Integrating STEM and Cultural Identity in Post-Graduation Planning

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Context

Ske Tas, Kamduum (Hello, how are you doing)? Ani an ap Ce:gig (My name is) Crystal M.A. Hale, and I serve as an instructional coach at the Accelerated Learning Academy (ALA) within the Salt River Pima-Maricopa Indian Community (SRPMIC). ALA is a beacon of hope for Native American students, designed to provide vital support for credit recovery and culturally relevant academic pathways.

With a bachelor's degree in psychology and sociology, a master's degree in education and Innovation, and a master's degree in educational leadership (Principalship), I am passionately committed to reimagining equitable, community-rooted education. In 2023, I refocused my efforts to empower Native American learners and educators. Currently, I am pursuing a Doctorate in Higher Education Leadership.

At ALA, our students are resilient O'odham and Piipaash youth who have disengaged from traditional public-school systems. They are creative, deeply connected to their heritage, and deserving of an educational environment that honors their experiences while maintaining high academic standards. They face challenges related to generational trauma, socio-economic barriers, and a lack of culturally responsive curricula. Addressing these challenges fuels my urgency and determination as an instructional leader.

My connection to this community is both personal and professional. Though I am not a tribal member, I am a dedicated partner, advocate, and learner who respects and cherishes the preservation of traditional Native American cultures. I approach my work with humility and unwavering commitment to uplifting Indigenous voices in every aspect of educational reform.

The mission and vision of this Leadership Practice Guide are grounded in my belief that culturally responsive and community-centered leadership is essential for transforming schools in Indian Country. This guide provides practical, research-informed strategies that integrate educational best practices with Indigenous knowledge systems. My goal is to build leadership capacity among educators and community members, empowering students, honoring culture, and achieving educational sovereignty within all Salt River Schools and the O’odham and Piipaash communities.

Rationale

I chose the topic of culturally responsive STEM-based post-graduation planning for my leadership guide because it addresses a pressing need among students at the Accelerated Learning Academy (ALA). Many of these students have faced interrupted academic journeys and feel disconnected from traditional college and career readiness frameworks. The students we serve, primarily O’odham and Piipaash youth, deserve an education that honors their identities, backgrounds, and aspirations.

This guide aims to integrate STEM pathways with culturally relevant practices, reimagining post-graduation planning as a personalized, empowering, and community-centered process.

While many students opt to attend programs at the East Valley Institute of Technology (EVIT) in the metro Phoenix area, to pursue technical paths rather than academic ones, it is essential to make them aware that these are not the only options available. Additionally, I want them to understand the history of the land they inhabit and how STEM can offer them meaningful career opportunities that align with their cultural traditions and land-use practices.

This topic is particularly relevant to leadership in Indigenous communities as it emphasizes the importance of educational sovereignty. Leadership grounded in Indigenous values must create systems that prepare youth to navigate and transform Western institutions. STEM fields—such as environmental science, technology, health, and engineering—offer powerful opportunities for tribal communities to reclaim land stewardship, foster economic innovation, and promote data sovereignty. However, without intentional and culturally responsive guidance, Indigenous youth are often underrepresented and underserved in these areas. According to Marin (2015), Indigenous leadership in education must focus on sovereign, STEM-rich futures that are culturally sustaining.

This topic is crucial for culturally responsive schooling because it challenges the deficit narratives surrounding alternative education and instead centers on student strengths, identities, and community assets. Culturally responsive post-graduation planning affirms that success does not follow a single pathway. It enables students to envision futures in entrepreneurship, tribal governance, trades, college, or creative industries, all of which may intersect with STEM. Research supports that integrating Indigenous knowledge systems into STEM learning enhances student engagement, motivation, and academic achievement (Bang et al., 2017). Additionally, land-based and place-based pedagogies have been shown to bridge cultural relevance with science learning (Medin & Bang, 2014).

This topic resonates with me on a personal level. As an instructional coach, I have guided students and teachers through moments of disconnection and re-engagement. I have witnessed students come alive when they realize that coding can be a tool for language revitalization or that environmental science directly connects to protecting tribal lands. My background in education and psychology drives me to create systems that heal rather than harm. I want all students to understand that the future is not something to fear, but something they can shape. Increasing exposure to STEM and STEM environments—such as hosting STEM panels, attending regional or national science fairs, and participating in Native STEM events—will help students see themselves represented in these fields. This representation is essential for building students' capacity and shifting their mindset to envision new possibilities for their futures.

This leadership guide will be grounded in evidence-based practices that incorporate cultural and academic rigor. Research by Bang et al. (2015) highlights that culturally sustaining STEM education must be co-created with communities, incorporating their ecological, historical, and political contexts. This aligns with our work at ALA, where tribal departments and families must be co-designers of student success. Additionally, Cajete (2000) argues for expanding the scope of career readiness to include “tribally defined goals of wellness, responsibility, and cultural continuity,” a vision that this leadership guide will embrace.

Topic Summary

Leadership for Culturally Responsive, Standards-Aligned, Project-Based Learning at ALA Using Edgenuity and STEM Integration

The Salt River Schools' Accelerated Learning Academy (ALA) offers a distinctive educational model tailored for Native American students in an alternative high school environment, with a strong focus on credit recovery. The academy utilizes Edgenuity, a digital curriculum that facilitates personalized learning pathways for each student.

As an instructional leader in this setting, the emphasis is on integrating culturally relevant teaching practices with digital learning tools. This approach aims to maintain academic rigor through standards-aligned project-based learning (PBL) initiatives and enhance student achievement by focusing on main ideas and key details, which have been identified as the instructional priority for the year.

This leadership guide is informed by participation in the Indian Country School Leadership Institute (ICSLI) seminar and research into instructional equity, culturally responsive pedagogy, and digital learning frameworks specifically designed for alternative educational settings. The ultimate goal is to create learning environments that not only support graduation for students engaged in credit recovery but also foster a sense of identity, critical thinking skills, and 21st-century competencies, particularly in STEM fields.

A central challenge identified is the lack of engagement and pacing among Edgenuity users. In response to this issue, the academy has initiated the integration of teacher-designed PBL projects that complement digital instruction, creating deeper learning opportunities that are anchored in the community and culture of the students.

Background and Context

The Accelerated Learning Academy (ALA) caters specifically to Native American youth, a demographic often characterized by credit deficiencies and educational disruptions. These students face multiple challenges, including historical trauma, socioeconomic inequities, and a lack of cultural relevance in mainstream educational curricula (Brayboy et al., 2015). As a result, instructional leadership at ALA is focused on implementing culturally sustaining pedagogy while also addressing the technical requirements associated with credit recovery, graduation timelines, and adherence to educational standards (Paris & Alim, 2017).

Edgenuity serves as the primary instructional delivery system at ALA, providing self-paced learning modules across essential academic subjects. Although it offers flexibility and facilitates credit recovery, there are instances where the program may lack the cultural engagement and real-world applicability that foster student involvement and critical thinking. This is particularly evident in alternative school environments, where students often thrive on contextualized and experiential learning.

To enhance the educational experience, ALA's leadership is pursuing a dual strategy: first, integrating Project-Based Learning (PBL) as a complementary approach to Edgenuity; and second, emphasizing professional development and coaching cycles focused on instructional strategies that improve comprehension of main ideas and key details across all subject areas. This strategy was developed based on insights gained from classroom walkthroughs and audits of student work, which highlighted significant gaps in content mastery stemming from inadequate foundational skills in reading informational texts.

The Role of Project-Based Learning (PBL)

Project-Based Learning (PBL) is an essential strategy to address passive engagement in digital instruction. It is an evidence-based approach that enhances problem-solving abilities, collaboration, and mastery of content (Larmer et al., 2015). At the ALA, Project Based Learning is not intended to replace Edgenuity; rather, it functions as a complementary instructional layer. For instance, after students complete a unit on the U.S. Government through Edgenuity, they may undertake a hands-on civic engagement project for Civics Day, which could involve designing mock legislation or analyzing the role of tribal sovereignty in the Constitution.

Each PBL unit is meticulously aligned with Arizona state standards and is scaffolded to reinforce the key focus of the year: identifying and analyzing main ideas and key details. This method ensures that as students independently progress through online coursework, their comprehension and analytical skills are further developed through live, culturally relevant PBL lessons.

To support this shift, teacher professional development (PD) has been restructured. PD sessions are organized around Jim Knight's Impact Cycle, which emphasizes the identification of instructional goals, learning strategies, and improvement through coaching. In addition, coaching walkthrough tools have been updated to assess how effectively PBL units are integrated with the Edgenuity pacing and to monitor student engagement with core comprehension standards.

STEM Integration in PBL

In alignment with the goals of Salt River Schools and the national initiative for increased Native representation in STEM careers, ALA's Project-Based Learning (PBL) strategy intentionally incorporates STEM-based projects. Many Native students often feel a cultural disconnect from STEM fields; however, research indicates that linking STEM education to community knowledge systems and Indigenous ways of knowing can enhance engagement (Bang & Medin, 2010).

For example, students enrolled in a Biology Edgenuity course may engage in a PBL project analyzing the Salt River ecosystem and exploring water conservation, thereby applying scientific concepts to the land stewardship values inherent in O'odham and Piipaash culture. Similarly, math projects might involve analyzing tribal census data or developing community-based business plans. These hands-on projects provide relevance and rigor to otherwise abstract content.

Culturally Responsive Leadership as the Foundation

This guide draws extensively on the insightful research conducted by Khalifa et al. (2016) and incorporates the principles of the Culturally Responsive School Leadership (CRSL) framework. According to CRSL, it is imperative for school leaders to prioritize Indigenous voices, actively challenge and dismantle deficit narratives, and collaboratively create learning environments where every student feels acknowledged and empowered to thrive.

At ALA, this approach translates into meaningful collaboration with culture teachers, respected elders, and families to thoughtfully design Project-Based Learning (PBL) experiences that are rich in cultural relevance. Furthermore, it requires a meticulous review of Edgenuity content to identify and address any biases or omissions that may negate the diverse narratives of Indigenous students. It is also essential that the PBL work crafted by teachers authentically reflects the rich tapestry of tribal histories, governance structures, and the profound ecological knowledge inherent in Indigenous cultures.

Implementing this leadership practice necessitates changes at various levels, including scheduling, coaching, curriculum planning, and assessment. For instance, an "Essential Understandings" document was collaboratively developed with input from community members to define what culturally sustaining project-based learning (PBL) looks like in the context of ALA.

Literacy Priority: Main Ideas and Key Details

To align all instructional efforts, the leadership team has identified a specific cross-content skill as the priority for the 2025 school year: understanding main ideas and key details. Walkthroughs and formative data have shown that while students are progressing in Edgenuity coursework, they are not demonstrating proficiency on state-aligned benchmark assessments, especially in comprehending informational texts.

All project-based learning (PBL) units, coaching goals, and classroom walkthroughs focus on improving each student's understanding and application of main ideas and key details. For example:

- In science PBL, students summarize their hypotheses by identifying main ideas from their data collection.
- In English Language Arts (ELA), students extract key details from oral storytelling and textual analysis.
- In elective courses, such as Creative Writing and Culture, students compare oral and written narratives and identify core themes and supporting evidence.

Edgenuity lessons are supplemented with anchor charts, vocabulary maps, and scaffolded reading tools to reinforce the same cognitive processes across subjects. Our impact cycles ensure this literacy skill is not just taught, but also observed, coached, and measured throughout the quarter.

Research and Theoretical Foundations

This leadership guide is grounded in multiple strands of research:

- Culturally Responsive Leadership: Khalifa, Gooden, and Davis (2016) emphasize that leaders must promote equity by building relationships, understanding community histories, and addressing exclusionary practices.
- Project-Based Learning: Research by Thomas (2000) and Larmer et al. (2015) shows that PBL enhances critical thinking and content mastery, particularly for marginalized learners when properly scaffolded.
- Digital Learning and Credit Recovery: Findings from Pane et al. (2017) indicate that personalized learning platforms need to be supplemented with human interaction and contextually relevant materials to be effective.
- STEM Equity in Indigenous Education: Bang and Medin (2010) highlight that meaningful participation in STEM occurs when Indigenous values are honored and reflected in the curriculum.

This guide synthesizes these theories into a pragmatic approach that aligns with ALA's model and mission. It provides a framework for action that integrates digital learning, cultural inclusion, project-based rigor, and literacy development into one cohesive system.

Summary

This summary outlines a leadership plan tailored to ALA's unique context and student needs. By integrating PBL into Edgenuity, emphasizing culturally grounded STEM instruction, and centering our work on the foundational comprehension skill of understanding main ideas and key details, we are creating a learning environment that is equitable, rigorous, and deeply rooted in student identity.

As this leadership practice is implemented, the subsequent sections of the guide will detail how to train staff, assess impact, and sustain this model beyond the initial rollout year.

Implementation Plan

As a culturally responsive instructional leader at Salt River Schools' Accelerated Learning Academy (ALA), the implementation plan is designed to increase student engagement, academic achievement, and college/career readiness through PBL, literacy development, and STEM integration. Each goal is aligned to our ICSLI learning, with a deep emphasis on culturally sustaining practices and outcomes relevant to Native students. These goals incorporate the new schoolwide initiatives of main ideas and key details as literacy priorities and promote engagement through hands-on, real-world applications.

Goal 1: Launch a Culturally Responsive STEM-Infused Science Fair Across All Salt River Campuses

Establish an annual Salt River Schools Science and STEM Fair that includes students from ALA, Salt River Elementary, and other Salt River educational sites. The event includes a student exhibition of PBL-based science projects, a culturally grounded keynote from a Native STEM professional, and a showcase of STEM-related booths (robotics, environmental science, tribal agriculture, etc.). Local community members and Salt River tribal departments are invited to judge projects using rubrics that include cultural relevance, clarity of main ideas, and demonstration of key details. Each campus prepares projects with support from instructional coaches and teachers trained in project-based learning strategies.

Goal 2: Create University and Industry Partnerships to Expand STEM Engagement

Partnering with Arizona State University, Maricopa Community Colleges, and local industry leaders (e.g., Intel, Salt River Materials Group, and SRPMIC's own IT and Environmental departments) creates hands-on field trips, virtual lab tours, and mentorship opportunities. These partnerships culminate in student visits to regional and national STEM expos (e.g., AISES Conference, Arizona SciTech events). The purpose is to spark interest in STEM careers and expose students to Native professionals working in STEM fields.

Goal 3: Embed Project-Based Learning in Edgenuity and Elective Courses

Each teacher at ALA receives support in embedding at least one PBL lesson per quarter that aligns to core academic standards while integrating student interests and cultural knowledge. The instructional coach models lesson design that focuses on building students' capacity to identify main ideas and explain key details within the PBL format. PBL projects serve as formative assessments and will be eligible for presentation at the Science Fair.

Goal 4: Strengthen Student Literacy through a Focus on Main Ideas and Key Details Across All Content Areas

Through coaching and walkthroughs, leadership supports all ALA teachers in applying consistent strategies to help students extract, summarize, and articulate the main ideas and supporting details in their assignments, whether in Edgenuity or PBL formats. This strategy is reinforced across ELA, social studies, science, and elective courses, with anchor charts, sentence frames, and student feedback loops integrated into instructional routines.

Goal 5: Implement a Culturally Responsive Coaching Cycle to Support PBL and STEM Integration

The coaching model follows Jim Knight's Impact Cycle, and is adapted to include classroom co-teaching, data review, and lesson modeling with an emphasis on PBL, STEM engagement, and literacy skill-building. Observations use a walkthrough tool aligned to culturally relevant teaching indicators and main idea/key detail focus areas. Teachers set individual learning goals, receive support throughout the quarter, and reflect with the coach using student work and achievement data.

Assessment

Evaluating the impact of any leadership practice is essential to ensure alignment with intended goals, equity principles, and meaningful change. At Salt River Schools' Accelerated Learning Academy (ALA), where students engage in credit recovery through the Edgenuity platform, the need for culturally responsive, contextually grounded, and innovative assessment practices is paramount. As part of the leadership initiative that integrates project-based learning (PBL), expanded STEM engagement, and an academic focus on main ideas and key details, the assessment framework must go beyond traditional benchmarks. It must honor the lived experiences of Native students, prioritize engagement over compliance, and adapt to the hybrid nature of instruction at ALA.

The first layer of assessment involves measuring the effectiveness of our instructional priorities: ensuring students can identify and explain main ideas and key details in their learning, whether through Edgenuity assignments or hands-on PBL experiences. In a traditional setting, this might be measured through standardized test performance or reading comprehension scores. However, given ALA's focus on credit recovery and our students' diverse academic trajectories, success must be measured through growth. This includes assessing how students interact with digital texts, how often they complete assignments independently, and whether their project reflections and discussion responses demonstrate an understanding of main ideas and key details. These indicators will be reviewed biweekly by instructional coaches and teachers, using walkthrough checklists, Edgenuity progress reports, and direct observation of student work and engagement.

Another layer of evaluation centers on the impact of culturally responsive project-based learning. Since students at ALA are not in traditional, semester-long courses, our PBL strategy must be flexible and rooted in real-time relevance. The assessment of this element will rely on qualitative measures including student interviews, PBL project reflections, and evidence of student choice in topic selection. Teachers may use rubrics that evaluate not only academic content, but cultural relevance, depth of reflection, and creativity. For example, a student completing a culture project may document their learning through digital storytelling, posters, or short videos. Teachers may assess these products for content accuracy and cultural connection, while the instructional coach will evaluate whether students demonstrate deeper learning beyond surface-level engagement.

To ensure STEM engagement is growing, school systems can track participation in STEM-specific events, such as the schoolwide science fair, local university STEM partnership activities, and regional or national field trips. Each of these opportunities will include pre- and post-surveys for students to reflect on their experience and how it has influenced their interest in STEM. Additionally, student attendance, participation, and enthusiasm will be noted by advisors and teachers through anecdotal records and checklists. During post-event reflections, students will write or record a brief piece describing what they learned and how the activity connects to their future goals. This feedback will inform future decisions about which partnerships and field trips are most impactful.

Walkthroughs and informal observations can serve as essential data collection points throughout the year. Using a culturally responsive walkthrough form aligned to Jim Knight's Impact Cycle, instructional coaches will observe how often teachers provide opportunities for students to

engage in dialogue, show cultural artifacts in their lessons, or encourage students to connect learning to their own identity. Additionally, we will track how many teachers are successfully implementing at least one PBL project per quarter and how they are integrating main ideas and key details instruction into that work. Reflections and feedback from these walkthroughs will be shared in coaching cycles and documented as part of our continuous improvement plan.

Stakeholder feedback is another critical component. Students, teachers, and families may be invited to complete brief surveys and participate in listening circles twice a year. These conversations will center on whether students feel represented, whether instruction feels meaningful, and how they perceive their academic growth. Family engagement at ALA is often complicated by students being 18 or older, so we will offer optional feedback mechanisms for extended family, mentors, and community members to provide input as well. For students under 18, families will be invited to observe PBL project showcases or STEM events and provide input on their child's development and engagement.

To measure leadership impact, the instructional coach should maintain a detailed coaching log tracking which staff have received training or support in culturally responsive teaching, PBL design, or STEM integration. At the end of each quarter, these logs can be analyzed to determine whether professional development goals are being met and if they correlate with increases in student engagement or academic performance. Adjustments can be made accordingly, and teacher voice will be elevated through surveys and feedback sessions to ensure ongoing support is aligned with classroom needs.

Importantly, evaluation practices must be adaptive. Recognizing that not every student's success will look the same, and school systems must resist one-size-fits-all measures of achievement. Instead, the focus should remain on growth—growth in confidence, engagement, academic fluency, cultural identity, and STEM curiosity. This growth can be documented through both formal metrics and informal narratives, allowing for a fuller picture of how leadership practices are shaping the learning environment at ALA.

In sum, the assessment component of this leadership guide is not a static checklist, but a living framework that evolves alongside the needs and voices of our community. By embedding culturally relevant, student-centered evaluation into all aspects of implementation, we ensure that the work remains authentic, impactful, and aligned to the vision of Salt River Schools: to educate and empower all students through strength in culture and academic excellence.

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