'odham Ways of Knowing and Western Scientific Ways of Knowing.
Explain the difficulty in relating to ecology and the story of the Rain and the Wind.

Third journey: Application
Apply knowledge of ecological principles to create a hypothesis for an ecological question.
Develop an experiment to test a hypothesis.

Fourth journey: Analyzing/Evaluating/Creating
Conduct a field-based scientific experiment.
Analyze and interpret data using mathematics and ecological principles.
Prepare a scientific report and presentation.
Reflect on understanding of the Pima way of knowing.

BIO 154 Global Change Biology

Climate Change on the Tohono O'odham Nation

The Water-Food-TEK Nexus

Students learn about climate change impacts on food and water on the Tohono O'odham Nation and create a climate change adaptation plan that includes climate change science and traditional ecological knowledge.

First journey: Knowledge
Describe traditional and modern uses of water on the Tohono O'odham Nation.
Describe traditional and modern food production on the Tohono O'odham Nation.
Describe current and changes in temperature and precipitation patterns in the Southwest U.S.

Second journey: Understanding
Articulate indigenous perspectives on water and water resources.
Explain the relationship between water and food on the Tohono O'odham Nation.
Interpret the traditional O'odham calendar from the perspective of traditional food and water resources.

Third journey: Application
Identify potential impacts of climate change on both traditional and modern water availability for the Tohono O'odham Nation.

Final journey: Analyzing/Evaluating/Creating
Analyze water policy, scenarios for inclusion of Native Americans as stakeholders and incorporation of traditional ecological knowledge.
Develop an adaptation plan for meeting future water and food needs of the Tohono O'odham Nation.
Evaluate a climate adaptation plan for comprehensiveness, scientific validity and inclusion of cultural options.
What we learned

- The model promotes success in student learning
- Over 60 students in 4 STEM courses
- Results Indicate Improvement In:
  - Student Learning of Math & Science Concepts
  - Understanding of Cultural Core Values
  - Attitudes Toward Math & Science
  - Integration of Learning

![Bar chart showing improvement in various categories]
What We Learned

- Reflects the natural learning process of acquisition of knowledge and discovery.
- Creates a framework where O’odham students acquire a unique sense of cultural ownership.
- Promotes a culture of on-going assessment and ensures that learning and assessment occurs at successive levels of Bloom’s taxonomy.
- Model for curriculum design as well as evaluation and assessment (backward design approach).
- Serves as an indigenous curriculum map.
What We Learned

• The Man in the Maze Model is adaptable to any program or educational unit at TOCC from unit to course to program. Some examples of applications discussed at the workshop:
  • GED Program
  • Painting Program
  • Research Course
  • Business Course
The Next Step--Refining the model

- Create a holistic approach by including the inner as well as the outer learning journey
  - Inclusion of student self-reflection and self-assessment needs to be added
  - This promotes intrinsic motivation and reflects the inner learning component as well as the outer learning
- It is important to give back to the community, so final journey will create something of value or share knowledge gained with the community
Program-level for A.S. Life Sciences

Holistic Model of Education

1st-2nd-3rd/Body-Mind-Spirit/Curriculum-Learning-True Self
Holistic Model of Education

Holistic model of education because it takes into account the whole student as well as the relationship of the student with self, others and community

• Aims & Goals of the Journey:
  ❖ Strengthen Identity
  ❖ Personal Transformation—one’s body, mind and spirit are involved in the pursuit of the true self and knowledge
  ❖ Benefit to the community

It is an indigenous education model because it takes into account the “unified experience of being a human being” (Deloria 1999)
## Program-level for A.S. Life Sciences

### Holistic Model of Education

1st-2nd-3rd/Body-Mind-Spirit/Curriculum-Learning-True Self

<table>
<thead>
<tr>
<th>Journey:</th>
<th>Curriculum</th>
<th>Learning</th>
<th>True Self</th>
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<tbody>
<tr>
<td><strong>First journey:</strong></td>
<td>Introduction of PLO’s</td>
<td>Assessment at Knowledge Level (I)</td>
<td>Student Self-Assessment 1 (Identify Goals, Timeline &amp; Obstacles)</td>
</tr>
<tr>
<td><strong>Second journey:</strong></td>
<td>Reinforcement of PLO’s</td>
<td>Assessment for Understanding (R1)</td>
<td>Student Self-Assessment2 (Honest Check-in and re-evaluation)</td>
</tr>
<tr>
<td><strong>Third Journey:</strong></td>
<td>Reinforcement of PLO’s</td>
<td>Assessment for Application of Knowledge (R2)</td>
<td>Student Self-Assessment 3 (Honest Check-in and Re-evaluation)</td>
</tr>
<tr>
<td><strong>Fourth Journey:</strong></td>
<td>Creating something of value using knowledge gained and sharing with community</td>
<td>Assessment for PLO’s (A): analysis, evaluation and creation.</td>
<td>Student Self-Assessment 4 (Celebration of knowledge &amp; completion of journey; reflection on service to community)</td>
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</tbody>
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## CURRICULUM MAP A.S. Life Science

<table>
<thead>
<tr>
<th>PROGRAM LEVEL OUTCOMES</th>
<th>CORE COURSES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>BIO 105N</td>
</tr>
<tr>
<td>1. Demonstrate knowledge of scientific concepts &amp; vocabulary</td>
<td>I</td>
</tr>
<tr>
<td>2. Design and conduct a research project</td>
<td>I</td>
</tr>
<tr>
<td>3. Display a sense of place</td>
<td>I, R1</td>
</tr>
<tr>
<td>4. Apply critical and creative thinking skills to solve problems</td>
<td>I</td>
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Re-framing this project in the context of the Man In the Maze

- **First journey:** Training and creating the Man In the Maze Model
- **Second journey:** Understanding and exploring the model by applying it to the PBL units
- **Third Journey:** Applying this understand expanding the model to include a full program-level curriculum design and assessment
- **Fourth Journey:** Using this model to evaluate and assess the A.S. Life Science program
Impact & Key Accomplishments

• Creation of a Teaching-Learning Community Committed to Culturally-based Curriculum & Assessment
• Transformation of teaching strategies & philosophy to include Indigenous Knowledge.

“The journeys of the Man in the Maze model helps to integrate tradition and science. Both are elements of knowledge that can be explored and learned as paths of the journey.” Quijada 2016
Impact & Key Accomplishments

- Robust and culturally appropriate model for both curriculum development and assessment

- Systematic approach and unified vision of “holistic, high quality education” which “enhances our unique Himdag”

- Institutional transformation by building a culture of collaboration

- Provides a methodology and paradigm for indigenous education that can be applied to other institutions

The Future

- Applying the model across all of our programs
- K-12 Educational Model
- Applying the model to student retention (Student Services)
- Grant Evaluation
Thank you!

Questions, comments, insights?
References


