Teaching Strategies and Key Issues in American Indian and Alaskan Native Education

Muhammad Talal Khan[1*] and Sakiko Ikoma[2]

[1*]Shidler College of Business, University of Hawai'i at Mānoa, 2404 Maile Wy, Honolulu, HI 96822, USA.
[2]Fredericksburg, VA, USA.

*Corresponding author(s). E-mail(s): mtkhan@hawaii.edu;
Contributing authors: sakiko.ikoma@gmail.com;

Author Profiles

Muhammad Talal Khan — Google Scholar — ORCID
Sakiko Ikoma – Not Available

Abstract

Educating students from diverse cultural backgrounds, particularly American Indian and Alaskan Native (AI/AN), presents unique challenges and opportunities. Using unsupervised machine learning methods and drawing on textual open-ended survey responses by teachers, this study sheds light on salient themes about effective teaching strategies and important issues in an educational context. Our analysis identifies 20 topics related to effective strategies and 21 concerning important issues. Specifics of the teaching context, such as grade level, AI/AN student density, and school type, are all crucial determinants of teachers' reflections. Different factors matter differently for teachers' emphases on particular topics, a finding indicative of the complex nature of AI/AN education.

Keywords: Structural Topic Model, Education, Teaching, American Indian, Alaskan Native, Open Ended Survey, NAEP

1 Introduction

Despite decades of research and policy initiatives, American Indian and Alaskan Native (AI/AN) students continue to experience lower academic outcomes relative to their non-native peers [1, 2]. Understanding effective teaching strategies and key issues is crucial for addressing the persistent achievement gaps and unique challenges AI/AN student populations face. Educators working directly with students can provide insider viewpoints not captured by quantitative studies alone [3]. Their collective expertise and experience are invaluable resources for educational improvement, and incorporating educators' perspectives can help bridge the gap between academic theory and practice [4, 5].

Existing AI/AN education research underscores several critical factors for student success. Studies emphasize the importance of culturally responsive teaching that integrates indigenous knowledge, languages, and traditions into the curriculum [6–9]. Building solid relationships with AI/AN students and their families and collaborating with tribal communities to create meaningful learning experiences are crucial to student success [1, 10, 11]. Finally, addressing socioeconomic challenges [12] and preventing disciplinary exclusions [13, 14] can help support AI/AN students. Utilizing, Structural Topic Modeling (hereon STM) [15], this study extends the existing research base by analyzing educators' open-ended reflections on their experiences working with AI/AN students in the United States.

STM has been increasingly used in social science research to analyze complex, unstructured text data [16–21]. It has found applications in educational research exploring trends in educational technologies [22], analyzing learning analytics literature to improve teaching and learning [23], uncovering patterns of feedback in course evaluations [24–26], and understanding students study abroad experiences [17]. Our analysis first identifies groupings of salient themes, referred to as topics, about effective teaching strategies and essential issues as emphasized by teachers in their own words. Since STM is an unsupervised machine learning algorithm, all topical identification stems solely from the algorithm itself.[1] We then utilize the identified topics within a regression-based analysis to examine potential systematic variations in teachers' topic emphases. This analysis explores how these emphases might vary with the observable characteristics present in our dataset.

Our approach illuminates the specific context of AI/AN students and demonstrates the broader potential of such methods for investigating educational practices across diverse cultural settings. While focused on AI/AN education, many identified strategies and themes may have wider applicability in supporting learning and well-being for all students. The insights gained can inform policy and practice by guiding teacher support initiatives, refining educational practices, and enhancing academic outcomes and well-being for AI/AN students and their peers.

[1] Unsupervised methods in such contexts are ideal as they allows the researchers to discover topics from the data rather than assume them [15, 27].

2 Methods

We begin by discussing the fundamentals of a topic model before providing a brief overview of other types of topic models, namely Latent Dirichlet Allocation (LDA) [28] and Correlated Topic Model (CTM) [29]. We then introduce the theoretical underpinnings of STM. In line with the topic model literature, the terms documents or texts refer to individual survey responses provided by teachers. Each response represents a self-contained unit of analysis. The term corpus represents the entire collection of responses to a question. Lastly, vocabulary refers to the unique words in the corpus, encompassing the various terms and expressions used by the teachers in their responses.

All topic models are generative models of word counts; they define a data-generating process for each document and then use the data to find the most likely values for the parameters within the model [30]. These parameters are then estimated using an unsupervised machine learning algorithm, which treats each response as a "bag of words" and capitalizes on the co-occurrence patterns of words across responses [31]. Groups of words that exhibit tendencies to co-occur are called topics. Any topic is a probability distribution over vocabulary, and documents are modeled as a mixture of topics [30]. Unlike supervised learning, which is prone to inheriting biases and prejudices [32], unsupervised learning operates differently. It does not require explicit guidance from predetermined thematic issues. Instead, topics are identified based on the data's inherent patterns and structures, making unsupervised learning adept at discovering latent themes [18]. The researcher can then assign a label to each identified topic by examining associated vocabulary and documents.

LDA uses a probabilistic method to discern latent themes or topics within a corpus, representing each topic as a distribution of probabilities over the words available in the vocabulary [28]. By presuming that each document within the corpus results from topic selection and word generation based on these topics, LDA uncovers the inherent topic structure in a collection of documents. However, LDA overlooks topic interdependence by assuming that topics are generated independently. CTM builds on the LDA by relaxing the independence assumptions and instead models the correlations between topics using a topic-word correlation matrix [29]. Thus, CTM is superior to LDA because the correlation matrix encapsulates the intricate relationships between topics, permitting a more nuanced representation of the latent data structure.

STM extends and refines traditional topic modeling methodologies (LDA, CTM) and their extensions [33–41]. STM's distinct innovation is its ability to integrate arbitrary metadata about the documents into the topic model, which can take the form of covariates affecting topical prevalence [42]. STM without the inclusion of any such metadata is equivalent to a CTM [30]. By including something that we expect to be important in the data-generating process, the estimation of topics is improved. For example, in the context of teachers' responses, the type of school—high-density AI/AN versus low-density AI/AN would likely impact the topics prevalent in the discussion. The mathematical details of our STM implementation are provided in Appendix A.

3 Data

Data for this study was sourced from the publicly available National Indian Education Survey (NIES) 2019. Conducted under the direction of the National Center for Education Statistics on behalf of the U.S. Department of Education's Office of Indian Education, NIES aims to provide a comprehensive picture of the educational environment for fourth and eighth-grade AI/AN students across the United States. The 2019 NIES asked teachers to respond to a pair of open-ended questions, which we used for our analysis. Table 1 contains the exact phrasing of the question as it appears on the survey.

Table 1: Open-ended write in questions as they appear on the 2019 NIES

Question 1: Effective Strategies	What have you found to be the most effective teaching and learning strategies for increasing the achievement of your American Indian or Alaska Native students?
Question 2: Important Issues	In the space below, please share with us your thoughts about any other important issue(s) about your students, school, or community that are related to student academic performance, student aspirations, or other educational matters.

Given that responses to both questions were optional, some teachers opted not to provide any feedback, while others responded to just one of the questions. To address this, we divided our dataset into two separate samples, each corresponding to one of the questions. We employed regular expression techniques to preprocess the responses, eliminating nonsensical, empty, and irrelevant content variations. We use the *STM* package in *R* to stem the words, reducing them to their root form. This process utilizes the Porter stemming algorithm [43] and is implemented using the *textProcessor* function. Subsequently, we eliminate punctuation, numbers, and stop words, which are words that contribute minimal semantic meaning (e.g., "a", "an", "the", "is", and "at"). Post-processing, the mean word count for responses is 16.7 for effective strategies and 27.9 for important issues, reflecting the remaining meaningful content.

The distinct ability of STM is incorporating covariates into the estimation of topics and assessing their impact on topical prevalence, shifting from one specific value to the other. Our analysis models topical prevalence as a simple linear function of the covariates. Table 2 describes the covariates, their counts, and response rates.

4 Estimation

We employ two distinct topic models, one for each sample, to address two key questions: effective learning strategies for AI/AN students and important considerations in this domain. A pivotal modeling decision involves choosing the number of topics $\mathbf{K}$ to be estimated. For this selection process, the literature advocates for statistical measures considerations and human judgment [15]. Our selection process has two stages. First, we estimate models with 5 to 30 topics, examining residuals and held-out likelihood. In structural topic models, residuals capture variance dispersion during topic

Table 2: Covariates used for topical prevalence analysis, their post-processing counts, and response rates

Covariate	Values/Description	Effective Strategy (N=4,993)	Important Issues (N=4,519)
Grade	Grade 4	2,295 [82%]	1,993 [71%]
	Grade 8	2,698 [77%]	2,526 [72%]
AI/AN Density	Low density AI/AN school	3,762 [75%]	3,497 [70%]
	High density AI/AN school	1,231 [96%]	1,022 [80%]
School Type	Low density public school	3,762 [75%]	3,458 [70%]
	High density public school	967 [95%]	799 [78%]
	Bureau of Indian Education school	256 [99%]	218 [85%]
	Private/Department of Defense school	46 [72%]	44 [69%]

Note: Schools are categorized as low-density if less than 25% of the student population is AI/AN and as high-density if 25% or more of the student population is AI/AN. Response rates, presented in parentheses, are computed for each covariate using the formula: (post-processing responses / pre-processing responses) × 100. This yields the percentage of responses retained after data processing.

modeling, indicating model fit [44]. Lower residuals suggest the model better interprets corpus word usage. Held-out likelihood measures predictive performance by estimating held-out words' probabilities after removal during training [44]. Higher values indicate better generalization [45]. We select **K** candidate values based on model fit.

For the shortlisted number of topics, we compare these models based on semantic coherence and exclusivity. Semantic coherence, a measure of internal consistency, focuses on capturing the co-occurrence patterns of the most frequent words within a given topic [46]. Exclusivity measures the frequency of the top words in each topic relative to other topics, emphasizing the distinctiveness of the most probable words [47]. We select values of **K** whose performance is not strictly worse than any other model on both coherence and exclusivity. If two models perform equally well, we choose the one with fewer topics to maintain parsimony.

5 Results

In exploring the estimated topics, we adopt two approaches, following the guidance of Roberts et al. [42]. Firstly, we analyze groups of words associated with each topic. Secondly, we thoroughly examine documents that strongly connect with each topic, enabling us to assign descriptive and informative names to them. In the main text, we present each topic through its descriptive label and illustrative sample responses. It's important to note that identifying these topics is purely a result of unsupervised machine learning algorithms without any human biases. However, in naming the topics, we rely on our interpretation of the ideas expressed within each topic derived from reviewing the most representative documents.

5.1 Effective Teaching and Learning Strategies

Table 3 presents the sample responses and labels for each topic, highlighting effective teaching and learning strategies for AI/AN students. Analysis of these topics reveals few higher-level themes: cultural elements and inclusivity, academic strategies, relationship building, and knowledge gaps.[2] Word profiles and detailed response analysis using stemmed words are provided in Appendix B.

Table 3: Effective Teaching and Learning Strategies Selected Teacher Responses

1. Integrating Native Culture Into Curriculum
"Inviting elders to share their knowledge of customs, language, clothing, an[d] culture. Field trips to the reservation for cultural celebrations."
"To recognize and acknowledge their culture when appropriate. During our state study unit, that is easier to do."
"Understanding their deep history and acknowledging the atrocities that have been committed to their ancestors."
2. Uniform Teaching
"Children do not see each other through any lens of color, race, ethnicity or nationality. My most effective teaching is done when I chose to teach them looking through the same lens."
"Teaching them exactly as I would teach any other child. The color of their skin and their heritage has very little impact on how I treat and teach my students."
3. Relatable Teaching
"Try to relate content to everyday situations that all students can relate to."
"Bringing in examples that tie local knowledge into the lesson as well as inviting guest speakers from the community to tell first-hand how math is used in their day-to-day."
"Personal life stories and using culturally appropriate material to get points across."
4. Awareness of AI/AN Student Presence
"In more recent years I have noticed my students being unaware of any heritage. If asked, they have no idea if they are American Indian."
"To be honest I'm not sure, I am not aware of any Native American or Alaska Native students."
5. Hands-On Active Teaching
"Hands on activities, with a lot of visual aides."

[2]The thematic categorization is also corroborated by topic correlation patterns identified through the STM analysis.

Table 3: Effective Teaching and Learning Strategies Selected Teacher Responses (continued)

"Using a lot of visuals, manipulatives and a lot of repetition."
"[C]ombinations of hands-on activities and physical movement."
6. Building Student Relationships
"Develop positive relationships with them by communicating with them on a daily basis. Show them you care. Do whatever it takes to get the job done."
"Having a strong teacher/student relationship that's built on trust and respect."
"Caring for the student, showing empathy, building trust and love."
7. Visual and Sensory Teaching Style for Math
"Using models to see and touch. Using songs to help students remember mathematical concepts."
"Use math manipulatives, draw pictures to help you solve the problem, use a calculator when the standards allow you to and/or use a calculator to help explain something but then make sure they can still solve it without a calculator, talk to them using the actual mathematics vocabulary as much as possible so they learn the math language, and review their assessments and remediate topics they are consistently scoring low on."
"Consistent practice, looking for patterns, models, anchor charts, and multiple different approaches to solving mathematics problems."
8. Use Multiple Strategies
"As a teacher, being open to multiple methods to reach a solution, not just the method that works best for me, is the key to helping students gain understanding."
"Students need to be met where they are at educationally, emotionally, and socially. I try to understand their perspective and listen to them when they have issues. We talk through things and I give them a chance to speak up when they don't like things. However, I also have high expectations for them. I encourage them to overcome the obstacles in their lives. Blended Learning is the best teaching strategy I have used."
"I use a variety of teaching methods in my class each day to maximize student exposure."
9. Providing Extra Time and Support
"Focus on the time they are at school; wait time for responses; modify and adapt assignments."
"Giving them more time to get work done, more chances to fix any mistakes on the assignments, one on one help when they have time."
10. English Language Strategies

Table 3: Effective Teaching and Learning Strategies Selected Teacher Responses (continued)

"ELL strategies and exposure to a wide variety of texts, both fiction and non-fiction."
"The use of district IEFA [Indian Education for All] coaches and resources."
"Using GLAD [Guided Language Acquisition] strategies; graphic organizers/-thinking maps; small group work; collaborative activities; hands-on projects; student-generated ideas/projects/choice."
11. Supportive Classroom Culture
"Loving and supportive classroom atmosphere plays a huge role in whether kids feel welcome at school! Also, consistent routines and expectations make for a safe classroom environment. Kids will want to be at school because it is a safe and supportive place to be."
"Making sure that all of my students felt heard, and feel like an important member of their classroom community. It is also important for all students to understand that the background that they bring with them is important and it should be heard."
12. Scaffolded Active Learning
"Making connections with those students. Offering scaffolds for their learning as well as differentiating for them."
"Present concepts in different forms to accommodate learning styles and spiral teaching."
"Active learning, kinesthetic learning, project-based learning, group work, arts integration, reading relevant and relatable culturally-connected resources."
13. Culturally Responsive Teaching
"Allowing them to choose topics and content when I am able to do so. When they can choose their own writing topics, and their own reading books they are more invested in their work."
"American Indian/Native students may communicate differently. In verbal communication, they may be uncomfortable looking eye to eye/face to face. In written communication, it could be a lack of articles or varied/misplaced adjectives, adverb phrases. In thought organization, it could be in moving from general to specific in both written and verbal communication. Rather than the teacher focusing on error, he/should focus on culture, consider comprehension, analysis, and overall thought development."
"Feedback has been a critical component to increasing the achievement of our American Indian students. Instead of using a numerical number (grade) to determine a student's success, teachers have been focusing on feedback specifically tailored to improving areas of weakness and building on areas of strength."
14. Having High Expectations

Table 3: Effective Teaching and Learning Strategies Selected Teacher Responses (continued)

"Setting high expectations for all students. Highly structured classroom with set routines."
"Oral discussions, positive reinforcement, high expectations, and gentle but firm behavior plan."
"I require the same level of success that I require of all my students."
15. Treating All Students Equally
"They want to be treated like everybody else. Teach them the same as everyone else."
"I have found that treating them like the other students and not singling them out works best for my student."
16. Incorporating Student Background
"Building on background information and relating topics back to everyday life experiences."
"I make the lessons relevant to their experiences and life."
"Translating some concepts in native language and providing real world situations or problems."
"Connecting with them, showing interest in their family history, and using that knowledge to inform teaching."
17. Diverse Learning Opportunities
"Using as many learning opportunities as possible for all types of learners: auditory, visual, tactile. Also, focusing on what students are interested in about their culture heightens interest. And being open to hearing their experiences with their Native culture. I've learned so much from my students."
"Providing as many opportunities for student choice and differentiation as possible, so students can focus on what is personally relevant and interesting to them in their reading and writing."
18. No Strategy That Works or Unsure
"I haven't found anything that specifically helps increase their achievement."
"I have not found any specific strategies to be effective in the achievement of my American Indian or Alaska Native students. I believe that I would need more professional development in this area to find effective strategies."
19. Small Group and Individualized Instruction
"Small group instruction, group work (in student teams), and group discussions."
"Working with them in small groups or one-on-one."
"Small group and differentiated instruction."

Table 3: Effective Teaching and Learning Strategies Selected Teacher Responses (continued)

20. Building Family Relationships
"Building a positive rapport with the students and their families. Getting to know students and their families outside of the school setting. Call parents on a regular basis."
"Getting to know each student and his/her strengths and struggles. At our school, we differentiate instruction to better meet the needs of each student. I also think it is extremely important to focus not only on the classroom but also on getting to know the parents, families, and being involved in the community."
"Building relationships with students and families have substantially increased the productivity of students' learning."

Note: *These selected responses should not be interpreted as representative of the entire AI/AN students or community.*

Figure 1 displays the expected proportion of the corpus associated with each topic and its corresponding thematic category. This visualization ranks topics based on their importance in the corpus. The relative ranking of the topics is a valuable reflection of what educators deem critical. The size of each bar is proportional to the probability that that specific topic has generated a randomly selected word from the corpus.

Examining Figure 1 reveals that the most prominent response is Awareness of AI/AN Student Presence (Topic 4). Building Student Relationships (Topic 6) is the second most prominent topic, underscoring the central importance that educators place on fostering strong, trusting connections with their students on a personal level. Taking a genuine interest in students' cultures, families, and interests is foundational for effective teaching and learning. Other highly ranked topics include Small Group and Individualized Instruction (Topic 19), Integrating Native Culture into Curriculum (Topic 1), Treating All Students Equally (Topic 15), and No Strategy that Works or Unsure (Topic 18). The emphasis on small group and individualized instruction points to the perceived value of differentiated teaching approaches catering to diverse learning needs. Integrating Native culture into the curriculum is also given substantial weight, reflecting a recognition of how critical cultural relevance and representation are for engaging AI/AN learners. The high placement of equally treating students reveals a prevailing belief in maintaining equitable standards and environments for all students while acknowledging their unique backgrounds.

Within each sub-theme, there is a stronger emphasis on differentiated instruction than active learning. There is also a notable preference for establishing personal relationships with students over fostering connections with their families. The direct integration of Native culture into the curriculum is more critical than other inclusion strategies. Meanwhile, treating all students equally, high expectations, and consistent teaching practices are equally important. A significant observation is that when there are few to no effective strategies mentioned (which we classify as knowledge gaps), the responses are dominated by varying levels of awareness regarding the presence

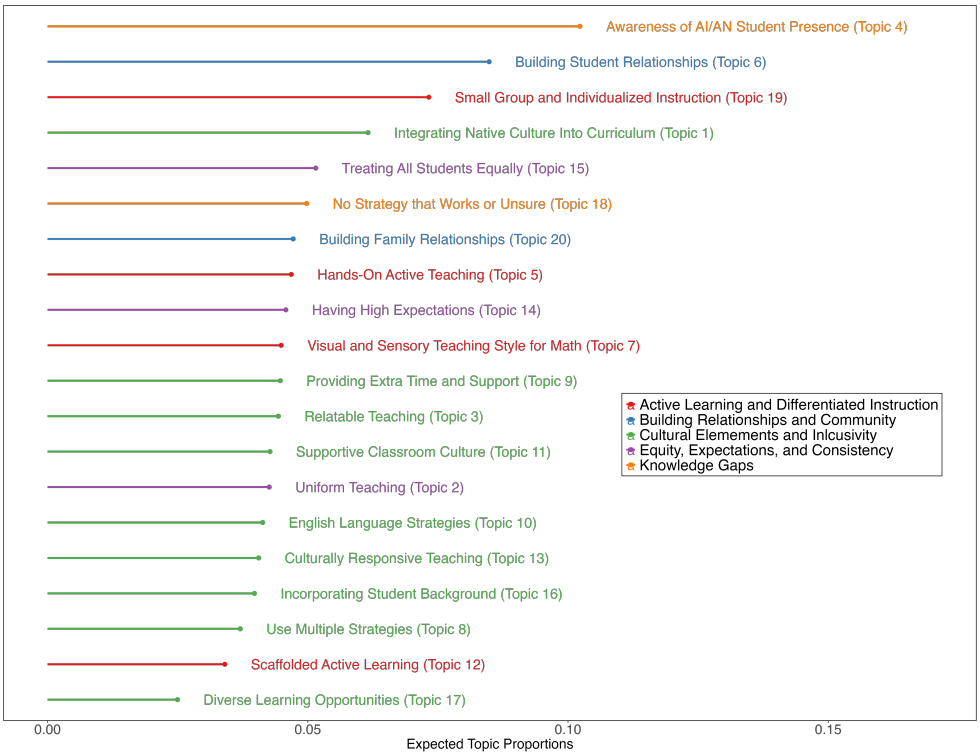

Fig. 1: Effective strategies topical ranks based on expected topic proportion

of Native students. We investigate this further using covariate analysis in the next section.

5.1.1 Effective Strategy Covariates

To examine the association between topical prevalence and metadata covariates, we leverage a unique feature of the STM - the ability to incorporate metadata into topic estimation. This analysis is conducted by estimating a regression of response-level topic proportion onto the document metadata [42, 48]. By doing so, we get to the question of whether teacher responses vary based on what grade they teach, the density of AI/AN students at their school, and the type of school they teach at.[3] We report our results as figures by plotting the mean difference in topic proportion shifting from one specific covariate value to another. However, it is essential to note a few caveats: first, a higher prevalence of a topic associated with a particular covariate does not imply its absence in other covariates. Additionally, readers should not interpret our results as causal due to the potential for omitted variable bias. Nonetheless, this type of analysis

[3]All covariates enter as binary variables that highlight the effects of interest. For example, Grade 4 vs Grade 8, Low-Density Public School vs Others). Regression estimation is done using the *estimateEffect* function available in R's stm package using "Global" parameters to incorporate uncertainty [48].

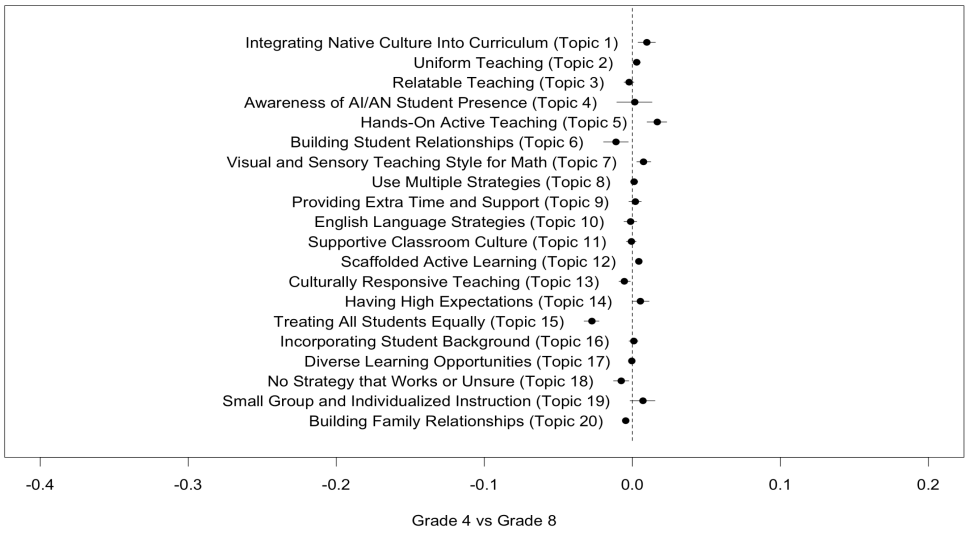

Fig. 2: Effect of grade on effective strategies

provides valuable insights into what teachers emphasize in their responses based on different conditions.

The analysis of teaching strategy topics across grade levels, as depicted in Figure 2, reveals some notable differences between grade 4 and grade 8 teachers, although most topics show relatively minor variations. Grade 8 teachers place a stronger emphasis on active learning styles and the integration of culture into the curriculum. This is evidenced by the statistically significant higher prevalence (at the 95% level) of topics such as Hands-On Active Teaching Style (Topic 5), Visual and Sensory Teaching Style for Math (Topic 7), Scaffolded Active Learning (Topic 12), and Integrating Native Culture Into Curriculum (Topic 1). In contrast, grade 4 teachers prioritize equity and relationship-building aspects of teaching. This is reflected in the higher prevalence of topics like Treating All Students Equally (Topic 15), Building Student Relationships (Topic 6), and Building Family Relationships (Topic 20). These findings suggest that grade 4 teaching tends to be more personalized, focusing on creating a supportive and inclusive classroom environment that fosters individual student growth and strong interpersonal connections. Grade 8 teaching appears to be more oriented towards specific teaching styles and strategies that promote active, hands-on learning experiences and incorporate cultural elements into the curriculum, reflecting older students' evolving needs and capabilities.

Figure 3 compares low versus high AI/AN student density schools. A key observation is that Awareness of AI/AN Student Presence (Topic 4) is highly prevalent in high-density settings. Teachers in high-density schools often mention dwindling numbers of AI/AN students, reflecting their sensitivity to demographic changes. In contrast, educators in low-density schools frequently report never encountering AI/AN students, leading to a significant gap in awareness. The topic itself is more prominent

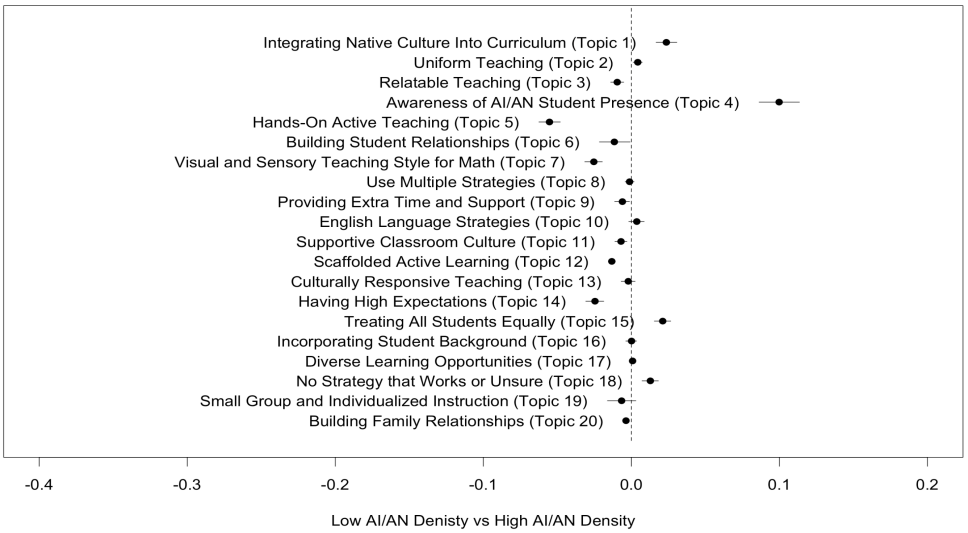

Fig. 3: Effect of density on effective strategies

in high-density settings, where teachers are more likely to emphasize AI/AN student presence due to regular interactions and a heightened sense of responsibility to address their cultural and educational needs. The results also uncover a concerning trend: a higher prevalence of No Strategy that Works or Unsure (Topic 18) among schools with a high density of AI/AN students, signaling a gap in the ability of educators to support these students. This finding calls for specialized professional development and resources to equip teachers with the necessary knowledge, skills, and strategies to enhance the academic achievements of AI/AN students and tackle the distinct challenges they encounter in educational settings.

Integrating Native Culture (Topic 1) and Treating All Students Equally (Topic 15) also stand out. Topic 1 reinforces the need for a balanced approach in educational settings that serve AI/AN students. It is crucial to incorporate Native cultural elements, i.e., elders, powwows, literature, and field trips, to foster an appreciation of Indigenous heritage, traditions, and experiences. It is equally important to cultivate an inclusive learning environment where AI/AN students are treated like everyone else. Striking this balance ensures that AI/AN students feel culturally recognized and fully integrated into the classroom community, promoting their overall academic success and well-being. As for low-density settings, the emphasis is more on active and differentiated learning (Topics 5, 7, 12), relationship building (Topic 6, 20), high expectations (Topic 14), and relatable teaching (Topic 3).

In Figures 4 and 5, we aim to capture the heterogeneity across the public school landscape based on AI/AN student density. These figures illustrate the mean differences in topic proportions when comparing Low-Density Public (LDP) and High-Density Public (HDP) schools. The results for both types align with the findings presented in Figure 3. Bureau of Indian Education (BIE) schools are the most

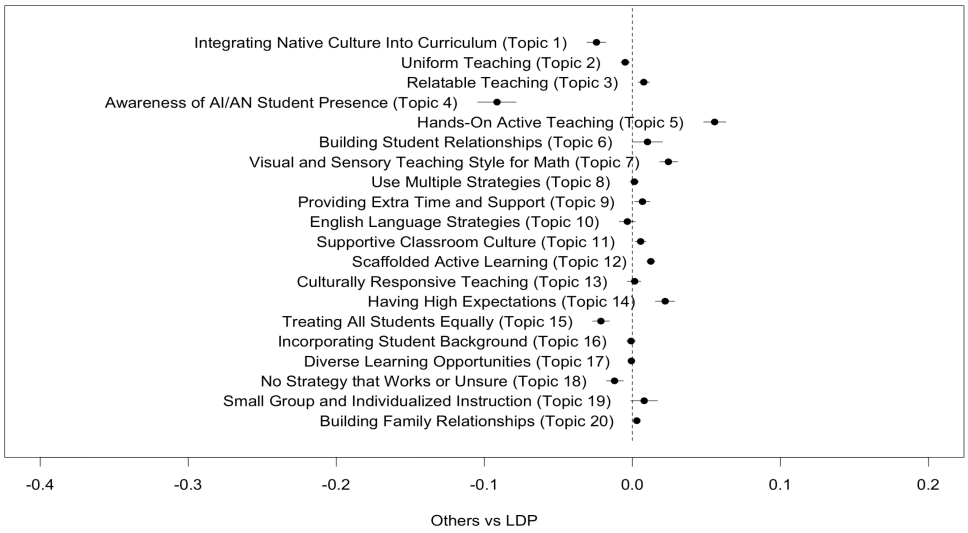

Fig. 4: Effect of LDP schools on effective strategies

informative about the needs of AI/AN students because of their federal and tribal partnerships.[4] While the results for BIE schools are similar to those of high-density school settings in general, teachers at these institutions place a notably greater emphasis on the importance of strong student-teacher relationships (Figure 6).

Research suggests that students' success in DoDEA schools is closely tied to their socioeconomic background, with many students coming from middle-class, military families. These families often possess higher levels of education and stability, contributing to a culture of high expectations both at home and within the school [49]. Additionally, DoDEA schools benefit from a highly engaged parent community [50]. Similarly, private school students come from families that emphasize education and achievement, which leads to heightened academic expectations from both parents and the schools [51]. Parents in private schools also tend to be more involved in their children's education [52, 53]. Educators in PRIVDOD schools recognize the significance of these factors, as shown in Figure 7. Acknowledging the role of family background in student success, teachers in these schools seem to emphasize setting high expectations (Topic 14) and prioritizing strong connections with students and their families (Topics 6, 20).

[4]For more information, visit https://www.bie.edu/topic-page/tribally-controlled-schools.

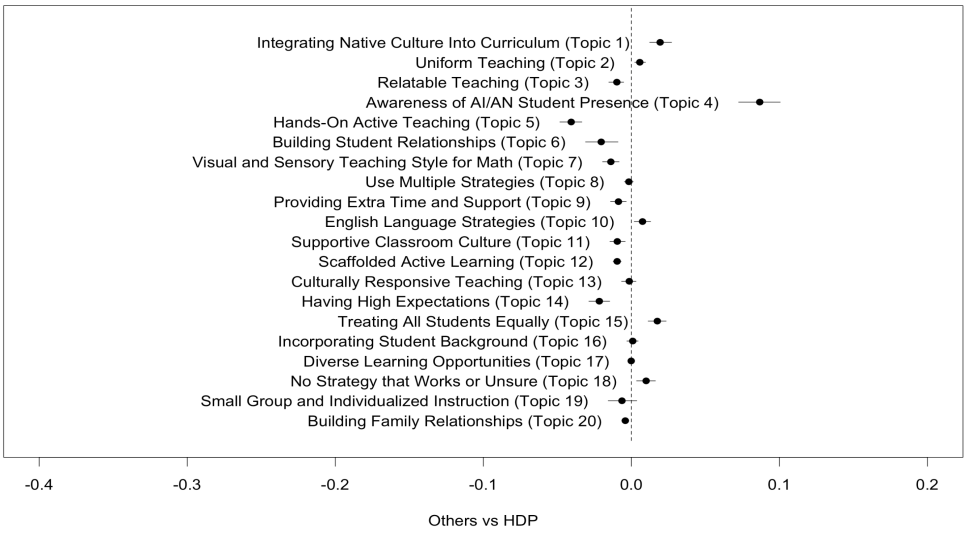

Fig. 5: Effect of HDP schools on effective strategies

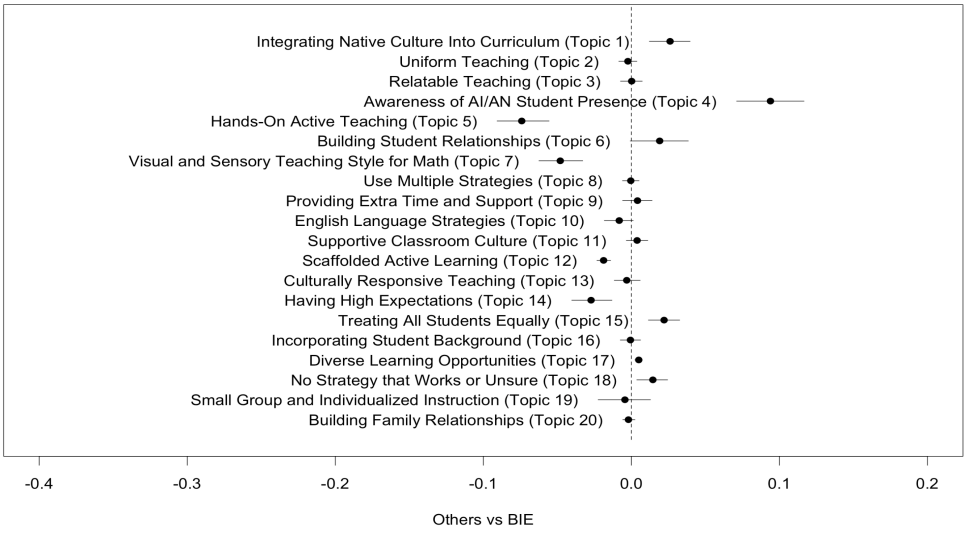

Fig. 6: Effect of BIE schools on effective strategies

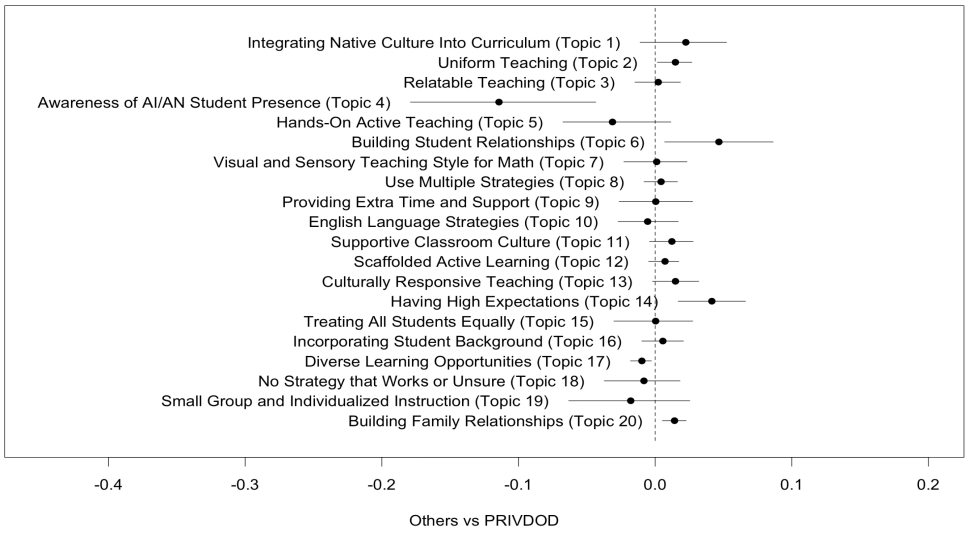

Fig. 7: Effect of PRIVDOD schools on effective strategies

5.2 Important Issues

Our STM analysis identified 21 topics concerning student academic performance, aspirations, and broader educational outcomes. These topics cluster into three themes: socioeconomic factors and family dynamics, school and community environment, and student characteristics. Table 4 presents topic labels with a few selected teacher responses, some of which include strategies for addressing specific challenges. Detailed word profiles and topic analysis are provided in Appendix C.

Table 4: Important Issues Selected Teacher Responses

1. Learning Gaps
"We are not meeting the need our students or preparing them to succeed in our world today. Students are moving forward regardless whether they have true conceptual knowledge or demonstrate any application of their knowledge."
"I find that my students are so technology overloaded/use to instant gratification they no longer have nor want to acquire the skills associated with learning. They don't want to read/learn or research to find answers- they will ask 'why do I need to learn that I can just google the answer?' They are unable to even search for information without typing in a google search the exact question that they are being asked to answer."
"We have found our students really struggle with apathy and their willingness to put forth a true effort."
2. School Resources and Funding

Table 4: Important Issues Selected Teacher Responses (continued)

"We are a Title 1 school in a rural community where our city does not provide public transportation to the school. They do provide free transportation to some of the local schools, just not ours. Teacher pay and incentives are one of the lowest in the nation (South Dakota). We disbanded our literacy library and are only allowed to use the books provided in our basal which are not diverse or rigorous enough to meet the needs of our students."
"My community cannot afford new desks for students yet the desks are breaking every day. Simple school needs cannot be met."
"Our Native American students start school (pre-school/kindergarten) already behind. This means that they struggle from day one. They need constant support and a positive school environment to have any hope of success. Our teachers give 100% and we have been working tirelessly to try to build a positive and supportive school environment where every child can learn. The more support a child receives from home the more success they have in school. We really appreciate all our parent supporters."
"Students need access to computers, the school need purchase programs (websites, apps) that will help them in their academic content areas."
3. Low Socioeconomic Status and Poverty
"Low socio-economic demographics, poverty, homelessness, and unstable family dynamics negatively [effect] student academic performance, student aspirations, and other educational matters."
"It is clear that our community is facing a serious issue of violence, drugs, alcohol abuse, domestic abuse and multiple forms of crime. This affects student performance & their educational & future aspirations as well as moral among students and staff."
4. Lack of Future Orientation
"The students don't foresee a future outside of the village. Many have dreams of leaving, but the reality is that most of them will not leave the village. They don't see many outside influences and therefore don't actually understand what it will take for them to be successful outside of the village."
"Students don't see that they have a future where an education will benefit them."
5. Lack of Accountability
"Holding students accountable for their behavior is a struggle with our administration."
"This group of students hasn't been held to any type of high standard yet. They struggle with accountability."
6. Classroom Management and Student Support

Table 4: Important Issues Selected Teacher Responses (continued)

"Classroom management is one of the most significant issues facing teachers. Effective classroom management based on positive relationships with students and student accountability are two areas that significantly improve student achievement and make quality instruction and learning even possible."
"My biggest challenge is the students' off task behavior in class - I spend an awful lot of time doing crowd control. These students disrupt class daily and take away from the educational environment of others. These are not suspension type behaviors - just constant talking and doing anything other than what I ask."
"We are not able to easily remove disruptive students from the classroom. So much of my time is spent trying to manage disruptive students that I'm not able to effectively teach the students who are engaged."
7. Lack of Family Involvement
"Parental involvement is lacking. I am lucky if I get 50% of parents in for conferences. Most parent phones are disconnected or have my number or school number blocked."
8. Attendance and Behavior Issues
"Student absences and tardiness is the biggest issue."
"Attendance and tardiness have been an ongoing issue. Agencies designed to enforce these issues are overloaded with larger and more serious issues and these go unaddressed. Many students come to school tired or unclean due to home-life issues. Many student's families place little importance on education and have little or no involvement. Many students that need them, do not have glasses even though they are free. Most of my students live with extended family rather than parents."
"There are behavior issues that affect academic performance, other issues at home also affect performance."
9. Difficult Home Life
"It is an impoverished area. Many families struggle to proved the necessities without the assistance of local outreach programs and churches. (food banks, clothing closets etc.)"
"A lot of our students have chaotic or upsetting home lives and have trouble focusing on schoolwork or finding the drive to complete it. How does one motivate a student who is being abused by someone they love, or doesn't know where their next meal is coming from, or is living out of a car? We can make our subjects fun and provide a safe environment, but some of these kids are truly in survival mode - and it's next to impossible to learn in that mode."
"Food insecurity. Where they might be sleeping each night. Adequate clothing."
10. Class Size and Composition

Table 4: Important Issues Selected Teacher Responses (continued)

"I have small classes because I teach accelerated and Gifted math classes. However, other math classes are very large. The class sizes seem to have a negative affect on student performance especially with short class periods. Our classes are 51 minutes twice a week and 57 minutes three times a week. When teachers have between 30 and 35 students in a class, it is very hard to give individual attention in 51 to 57 minutes classes."
"I feel as though the large class sizes are impacting instruction to a certain degree. There is an increase in negative student behaviors due to these larger class sizes, as well as the inability to meet with students one-on-one on a more regular basis."
11. Lack of Motivation and Effort
"The most important issue for some of our students is motivation. We are working to have them motivated and engaged."
"Students seem increasingly more uninterested in school and long-term success. As a school we promote positive attitudes and a growth mindset. These are talked about on a daily basis through communities circles. Academically, students set goals and take ownership of their learning and progress toward those goals. As a teacher I work hard to offer engaging instruction that is both relevant and of high interest."
12. Behavior and Discipline Issues
"Extreme behavioral issues have become a very large problem. We spend so much time dealing with student behavior that learning gets a backseat."
"There is a serious lack of accountability for our students. There are no consequences for disrespectful behavior."
"I think the behavior expectations from our administration is low. As a result, students aren't always held accountable for poor choices."
13. Health and Safety Concerns
"I am concerned about the rise in mental health issues amongst middle schoolers."
"Vaping e-cigarettes has become a big issue among teenagers. This is concerning because I do not have a ton of knowledge about the effects of vaping. I need more education about this. Vaping is appealing to students. They do not know the dangers."
"Mental health issues are a major concern (depression and anxiety)."
14. Curriculum and Assessment Challenges
"I feel that the school district isn't looking to teach proven best practice. I think that changing the curriculum and/or teaching styles could really benefit the students."
"Outdated materials make it difficult to provide adequate instruction."

Table 4: Important Issues Selected Teacher Responses (continued)

"We are a very diverse school. So making sure everyone is addressed in the curriculum is important."
"We are [over burdened] with testing and running diagnostics. It interferes too much with instructional planning and activities."
"Tried contacting provider of curriculum materials about inadequate review aspects of texts and couldn't get them to acknowledge my concerns."
15. Lack of Teacher Support
"I am disappointed in our school's and district's inaction to support teachers who are struggling."
"Teachers are continually being asked to do more and more with the same or less resources. The powers that be continue to interfere with the classroom by dictating what teachers must do and how they must do it. This is having a negative impact on morale and the desire (especially for early career teachers) to continue in the profession. All of this for little to no more money. Also, the pressure of high stakes observations is not a positive factor for teachers."
"I believe teachers should be respected for the challenging work we do. We should be provided funds, professional development, and highly effective teachers should be shown appreciation by administration."
16. Lack of Culturally Responsive Education
"The questions previous to this one, just made me realize I am not adequately meeting the needs of my Native students. With such a large percentage of our population being Native, we need to be doing more as a school to actively include cultural content, and better equipping our teachers with instructional methods specific to our Native students."
"Our students are still very underrepresented. I personally would love to do more for my National Indian students, but I need more information."
17. Lack of Support and Stability
"Lack of great community role models to inspire students."
"We have an abundance of students with mental health/social emotional concerns and lack staff to support them."
"Poor home life, lack of support from families."
18. Goal Setting and School Climate
"Setting goals with my students and keeping a chart on their progress. I found that when I set goals with them and let them be involved in the process I have a better outcome as far as their scores and grades."

Table 4: Important Issues Selected Teacher Responses (continued)

"I wish our students were pushed more to have a goal for what they want to become and pushed to achieve that goal. Sometimes it feels like people don't want these kids to ever leave their community."
19. Technology and Social Media Impact
"Smart phones, computer screens, video games, and other digital devices are the biggest concern I have about our culture and community -they are incredibly invasive and addictive."
"I feel that students are too obsessed with social media these days. Their constant access to technology without parental restrictions is like a drug. Many are becoming apathetic about school and are growing up too quickly because of their exposure to inappropriate material on the internet."
"Since technology is everywhere now, we need to utilize it to our advantage. Cell phones are a constant struggle in the classroom as they are disruptive. Instead of making them go away, embrace and use them."
20. Socioeconomic and Linguistic Challenges
"High free and reduced lunch population as well as a high ELL population."
"Majority of students are non English speaking and have a difficult time translating in their own language and many of their parents are illiterate in their native language as well."
21. School and Community Partnerships
"Engaging families and the community into the schools mission and vision of their children is vital. Being able to network and create community support and partnerships for student growth socially, academically, and emotionally allows educators to maintain a presence in the community to understand the strengths and needs for constant and never-ending improvement for children."

Note: *These selected responses should not be interpreted as representative of the entire AI/AN students or community.*

Figure 8 presents a comprehensive overview of expected topic proportions across various educational challenges, categorized into three broad themes: School and Community Environment, Socioeconomic Factors and Family Dynamics, and Student Characteristics. The analysis reveals that Lack of Accountability (Topic 5) and Lack of Family Involvement (Topic 7) are the most prominent, suggesting these factors play a central role in shaping educational outcomes. School Resources and Funding (Topic 2) also significantly highlights persistent concerns over the lack of an equitable distribution of educational resources. The data underscores the complex interplay between external factors such as Low Socioeconomic Status and Poverty (Topic 3) and internal school structuring issues like Class Size and Composition (Topic 10). Student-centric challenges, including Lack of Future Orientation (Topic 4) and Lack

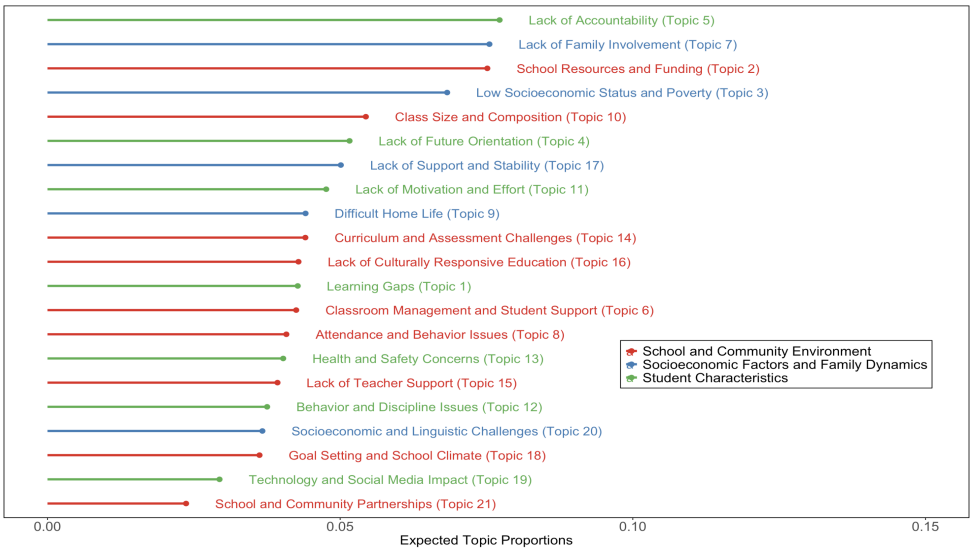

Fig. 8: Important issues topical ranks based on expected topic proportion

of Motivation and Effort (Topic 11), are also substantial, emphasizing the need for targeted interventions addressing academic skills and student attitudes. These findings have important implications for educational policy and practice, suggesting that holistic approaches addressing structural and individual factors are necessary for comprehensive enhancement of educational performance.

The relative weights of topics within their respective broad themes, offer insights into the distribution of issues as perceived by educators. Within the school and community environment theme, School Resources and Funding (Topic 2) and Class Size and Composition (Topic 10) emerge as dominant concerns. In contrast, School and Community partnerships (Topic 21) receive comparatively less emphasis. This distribution suggests structural and resource-related challenges are more pressing than community engagement initiatives. In the socioeconomic factors and family dynamics theme, Low Socioeconomic Status and Poverty (Topic 3) and Lack of Family Involvement (Topic 7) are prominently featured, indicating their perceived critical role in educational outcomes. Language Challenges (Topic 20) receive less attention, which may warrant further investigation into the potential under-recognition of linguistic barriers. The theme of student characteristics is dominated by issues of Lack of Accountability (Topic 5), Lack of Future orientation (Topic 4), and Lack of Motivation and Effort (Topic 11). Interestingly, Technology and Social Media Impact (Topic 19) is less emphasized, potentially reflecting a nuanced view among educators regarding the role of digital technologies in education. This distribution highlights the primacy of student engagement and personal development concerns from educators' perspectives.

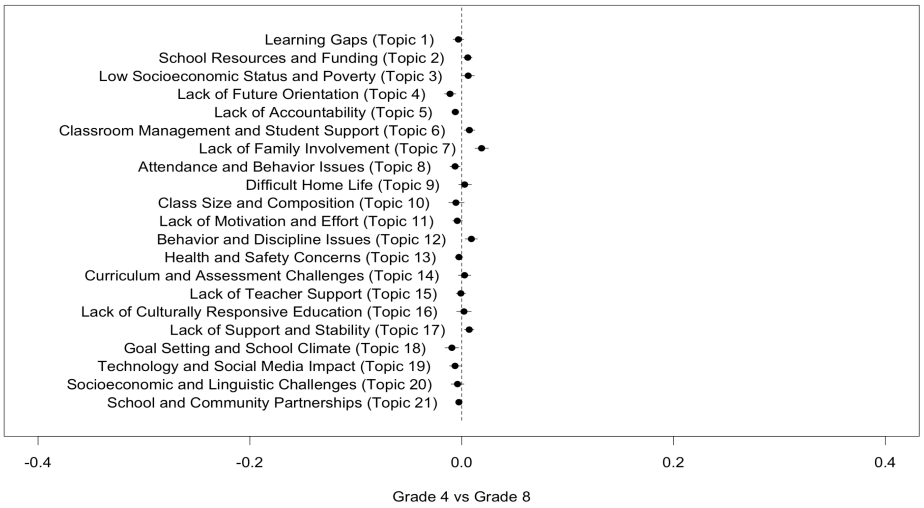

Fig. 9: Effect of grade on important issues

5.2.1 Important Issues Covariates

In examining the differential prevalence of topics between Grade 4 and Grade 8 teachers in Figure 9, our analysis reveals significant variations illuminating the distinct challenges and priorities at these educational stages. Grade 4 teachers show a higher propensity to discuss topics related to students' Lack of Future Orientation (Topic 4), Lack of Accountability (Topic 5), Attendance and Behavior Issues (Topic 8), and Goal Setting and School Climate (Topic 18). This suggests that elementary educators focus on foundational aspects of student development, including fostering a sense of purpose, encouraging accountability, addressing behavioral challenges, and establishing a positive learning environment. Conversely, Grade 8 teachers demonstrate a greater emphasis on topics concerning School Resources and Funding (Topic 2), Classroom Management and Student Support (Topic 6), Lack of Family involvement (Topic 7), Behavior and Discipline Issues (Topic 12), and Lack of Support and Stability (Topic 17). This shift in topic prevalence indicates that middle school educators grapple more intensely with systemic challenges, including resource allocation, complex classroom dynamics, and the critical role of family engagement in student success. The heightened focus on behavior and discipline issues and concerns about support and stability underscores the unique social and emotional challenges that emerge as students transition into adolescence.

In Figure 10, schools with lower AI/AN student density show a higher prevalence of topics related to School Resources and Funding (Topic 2), Low Socioeconomic Status and Poverty (Topic 3), Lack of Future Orientation (Topic 4), Lack of Family Involvement (Topic 7), Difficult Home Life (Topic 9), Lack of Support and Stability (Topic 17), and Goal Setting and School climate (Topic 18). This suggests that educators with fewer AI/AN students focus more on broader socioeconomic challenges,

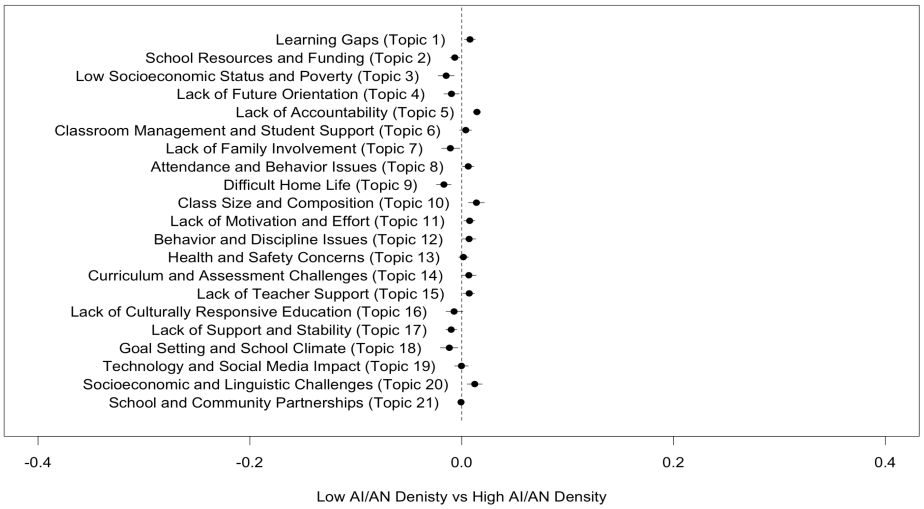

Fig. 10: Effect of density on important issues

family engagement issues, and establishing supportive school environments. In contrast, schools with higher AI/AN student density demonstrated greater emphasis on learning gaps (Topic 1), Lack of Accountability (Topic 5), Class size and Composition (Topic 10), and Socioeconomic and Linguistic Challenges (Topic 20). This shift in topic prevalence indicates that educators in schools with a higher proportion of AI/AN students are more concerned with specific academic challenges, such as addressing learning gaps, managing diverse classroom compositions, and focusing on accountability. While schools with lower AI/AN density tend to emphasize broader socioeconomic issues, those with higher AI/AN populations show a more specific concern for Socioeconomic and Linguistic Challenges (Topic 20). This shift highlights the interplay between economic factors and language barriers in education for AI/AN students.

The analysis of topic prevalence in LDP (Figure 11) and HDP (Figure 12) schools reveals distinct patterns of challenges and priorities. LDP schools show a higher emphasis on topics related to socioeconomic factors (Topics 2, 3), family engagement (Topics 7, 9), and school climate (Topics 4, 17, 18), suggesting a focus on addressing broader environmental and social challenges. In contrast, HDP schools demonstrate greater concern with Learning gaps (Topic 1), Lack of Accountability (Topic 5), Class Size and Composition (Topic 10), and Lack of Teacher Support (Topic 15). This indicates that HDP schools focus more on specific academic and structural issues within the school system. The divergence in topic prevalence between LDP and HDP schools highlights the varying needs and challenges faced by different types of public schools, underscoring the importance of tailored approaches to education policy and resource allocation.

In comparing BIE schools to others (Figure 13), we observe a higher prevalence of topics on Lack of Accountability (Topic 5) and Socioeconomic and Linguistic Challenges (Topic 20). This suggests that BIE schools face distinct challenges in fostering

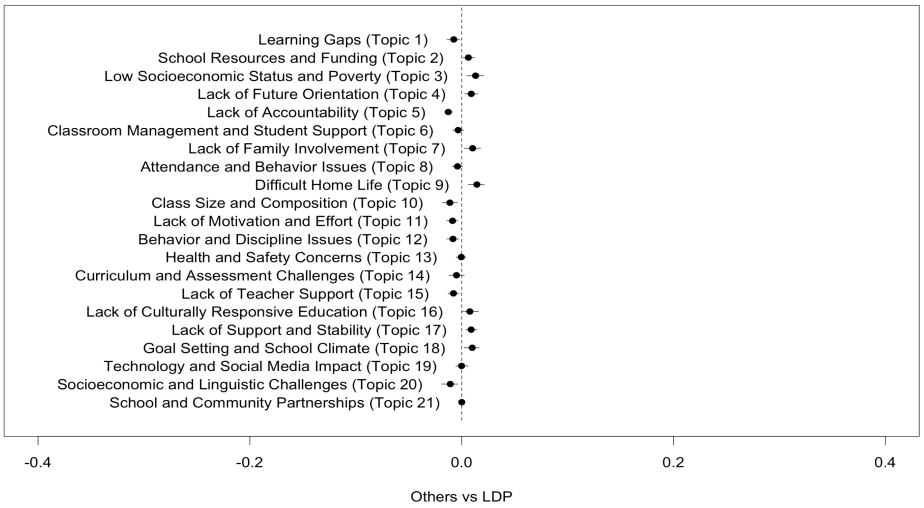

Fig. 11: Effect of LDP schools on important issues

student engagement while addressing the complex interplay of socioeconomic factors and language barriers. Educators must navigate student responsibility and academic performance issues against cultural, linguistic, and economic diversity. For PRIVDOD schools (Figure 14), we see a higher prevalence of Lack of Support and Stability (Topic 17), indicating educators are more attuned to student support and environmental stability issues. This may reflect active efforts to address challenges in providing consistent support structures, possibly due to unique circumstances like frequent relocations in military families. The heightened focus on support and stability in PRIVDOD schools could indicate ongoing efforts to create robust support systems or highlight an area of particular concern for improvement.

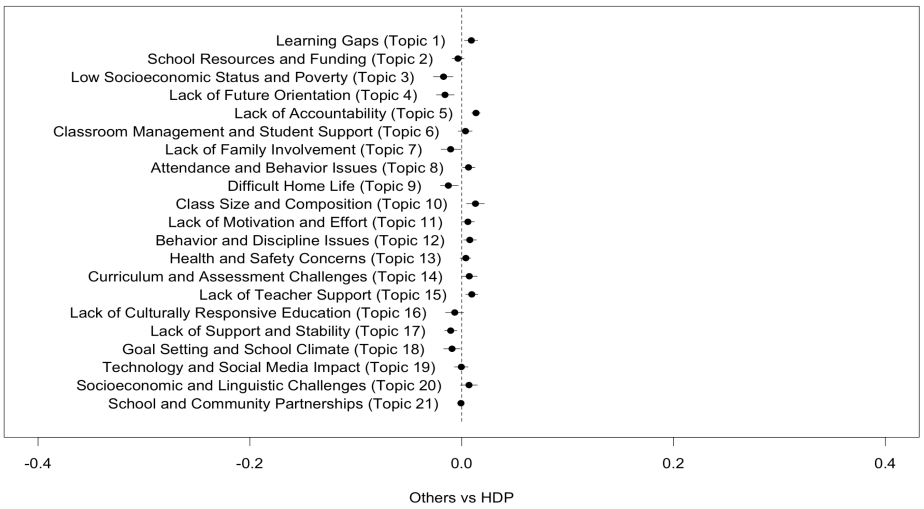

Fig. 12: Effect of HDP schools on important issues

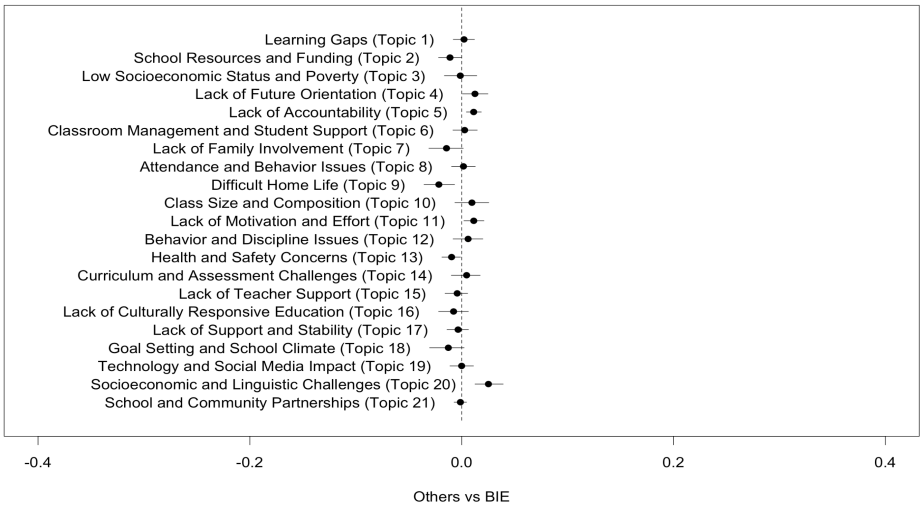

Fig. 13: Effect of BIE schools on important issues

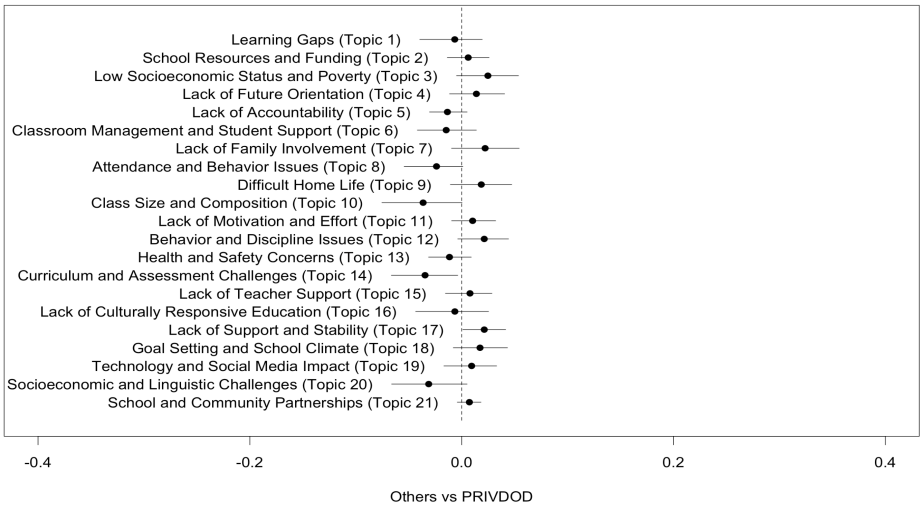

Fig. 14: Effect of PRIVDOD schools on important issues

6 Conclusion

In this paper, we analyze effective teaching strategies and critical issues in education for AI/AN students, a subject of considerable importance to educators, policymakers, and researchers across multiple disciplines. By leveraging a corpus of open-ended survey responses from teachers working with AI/AN students, we employed advanced text analysis tools to characterize the salient themes emphasized in teachers' reflections. Our analysis reveals 20 topics related to effective teaching strategies and 21 concerning significant educational issues.

This study reveals significant variations in effective teaching strategies and important issues across different educational contexts. Grade levels, school types (public, BIE, and PRIVDOD), and the density of AI/AN students all influence the approaches educators prioritize and the challenges they face. Lower grades focus on foundational aspects like relationship-building and treating all students equally, while higher grades emphasize active learning and cultural integration. Schools with higher AI/AN student populations show greater concern for cultural integration and specific academic challenges, whereas schools with lower AI/AN density prioritize broader socioeconomic issues. BIE schools emphasize the importance of strong student-teacher relationships, while PRIVDOD schools focus on high expectations and family connections.

The analysis of important issues further highlights these differences. Lower grades grapple with foundational challenges like future orientation and accountability, while higher grades face more complex systemic problems. High-density AI/AN schools emphasize learning gaps and socioeconomic challenges, while low-density schools focus on broader environmental factors. PRIVDOD schools show a unique concern for student support and stability. These findings underscore the need for tailored educational

approaches considering each school environment's unique characteristics, student population, and grade level. By recognizing and addressing these differences, educators and policymakers can develop more effective strategies to support diverse student needs and overcome the specific challenges faced in various educational settings.

Future research should examine the extent to which our findings apply to teachers in different educational settings and geographical regions. Our application of computational methods for analyzing text-as-data to investigate AI/AN education will stimulate further research on relevant and engaging pedagogy , equal access to education, and inclusive learning environments more broadly. While our focus has been on AI/AN education, many of the themes and strategies identified may have broader implications for supporting diverse student populations in various educational contexts.

7 Declarations

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- **Conflict of interest:** On behalf of all authors, the corresponding author states that there is no conflict of interest. The content of this publication does not necessarily reflect the views or policies of the U.S. Department of Education. All errors and omissions are the sole responsibility of the authors.

8 Data Availability Statement

The datasets analyzed in this study are publicly available through the National Center for Education Statistics (NCES). Specifically, the analysis relies on the 2019 National Indian Education Study (NIES) Teacher Responses dataset. This dataset can be accessed via the NIES section of the NCES Nation's Report Card website: https://nces.ed.gov/nationsreportcard/nies/.

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Appendix A Technical Details

Below, we provide a brief overview of the technical details of the STM [30, 42]. For a given document $\boldsymbol{d}$ with a vocabulary of size $\boldsymbol{V}$, number of topics $\boldsymbol{K}$, and $\mathbf{1} \times \boldsymbol{p}$ vector of covariates $\boldsymbol{X_d}$, where $\boldsymbol{p}$ is the total number of covariates, the document generative process begins by estimating a prior distribution of topic prevalence in a document estimated using logistic normal generalized model based on document covariates $\boldsymbol{X_d}$. Equation 1 formalizes this, where $\boldsymbol{\gamma}$ is a $\boldsymbol{p} \times (\boldsymbol{K-1})$ matrix of coefficients, and $\boldsymbol{\Sigma}$ is a $(\boldsymbol{K-1}) \times (\boldsymbol{K-1})$ covariance matrix. $\boldsymbol{\theta_d}$ is the resulting $\mathbf{1} \times (\boldsymbol{K-1})$ vector of probabilities that we generate from the mean of the logistic normal $\boldsymbol{\mu}$. Each $\boldsymbol{\theta_d}$ entry corresponds to how much proportion of a document comprises a given topic.

$$\boldsymbol{\theta_d} \mid \boldsymbol{X_d}, \gamma, \boldsymbol{\Sigma} \sim \textbf{Logistic Normal}(\boldsymbol{\mu = X_d \gamma, \Sigma}) \tag{A1}$$

Next, the prior probability that the word is associated with a topic $\boldsymbol{k} \in \boldsymbol{\{1, \ldots, K\}}$ is calculated. $\boldsymbol{m}$ and $\boldsymbol{\kappa_{kt}}$ are $\boldsymbol{V}$ length vectors representing the baseline probabilities for each word in the vocabulary and topic-specific deviation for the impact of a topic on word frequencies, respectively. By applying a logistic transformation to the sum of these coefficients, they can be transformed into probabilities for utilization in a multinomial distribution, giving us equation A2.

$$\boldsymbol{\beta_{dk} \propto exp(m + \kappa_{kt})} \tag{A2}$$

It can be helpful to imagine each document as having a set of $\boldsymbol{N_d}$ empty positions, each of which will eventually be filled by a word $\boldsymbol{w_{dn}}$ from the vocabulary. For each empty position $\boldsymbol{n} \in \boldsymbol{\{1, \ldots, N_d\}}$ in the document, the model draws the word's topic assignment $\boldsymbol{z_{dn}}$ based on the topic proportion vector $\boldsymbol{\theta_d}$. The specific topic $\boldsymbol{z_{dn}}$ is associated with the filling of an empty position $\boldsymbol{n}$ through the process in equation A3. Conditioned on the specific topic $\boldsymbol{z_{dn}}$ chosen for a position, an observed word $\boldsymbol{w_{dn}}$ from the topic is drawn using equation A4.

$$\boldsymbol{z_{dn}} \mid \boldsymbol{\theta_d} \sim \textbf{Multinomial}(\boldsymbol{\theta_d}) \tag{A3}$$

$$\boldsymbol{w_{dn}} \mid \boldsymbol{z_{dn}}, \boldsymbol{\beta_{dk=z_{dn}}} \sim \textbf{Multinomial}(\boldsymbol{\beta_{dk=z_{dn}}}) \tag{A4}$$

The model iterates over these two distributions using a Variational Expectation-Maximization algorithm that gives us the estimates of model parameters $\boldsymbol{\gamma}$, $\boldsymbol{m}$, $\boldsymbol{\theta_d}$, $\boldsymbol{\kappa_{kt}}$, and $\boldsymbol{\beta_{dk}}$ upon convergence. Prior regularizing distributions are used for $\boldsymbol{\gamma}$ and $\boldsymbol{\kappa}$ for better interpretability and to prevent over-fitting [30]. To address non-convexity, we rely on the spectral initialization approach [30].

Appendix B Effective Teaching Strategies

Table B1 presents the distinctive word profiles and labels for each topic. Our presentation of each topic involves a unique combination of the top 10 words from three-word profiles, encompassing 1) words with the highest probability of occurrence, which are frequent but not necessarily exclusive to the topic, 2) FREX words that are weighted considering their overall frequency and exclusivity to the topic, and 3) Lift words weighted based on their lower frequency in other topics. Emphasizing exclusivity, we utilize the default weight of 0.7 for FREX [30]. We then discuss each topic in detail focusing on stemmed words that best capture the core ideas for brevity.

Table B1: Effective Teaching and Learning Strategies Word Profile

#	**Topic Labels**	**Top Words**
1	Integrating Native Culture into Curriculum	cultur, share, includ, histori, discuss, heritag, literatur, understand, tradit, studi, tribe, unit, event, aspect, elder, born, cloth, embrac, field, justic, mine, mirror
2	Uniform Teaching	teach, need, student, believ, meet, day, everi, abil, speak, ethnic, matter, fit, impact, chang, chose, function, negat, report, accord, fluent, normal
3	Relatable Teaching	can, relat, lesson, tri, materi, stori, interest, incorpor, content, integr, tell, basketbal, comparison, fish, script, watch, hunt, real-lif, theyv
4	Awareness of AI/AN Student Presence	american, nativ, student, indian, alaska, awar, taught, school, class, never, popul, alaskan, unawar, african, ancestri, eighth, hispan, indianalaskan, literaci, non, percentag
5	Hands-On Active Teaching	activ, hand, visual, lot, hands-, much, repetit, manipul, possibl, cooper, interact, technolog, pace, prior, review, associ, chromebook, colleagu, curricular, finish, less, movement, outcom
6	Building Student Relationships	relationship, build, know, get, person, famili, show, care, respect, will, develop, trust, rapport, establish, foremost, fulli, genuin, goe, honesti, recept, solid
7	Visual and Sensory Teaching Style for Math	use, math, help, model, concept, vocabulari, problem, see, present, understand, pictur, repeat, solv, mathemat, graphic, bridg, clue, conceptu, construct, defin, discov, grasp, multi-mod, oceti
8	Using Multiple Strategies	school, way, teacher, best, encourag, talk, educ, come, thing, particip, child, reach, children, cut, experienc, grader, ignor, info, interview, obstacl, warm, avoid

Table B1: Effective Teaching and Learning Strategies Word Profile (continued)

#	**Topic Labels**	**Top Words**
9	Providing Extra Time and Support	time, give, involv, parent, communic, think, question, assign, tutor, respons, answer, extra, wait, adequ, anxieti, calm, circl, extend, extrins, front, homework
10	English Language Strategies	practic, base, languag, project, text, book, resourc, varieti, research, method, data, guid, analyz, bodi, documentari, driven, genr, iefa, media, modal, multicultur
11	Supportive Classroom Culture	make, classroom, find, import, engag, feel, sure, communiti, take, listen, environ, safe, welcom, great, deliv, stand, atmospher, instil, moment, ownership, rise
12	Scaffolded Active Learning	learn, support, motiv, collabor, scaffold, area, approach, style, progress, reteach, monitor, projectbas, audio, healthi, measur
13	Culturally Responsive Teaching	read, allow, write, skill, focus, abl, choic, better, grade, may, aloud, thought, comprehens, choos, face, villag, artwork, boy, critic, next, repitit, summar, town, alexi
14	Having High Expectations	expect, high, level, set, success, posit, goal, academ, consist, keep, hold, convers, account, prais, strength, common, challeng, characterist, firm, futur, gentl, ground, isnt, persist, rate
15	Treating All Students Equally	one, help, class, like, treat, dont, understand, ask, race, everyon, els, equal, singl, other, check, often, usual, modif, besid, deeper, ever, full, indic
16	Incorporating Student Background	connect, differ, provid, background, experi, knowledg, life, topic, relev, inform, real, world, reciproc, schema, translat, rich
17	Diverse Learning Opportunities	well, also, opportun, live, mani, just, realli, part, offer, start, unknown, extrem, hesh, manner, either
18	No Strategy that Works or Unsure	strategi, effect, achiev, found, use, increas, specif, havent, ell, seem, esl, target, yet, consid, control, ethic, hook, knew, noth, outlin, siop, teachinglearn
19	Small Group and Individualized Instruction	work, group, instruct, small, individu, differenti, direct, discuss, one–on, whole, intervent, unsur, mindset, reiter, rephras, sped, center
20	Building Family Relationships	student, famili, releas, especi, certain, physic, requir, seem, understand, also, will, insid, apt, although, nonverb, upon, doesnt, becom

B.1 Cultural Elements and Inclusivity

Integrating Native Culture Into Curriculum (Topic 1), the responses emphasize the importance of incorporating Native cultural (cultur) elements into educational settings. Including (includ) historical (histori) facts and inviting elders (elder) to (share) their knowledge fosters a more profound understanding (understand) of Indigenous heritage (heritag), traditions (tradit), and cultural elements, such as clothing (cloth). Field trips to events (event) such as Powwow's and discussions (discuss) of literature (literatur) by Native American scholars provide firsthand experiences and comprehensive views of Native American life. Recognizing history's importance and past atrocities leads to a more inclusive and just (justic) educational environment. The responses suggest a multifaceted approach that embraces (embrac) Native American culture, history, and perspectives, mirroring (mirror) diverse aspects (aspect) of their experiences, including tribal (tribe) unity (unit) and challenges like mining (mine) on their lands.

Relatable Teaching (Topic 3), the responses emphasize making educational content relevant and accessible to students. Educators aim to relate (relat) lessons to students' lives by incorporating (incorpor) materials (materi) and stories (stori) that reflect the students' community and personal interests, such as basketball (basketbal), fishing (fish), and hunting (hunt). This helps students see the value and applicability of their learning, fostering engagement and understanding. Teachers can make abstract concepts more tangible and meaningful by integrating (integr) culturally appropriate content and using real-life (real-lif) examples. Allowing students to (tell) their own stories or incorporate their hobbies and cultural norms into the curriculum helps personalize their learning experience. By adapting teaching strategies to include relevant comparisons (comparison) and examples, educators strive to create a more inclusive, engaging, and effective learning environment that resonates with all students.

Using Multiple Strategies (Topic 8), the responses suggest that several strategies are the (best) (way) to accommodate diverse educational (educ) needs and cultural backgrounds. For example, encouraging (encourag) participation (particip) fosters an inclusive and supportive classroom environment. This approach involves building nurturing relationships, adopting flexible teaching methods, and recognizing students' cultural backgrounds. Talking (talk) and listening highlight the importance of communication and giving students a voice in their learning process. Terms like obstacle (obstacl) indicate the challenges teachers face and the necessity to (avoid) traditional methods when they hinder student engagement. Professional development, curriculum training, and best practices in student engagement provided by the school district can also be helpful. Using multiple strategies, teachers can create an inclusive learning environment that respects cultural diversity while actively engaging all students to achieve optimal educational outcomes.

Providing Extra Time and Support (Topic 9), ties into respecting cultural perspectives on the concept of time. The responses emphasize giving (give) students (extra) or adequate (adequ) (time) to turn in their assignments (assign). A (calm) teaching voice, not rushing students with classwork, and giving them time to (think) and reflect on their answers can help them with their anxieties (anxiety). Support involves increasing parental (parent) communication (communic) and involvement

(involv), assigning (assign) tutors (tutor) for (homework) help, and extrinsic (extrins) motivators and incentives such as play time.

English Language Strategies (Topic 10), the responses suggest diverse strategies to address the language (languag) challenges faced by students from multilingual backgrounds. Responses align with the components of Guided Language Acquisition Design (GLAD) and the Sheltered Instruction Observation Protocol (SIOP). Standard English Language Learning (ELL) strategies emphasizing practice (practic), immersion in English, and exposure to various texts (text) and books (book) indicates a focus on improving grammar and vocabulary. Some responses highlight the importance of integrating multicultural (multicultur) elements and a variety (varieti) of resources (resourc) such as (media), documentaries (documentari), podcasts, articles, online videos, folktales such as the creation and trickster stories, and district resources if available, i.e., Indigenous Education for All (iefa). The mention of guidance (guid) and (research) underscores the role of structured exploration in learning, while (data) driven methods and analysis (analyz) can help tailor the approach. Overall, English learning becomes more effective when it is inclusive across different genres (genr) and bodies (bodi) of work through a blend of traditional and innovative approaches.

Supportive Classroom Atmosphere (Topic 11), the responses highlight the importance of making (make) students (feel) (safe), welcome (welcom), and valued in the (classroom). Teachers should (listen) to their students, (take) an interest in their lives, and incorporate their traditions to create a sense of (ownership). A supportive classroom atmosphere (atmospher) is crucial, especially for instilling (instil) confidence in AI/AN students who face socio-economic challenges outside of school. Delivering (deliv) engaging (engag) instruction can help students (rise) to their full potential. A thoughtfully cultivated classroom environment can set the stage for (great) teaching moments (moment) that inspire and transform student success.

Culturally Responsive Teaching (Topic 13) means that teachers are mindful of students' cultures, and adapt instruction to honor and engage with the cultural identities of AI/AN students. These students may communicate differently, such as being uncomfortable with direct eye contact or face-to-face interaction. In written communication, articles or varied/misplaced adjectives and adverb phrases could be lacking. Instead of focusing on errors, teachers should emphasize comprehension (comprehens), analysis, critical (critic) thinking, and the development of (thought). Including content reflecting students' heritage, such as village (villag) tales or (artwork) studies, and allowing (allow) students to choose (choos, choic) their topics for reading (read) and writing (write) enriches the learning experience. Prioritizing feedback over traditional grades (grade) allows educators to provide more meaningful evaluations that (focus) on student growth and understanding.

Incorporating Student Background (Topic 16), the responses acknowledge the varied backgrounds (background) students bring to the classroom. Connecting (connect) academic content with students' personal experiences (experi), demonstrating its relevance (relev), and real-world (real, world) applications helps address differences (differ) in how students perceive information. A (rich) curriculum integrates students' prior knowledge (knowledg) and (life) experiences with academics.

This involves translating (translat) educational material to align with students' linguistic and cultural schemas (schema). The goal is to validate students' identities and help establish a reciprocal (reciproc) relationship between new information and existing frameworks.

Diverse Learning Opportunities (Topic 17), the stemmed words emphasize that students need a variety of learning experiences to flourish academically. The responses highlight the importance of providing many (mani) opportunities (opportun) for students to engage with the material in lively (live) and meaningful ways and offering (offer) alternative assessment opportunities. For example, traditional games and board work allow students to share their values, traditions, and personal artifacts, and access to counselors can provide diverse learning experiences. In many aspects, this is like Topic 8 (Using Multiple Strategies), but the nuance is not teachers using a blend of strategies but rather students learning from various opportunities.

Each of these educational topics carve out a distinct niche within the academic framework. Integrating Native Culture Into Curriculum (Topic 1) specifically addresses including Indigenous history and traditions to promote respect and knowledge of Native American heritage. Culturally Responsive Teaching (Topic 13) takes a broader lens by focusing on adapting teaching practices to fit the cultural backgrounds of all students, not just those of Indigenous heritage. Relatable Teaching (Topic 3) and Incorporating Student Background (Topic 16) aim to personalize learning but differ in scope; the former emphasizes making lessons relevant through real-life applications, while the latter seeks to deeply integrate students' personal and cultural experiences into the curriculum. Using Multiple Strategies (Topic 8) distinguishes pedagogical flexibility and student-centered learning environments over cultural content. Diverse Learning Opportunities (Topic 17) highlights the importance of providing students with various learning experiences and alternative assessment opportunities, shifting focus on student learning instead of teaching strategies. Providing Extra Time and Support (Topic 9) addresses the cultural perspectives on time and the importance of not rushing students. Supportive Classroom Atmosphere (Topic 11) is about making students feel safe, welcome, and valued. Lastly, Make English More Accessible (Topic 10) focuses on language acquisition and multicultural understanding for multilingual learners.

B.2 Active Learning and Differentiated Instruction

Hands-On Active Teaching (Topic 5), the responses emphasize the importance of engaging, interactive, and multi-sensory approaches to learning. Educators promote an active (activ) teaching style that prioritizes hands (hand) on activities and uses physical manipulatives (manipul). The emphasis on (visual) aids, repetition (repetit), and reviews (review) aligns with the recognition that these tools can aid with memory retention. The references to technology (technolog) and Chromebooks (chromebook) point towards integrating modern educational tools. Cooperation (cooper), interaction (interact), and colleagues (colleagu) imply the value of collaborative work and social interaction in the learning process, fostering a more dynamic and engaging classroom environment. The terms (lot) and (much) reinforce the notion that ample opportunities for hands-on experiences are crucial for effective learning outcomes (outcom). Words

like (pace) and (prior) suggest that an active teaching style can adjust for individual learning speeds and prior knowledge.

Visual and Sensory Teaching Style for Math (Topic 7), the responses focus on the utilization of an active teaching for Mathematics (math, mathemat). The responses emphasize the (use) of various multi-modal (multi-mod) approaches to (help) students (grasp) mathematical concepts (concept) and vocabulary (vocabulari). For example, many responses suggest using (model) objects, pictures (pictur), (graphic) organizers, anchor charts, and color coordination to conceptualize (conceptu, see) the problem. Repetition (repeat), clearly defining (defin) terms, giving students clues (clue), and bridging (bridg) new knowledge with existing understanding are also highlighted. More specifically, the Oceti Sakowin Essential Standards (OSEU) provide a framework for integrating Native American culture and history into education for Lakota, Dakota, and Nakota-speaking Native Americans. The Seven Sacred Laws embody respect, compassion, fortitude, generosity, wisdom, honor, and humility and hold significant cultural relevance. Incorporating these values into math teaching can profoundly benefit AI/AN students.

Scaffolded Active Learning (Topic 12), the responses advocate for a kinesthetic approach to learning (learn) to motivate (motiv) and (support) students. Like Topic 5, this focuses on project-based(project-bas) collaborative (collabor) work, reteaching (reteach) concepts, and catering to diverse learning styles (style) such as (audio) or visual learners to promote a healthy (healthi) classroom atmosphere. However, the distinction lies in scaffolding (scaffold), which gradually reduces support and guidance. For example, initially, teachers might emphasize collaborative efforts to facilitate peer-to-peer learning. As students reach comparable levels of understanding, teachers can gradually reduce the emphasis on collaboration. This shift aims to foster self-reliance and instill confidence among students. Monitoring (monitor) students (progress) is essential for this strategy's success.

Small Group and Individualized Instruction (Topic 19), the responses highlight the importance of using targeted instructional (instruct) approaches to support Native American students. Many educators bring up the effectiveness of (small) group instruction and individual (individu) one-on-one (one–on) teaching as it allows for greater differentiation (differenti) of instruction. Coupling small group and individualized instruction with (whole) group instruction also helps solidify learning by reiteration (reiter) and rephrasing (rephras), particularly for students who require special education (sped) services or interventions (intervent).

The academic strategies discussed offer complementary approaches to creating effective learning environments. Hands-On Active Teaching (Topic 5) emphasizes engaging, interactive, and multi-sensory approaches to learning, promoting a dynamic and collaborative classroom environment. Visual and Sensory Teaching Style for Math Concepts (Topic 7) applies these multi-modal approaches to teaching mathematics specifically, showcasing the adaptability of the strategies to different subjects. Scaffolded Active Learning (Topic 12) builds upon the principles of Topic 5, with a focus on gradually reducing support as students progress, fostering self-reliance, and instilling confidence. Small Group and Individualized Instruction (Topic 19) targets

diverse needs, particularly for those requiring special education services or interventions, enabling educators to tailor their teaching to the specific strengths, needs, and learning styles of individual students while complementing whole group instruction.

B.3 Equity, Expectations, and Consistency

Uniform Teaching (Topic 2) focuses on addressing the educational needs (need) of every (student), regardless of their (ethnic) background or linguistic ability (speak, fluent). Teachers believe (believ) that every (everi) child, on any given (day), requires and deserves uniformly high-quality education tailored to their abilities (abil). Each student's unique cultural background and experiences are integrated into a well-rounded curriculum without making students feel singled out or negatively (negat) impacted (impact). The objective is to (meet) students where they are, providing an equitable learning environment that does not change (chang) based on racial or cultural differences. Teachers state that uniform standards foster a functional (function) classroom environment and promote a sense of normalcy (normal) and belonging.

Having High Expectations (Topic 14), the responses emphasize maintaining (high) standards and expectations (expect) to foster academic (academ) (success) and positive (posit) development. Educators advocate for a structured and predictable learning environment where students (set) goals that they can be kept (hold, keep) accountable (account) for. Expectations should be consistent (consist) across all students; for example, all students should at least meet the Common Core State Standards (common). Positive (posit) reinforcement, praise (prais), and gentle (gentl) teaching help uphold these high expectations. Overall, balancing rigorous standards with a nurturing environment helps students develop self-discipline and meet academic expectations while preparing them for future (futur) success.

Treating All Students Equally (Topic 15) promotes equity principles in inclusive educational environments. Reponses emphasize that AI/AN students want to be treated (treat) (like) everyone (everyon) else (els). Equality (equal) should be the general demeanor in the classroom, and any individual issues should be addressed one-on-one (one). The integration of words like (ask), (help), and (understand) into educational discourse encourages a proactive environment where students seek assistance comfortably, reflecting an atmosphere where no one is singled (singl) out. Words such as (check) and (often) point to the necessity of continuous engagement and assessment to maintain a nurturing and understanding academic setting where every student, regardless of background or challenges, can succeed.

All topics aim to create an equitable learning environment but differ in context. **Uniform Teaching (Topic 2)** integrates students' backgrounds into a standardized curriculum, ensuring high-quality education for all. **Having High Expectations (Topic 14)** sets consistent standards while balancing strict expectations with nurturing support. **Treating All Students Equally (Topic 15)** promotes equity by encouraging students to seek help and engaging them regularly. Together, these strategies advocate for a inclusive learning environment that meets the diverse needs of all students.

B.4 Building Relationships and Community

Building Student Relationships (Topic 6), stresses the importance of establishing (establish) relationships with students built on (trust), (respect), and genuine (genuin) interest. Teachers should (get) to (know) their students on a personal (person) level, learning about their families (famili), cultures, and interests. Showing (care) helps (establish) (rapport), receptiveness (recept), and encourages students to be honest (honesti). Overall, good student-teacher relationships create a better learning experience.

Building Family Relationships (Topic 20), the responses revolve around the importance of fostering (apt) connections with not just students but also their families (famili). Understanding (understand) that learning inside (insid) the classroom is influenced by students' background and community values is crucial. Therefore, a collaborative partnership with parents can be especially (especi) important for AI/AN students. Talking with parents can help teachers understand non-verbal (nonverb) signals and cues. In the case of language barriers, understanding gestures and facial expressions may be particularly important. Family-informed responsive teaching creates belonging and helps (relieve) student stress and anxiety.

Building Student Relationships (Topic 6) centers around developing positive interpersonal dynamics directly within the classroom to enhance student comfort, trust, and engagement. Building Family Relationships (Topic 20) emphasizes an active and participatory role for families, extending beyond the classroom to involve them directly in their children's educational development and decision-making. Active family engagement is therefore a key element in a holistic educational strategy, particularly for AI/AN communities where familial and community ties hold significant cultural importance.

B.5 Knowledge Gaps

Awareness of AI/AN Student Presence (Topic 4), the responses focus on the awareness (aware) or lack thereof (unawar) about students' ancestry (ancestri, nativ, indian, alaska, alaskan, indianalaskan). Some educators mention they have (never) (taught) an AI/AN student while others note that their attention is geared toward other minority groups i.e. Hispanic (hispan) students. Teachers who acknowledge Native presence express concerns about students not openly expressing their heritage or decline in their percentages (percentag). One educator notices that a biracial native student in their class identifies more with their African American identity (african). The only strategy mentioned is enhancing cultural literacy (literaci) among educators to ensure all students, including those who may not readily disclose their Native ancestry, feel acknowledged and supported.

No Strategy that Works or Unsure (Topic 18), reflects a lack of specific (specif), effective strategies (strategi) for increasing the academic achievement of Native American students. The responses suggest that many teachers haven't (havent) (yet) (found) or used (use) approaches that consistently increase (increas) the performance of this student population. Few mention employing commonly used (ESL) or

(ELL) strategies, such as (SIOP), GLAD, and (hook), to support English language learners, but they are unsure if these are effective.

Appendix C Important Issues

Table C2: Important Issues Word Profile

#	**Topic Labels**	**Top Words**
1	Learning Gaps	learn, gap, focus, way, technolog, put, student, effort, find, skill, held, distract, yet, societi, destroy, span, explor, driven, cater, calcul, today
2	School Resources and Funding	school, need, student, help, care, attend, success, provid, one, environ, titl, system, fund, strong, avid, distrust, awesom, reward, truanci, subpar, public
3	Low Socioeconomic Status and Poverty	low, student, poverti, perform, famili, academ, aspir, affect, communiti, impact, drug, alcohol, rate, abus, tribe, conserv, meth, welfar, collar, comment, stricken
4	Lack of Future Orientation	get, dont, see, kid, will, know, want, tri, just, mani, influenc, futur, hands-, stuff, outlook, figur, choos, forget, wrong
5	Lack of Accountability	student, high, expect, can, also, well, communiti, struggl, take, difficult, account, emot, migrant, ace, stronger, treat, drop
6	Classroom Management and Student Support	classroom, teach, student, resourc, day, effect, abil, challeng, less, time, amount, misbehavior, signific, self, mold, routin, sped, valuabl, self-regul, interrupt, morn, esteem, retent, unless
7	Lack of Family Involvement	parent, involv, educ, famili, children, child, valu, communic, prioriti, rais, higher, stakehold, produc, whos, babysit
8	Attendance and Behavior Issues	issu, student, biggest, huge, mental, mani, complet, absente, factor, big, tardi, thought, absenc, turn, assign, deploy, gang, none, para, prepared
9	Difficult Home Life	live, lot, mani, come, student, outsid, experi, background, small, littl, grandpar, town, rural, low-incom, food, engin, fish, hunger, jail, pta, ride, mom
10	Class Size and Composition	class, grade, level, student, year, read, math, size, group, larg, gap, pass, smaller, core, section, kindergarten, babi, predict, one–on, algebra, average
11	Lack of Motivation and Effort	work, student, motiv, seem, hard, great, engag, success, growth, toward, intrins, drive, togeth, profession, socialemot, decid, placement, unprepar

Table C2: Important Issues Word Profile (continued)

#	Topic Labels	Top Words
12	Behavior and Discipline Issues	behavior, student, incom, trauma, mani, poor, come, increas, special, disciplin, disrupt, consequ, form, lead, vision, exhibit, alot, imped
13	Health and Safety Concerns	time, problem, think, concern, major, relat, health, homework, deal, face, point, condit, econom, report, vape, smoke, heat, anxieti, unwil, overcrowd, soon
14	Curriculum and Assessment Challenges	district, make, use, curriculum, materi, assess, like, base, teach, sure, book, survey, data, race, plan, outdat, authent, advisori, fraction, fast, hire, websit, analyz
15	Lack of Teacher Support	teacher, believ, student, administr, allow, chang, respect, make, receiv, individu, turnov, must, excel, team, collabor, workload, grate, risk, power, dedic, immers, empow, movement, eager
16	Lack of Culturally Responsive Education	cultur, nativ, test, american, state, enough, student, train, share, need, question, indian, alaska, count, naep, semest, liaison, speaker, elder, massiv
17	Lack of Support and Stability	lack, support, home, student, life, staff, role, model, often, larg, difficulti, broken, internet, stabil, clariti, thereof, instabl, send, articl, esol, chromebook
18	Goal Setting and School Climate	school, goal, set, year, better, becom, colleg, place, keep, job, last, tradit, wish, budget, alreadi, cut, citizen, fed, dirti, pbis, outdoor, misbehav, remain
19	Technology and Social Media Impact	feel, social, like, mani, student, part, play, school, media, member, game, video, addict, phone, generat, opioid, uncomfort, unknown, cell, disord, obsess
20	Socioeconomic and Linguistic Challenges	popul, mani, apathi, student, general, divers, high, school, among, languag, lunch, free, reduc, english, transient, sens, phenomen, list
21	School and Community Partnerships	import, school, achiev, student, educ, academ, mani, tend, creat, famili, trust, vital, priorit, greater, emphas, capabl, flaw, life-long, utmost, cultiv, economi, thank

C.1 Socioeconomic Factors and Family Dynamics

Low Socioeconomic Status and Poverty (Topic 3), the responses highlight the profound (impact) of poverty (poverti) and (low) socioeconomic demographics on students' academic (academ) performance (perform), aspirations (aspir), and overall well-being. Many students come from communities (communiti) plagued with issues such as drug use (drug, meth, alcohol), domestic violence (abus), and petty crimes

(crime). The high (rate) of unemployment, (welfare) dependence, and limited opportunities amongst tribes (tribe) perpetuate a cycle of poverty. Students from (low) income, blue (collar) families often struggle with low motivation. Overall, the conservative (conserv) environment and (stricken) conditions of these communities require urgent governmental interventions and support to break the cycle of poverty and improve educational outcomes.

Lack of Family Involvement (Topic 7), the responses emphasize the crucial role of parental (parent) involvement (involv) in valuing (valu) their childrens (child) education (educ). When parents prioritize (prioriti) and actively participate in their child's learning, students are more likely to succeed academically. However, many responses highlight a lack of familial (famili) engagement and limited communication (communic). Some parents view school as a babysitting (babysit) service rather than a path to future success. The lack of value placed on education is passed down generationally, perpetuating a cycle of disengagement. Building strong school-family partnerships and engaging all stakeholders (stakehold) is requisite to creating a culture that raises (rais) aspirations and (higher) achievement.

Difficult Home Life (Topic 9), the responses paint a picture of students experiencing (experi) numerous challenges outside (outsid) of school. Many come from low income (low-incom) (rural) areas with limited resources and opportunities. Poverty is a significant issue, with students relying on (food) banks, free school meals, and community outreach programs for necessities. Many students (live) in single-parent households, with grandparents (grandpar), or in foster care. Some students experience neglect, (hunger), instability, frequent relocation, and having parents in (jail). Students from these (small) (town) environments lack (background) knowledge and positive role models. Educators argue that a supportive and enriching (school) environment and parent-teacher associations (pta) can help students overcome these obstacles.

Lack of Support and Stability (Topic 17), the responses underline the (lack) of (support) and stability (stabil) at students (home). Students from (broken) homes lack positive (role) models (model) and struggle with emotional regulation. Access to educational resources like the (internet) is limited. Teachers express the need for more training, resources such as mental health services, and (staff) such as counselors and social workers to support students facing trauma and adversity. English for Speakers of Other Languages (esol) supports non-native speakers and can help enhance students' day-to-day communication skills. Access to technology (chromebook) and a nurturing school environment can provide students with (clarity) and direction in their life.

Socioeconomic and Linguistic Challenges (Topic 20), the responses highlight the significant socioeconomic and linguistic diversity in many schools. A large population (popul) of students live in poverty and qualify for (free) and reduced (reduc) lunch programs. Some teachers also note a (general) sense of apathy (apathi) (among) students due to factors such as poverty, (transient) populations, and a lack of parental involvement. Many (mani) schools have a diverse student body, with a significant number of English Language Learners (ELLs). ELLs may struggle to keep up with their peers due to language barriers while also facing the additional stressors associated with poverty, such as food insecurity and unstable housing. While educators value

linguistic diversity, they worry that emphasizing multiple languages could unintentionally hinder ELL students' academic progress. Overall, the responses emphasize the importance of providing targeted language support, such as ELL specialists, bilingual instruction, and differentiated materials.

C.2 School and Community Environment

School Resources and Funding (Topic 2), the responses discuss the critical role of resources in shaping the educational environment (environ) and student (success). Due to inadequate funds (fund), many schools are unable to provide the (help) and (care) students (need), particularly in low-income, title I (titl) populations. There is also (distrust) and disconnection between schools and their communities as schools fail to cater to the diverse needs of their students. Despite limited resources, some schools have been able to cultivate (strong) learning environments. These schools prioritize positive relationships, consistent expectations, and (reward) systems that incentivize (incentive) growth and achievement. While funding disparities remain a pressing concern, fostering a caring (care) and supportive (support) learning environment can help students overcome this.

Classroom Management and Student Support (Topic 6), the responses highlight that managing student behavior (misbehavior) and maintaining a structured routine (routin) are critical for creating a conducive teaching (teach) environment. Disruptive behaviors, such as interruptions (interrupt), refusing to follow directions, and engaging in physical altercations can significantly impact the (amount) of (time) available for teaching. Additional support staff, such as behavior specialists or instructional aides, utilizing special education (sped) strategies to accommodate learning disabilities, and fostering self-regulation (self-regul) and self-esteem (esteem) in students can help overcome these disruptions. This is, however, challenging (challeng) given limited resources (resourc).

Attendance and Behavior Issues (Topic 8), the responses discuss the impact of chronic absenteeism, tardiness (absente, tardi), and behavioral challenges on student learning and school climate. Many educators identify attendance as the (biggest) obstacle to academic success as frequent absences can lead to learning gaps and disengagement. Poverty, unstable home lives, (mental) health struggles, and (gang) involvement are significant factors (factor) contributing to attendance issues. Inconsistent disciplinary policies and a lack of accountability can also exacerbate these challenges. Teachers express they do not feel well (prepared) to address attendance and behavior issues, or it is beyond the scope of their job.

Class Size and Composition (Topic 10) expresses concerns about large class sizes (larg, class, size), particularly for (core) subjects like reading (read) and (math). Since the ability levels within a single (grade) can vary a lot, (smaller) class sizes are preferred because they make it easier to provide one-on-one (one-on-) support and differentiated instruction. To overcome gaps (gap) in student understanding ability grouping and vertical alignment across grade levels (grade, level) can help. Strategies to overcome this challenge include ability groupings to help overcome gaps (gap) in student understanding and vertical alignment across grade levels (grade, level) to ensure student preparedness. Providing additional support for struggling learners, such as

(algebra) readiness programs or earlier interventions, such as (kindergarten) transition initiatives, are also helpful.

Curriculum and Assessment Challenges (Topic 14), the responses express frustration with the lack of appropriate and up-to-date (curriculum). The materials (materi) and textbooks (book) are outdated (outdat) in the context of cultural representation. There is a need for more authentic (authent) resources such as books written by Native Alaskan authors and the (use) of diverse resources in advisory (advisori) programs. The curriculum's emphasis on assessments (assess), (data) collection, and (fast) pace of instruction interfere with their ability to meet individual student needs. Teachers express frustration with the district's (district) hiring (hire) practices and inequitable allocation of resources.

Lack of Teacher Support (Topic 15), the responses discuss the lack of administrative (administr) support for educators. Teachers strongly believe (believ) in fostering a respectful (respect) and collaborative (collabor) environment, empowering (empow) students through individualized (individu) support, and dedicated (dedic) teams (team) to help at (risk) students (excel). For this to happen, the administration (must) trust educators to make appropriate changes (chang) and (allow) for more teacher input. Teachers also believe that excess (workload) and lack of (movement) in contract negotiations contribute to low morale and high turnover (turnov).

Lack of Culturally Responsive Education (Topic 16), the responses highlight the need for more culturally (cultur) inclusive education for AI/AN students (nativ, american, indian, alaska). Suggestions include collaborating with the local AI/AN community, hiring informed liaisons (liaison), or having Native speakers or elders share their stories where students can freely interact and ask questions (speaker, elder, share, question). Teachers feel that the excessive emphasis on standardized testing (test) takes away valuable instructional time and does not accurately reflect the knowledge and abilities of their Native American students. Some educators also cite they are not knowledgeable (enough) about Native customs and heritage and (need) more training (train).

Goal Setting and School Climate (Topic 18), the responses underscore the importance of creating a supportive (school) climate that promotes academic achievement, personal growth, and social-emotional well-being. Many educators highlight the value of setting (set) clear and measurable goals (goal) for the (year) and beyond. Short-term milestones include keeping a job (keep, job), while long-term goals encompass college (colleg) admissions. Teachers argue these small wins add up and help students become better citizens (better, citizen). Goal setting is a gradual process towards accountability, structure, and learning, but the school climate often disappoints the students. Budget cuts, teacher turnover, and lack of emotional support make it difficult for students to remain focused.

School and Community Partnerships (Topic 21), the responses discuss the importance (import) of strong partnerships between schools and families (school, famili). Cultivating (cultiv) these (vital) relationships based on mutual (trust) ensures students achieve (achiev) their academic (academ) goals. Forms of meaningful communication include conferences, newsletters, and digital platforms. Internships, service-learning projects, or collaborations with local organizations can significantly

enhance student capabilities (capabl). Educators acknowledge the challenges in building and sustaining effective partnerships, particularly when faced with limited time and resources, cultural and linguistic barriers, and broader socioeconomic (economi) issues such as poverty, discrimination, and political polarization.

C.3 Student Characteristics

Learning Gaps (Topic 1), the responses highlight the challenges educators face in meeting the diverse learning needs of those who enter the classroom with significant (skill) and knowledge gaps (gap). These students lack (focus), get easily distracted (distract), and put no (effort) into their education. Societal (societi) changes, such as the proliferation of technological (technolog) exposure and consequent overstimulation have wreaked havoc on students' attention spans. To (cater) to these new demands, educators emphasize the role of a flexible, student-centric approach that utilizes differentiated instruction, scaffolding, exploration (explor) based learning, and meaningful uses of technology.

Lack of Future Orientation (Topic 4), the responses reveal a concerning trend among students who struggle to see the value of education and lack a clear vision for their (future). Many students believe they are incapable of success or that their efforts will not make a difference. Teachers emphasize the need to help students (see) and understand their potential (will), encouraging them to try (tri) and not to give up (dont). Students are timid and afraid to give (wrong) answers, which educators want to discourage. The influence (influenc) of peers, family, and societal expectations plays a significant role in helping students make informed choices (choos) and maintain a positive (outlook).

Lack of Accountability (Topic 5), the responses advocate for instilling a sense of purpose in students by setting high expectations (high, expect) and holding students accountable (account). Students from disadvantaged backgrounds, such as migrants (migrant), generally struggle (struggl) to uphold these expectations. Educators should consider their emotional (emot) well-being when communicating expectations. Things that help with student accountability include community (communiti) partnerships, relationship building, individualized support, and (stronger) safety net interventions.

Lack of Motivation and Effort (Topic 11), educators are concerned by students' lack of (work) ethic, motivation (motiv), and engagement (engag). Students show up unprepared (unprepar) to lectures and their lack of intrinsic drive (intrins, drive) is a major obstacle in their learning. Incorporating student interests into lesson plans, promoting social-emotional learning (socialemot), and providing opportunities for students to work together (togeth) can help with low motivation.

Behavior and Discipline Issues (Topic 12), the responses underscore the impact of behavioral challenges and disciplinary issues on student learning and school climate. Many (mani) students (come) from traumatic (trauma) and low-income backgrounds (poor, income), which can manifest in behavioral issues. Educators report an increase (increas) in disruptions, defiance, and aggression. These impediments (imped) lead to lead to lost instructional time and disruptions (disrupt) for all students. To mitigate these, educators advocate for consistent disciplinary consequences (discplin, consequ).

Health and Safety Concerns (Topic 13), the teachers discuss the increasing prevalence of (anxieti), depression, and other (health) issues among their students over (time). These issues lead to (major) hindrances in students learning, such as absenteeism, tardiness, and incomplete (homework) assignments. Teachers' (think) substance abuse (smoke, vape), economic (econom) challenges, and overcrowded (overcrowd) living conditions (condit) are to blame.

Technology and Social Media Impact (Topic 19), the responses recognize that widespread use of technology amongst students presents both opportunities and challenges. Social media can lead to problems like anxiety, unhealthy obsessions, and disorderly conduct (social, media, obsess, disord). In classrooms, students often disengage distracted by video games (video, game). Educators express particular concern about students accessing questionable (unknown) content online. On the other hand, technology offers enhanced information access, collaborative opportunities, and personalized instruction tailored to student needs.