

CULTURALLY RESPONSIVE FORMATIVE ASSESSMENT

by

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ABSTRACT

The purpose of this study was to measure teachers' comfort levels, and understanding of cultural responsiveness, formative assessment, and inquiry-based science and math instruction in a kindergarten through fifth grade school with a 100% population of Native American students. A group of five teachers accepted the invitation to explore culturally responsive formative instruction in math and science. Survey information, teacher observations, interviews, and a checklist of formative assessment methods used by teachers, were used to gather baseline data. The data was then used to determine levels of implementation of CRFA by teachers.

INTRODUCTION AND BACKGROUND

Project Background

For the past two years, I have been the Instructional Coach at Crow Agency Elementary School on the Crow Indian Reservation in Crow Agency, Montana. I had been in the classroom six years previous to that. There are 262 students in grades kindergarten through fifth grade enrolled in our school. One hundred percent of the students are enrolled members of the Crow Tribe. One hundred percent qualify for free or reduced lunch and Title 1. There are 18 classrooms ranging from kindergarten through fifth grade.

In spite of the student population being 100% Crow Native, only six teachers are members of the Crow Nation, one teacher is a member of the Navajo Nation, and eleven are non-American Indian. Although it is not possible to develop assessments and methods of instruction that validate every unique culture students bring to a classroom it is evident that the varying cultures, backgrounds, and methods of learning must be accommodated to some extent in order for learning achievement to occur (Banks et al., 2001). The larger percentage of non-American Indian classroom teachers at the school, 62% of the total, indicates the need for staff to develop cultural understanding.

One of my roles as instructional coach is supporting the staff in implementing reading and math curricula and assisting the teaching staff (classroom teachers and instructional aides) in meeting the needs of all our students. As part of my Big Sky Science Partnerships teacher leader role I also assist staff in implementing the school's science curriculum. I give benchmark assessments in reading and math with the help of three Title 1 staff members. Based on results of benchmark assessments Title 1 staff

members, along with instructional aides, provide intervention for students needing the most intensive instruction. Classroom teachers have the option of inviting me into their classroom to observe, co-teach, or model a lesson.

CONCEPTUAL FRAMEWORK

The Montana American Indian Student Achievement Data Report Fall 2010 gives the CRT data from years 2006 to 2010 (Montana Office of Public, 2010). According to Munson (2010) the data shows that American Indian students' scores at or above proficient levels have improved slightly in reading, mathematics, and science. However the gains are still significantly lower than for White students.

The data shows that 29% of American Indian students score at or above proficient levels in science versus 62% of White students scoring at or above proficient levels in science (2010), showing a 33% discrepancy among American Indian students and White students proficiency levels in science. This data also shows that 40% of American Indian students score at or above proficient levels in math versus 62% of White students scoring at or above proficiency levels in math (2010), showing a 22% discrepancy. The data on reading scores also shows that 62% of American Indian students score at or above proficiency levels versus 87% of White students scoring at or above proficiency levels (2010), showing a 25% discrepancy. This is a clear indication for the need to put policies in place to address this disparity. Culturally responsive and culturally valid assessment, facilitate learners' positive outcomes, play an important role in raising scores and in narrowing the huge disparity, between American Indian and White learners' outcomes.

Concern about the achievement gap that exists among American Indian students and White students prompts the need to identify best practices to improve educational outcomes for American Indian students (Oakes & Maday, 2009). Strategies that support learning include adjusting the curriculum to accommodate the culture, the perspective from which the curriculum is presented, showing respect for language and culture, and heightening knowledge of the surrounding community (Indian Nations At Risk Task Force, 1991).

Culturally responsive assessment provides the framework to validate learners' cultural background and learning styles as they strive for academic success. It is known that cultural psychologists, child development researchers, and theoreticians have acknowledged that culture and society play a vital role in cognitive development (Vygotsky, 1978; Wertsch, 1985; Wertsch, Del Rio, & Alvarez, 1995; Solano-Florez & Nelson-Barber, 2000). The culture and society a child lives, shapes how they learn and function. Thus a way of learning is, related to, the individual's background. Culturally relevant and responsive instruction can help teachers tap into students' prior knowledge, experiences, and community values to gain student engagement (Oakes, 2009). Building and developing teachers' practices can also include the use of formative assessment to drive instruction.

Test developers might start with the faulty belief that students who share the same racial or ethnic heritage, or language also share the same culture (Solano-Flores & Nelson-Barber, 2000). In reality there are vast differences among the students' personal experiences because of family income or geography (WestEd, 2010). Such is the case in grouping Native Americans as one group or culture of knowledge when there are vast

degrees of diversity not only within a particular Native American tribe but in different tribes from all areas of the country. Culturally responsive and culturally valid assessment necessitates culturally responsive approaches from the teaching communities.

Solano-Flores and Nelson-Barber (2000) advocate for cross-cultural awareness and competence in assessment and teaching because such understanding sets a more solid foundation for improving student success. In observing teachers who are effective with students from diverse cultural backgrounds, it was found that they gave respect and nurture children's prior knowledge. Really listening to the students' view of the world makes it safe for students to ask questions, clear up misconceptions, and complete expression of knowledge (WestEd, 2010). In order for this to occur, professional development in raising awareness, and designing and implementing approaches in culturally responsive instruction is necessary.

Lipka implies that concepts such as "culturally relevant" teaching and curriculum are more than teaching and learning styles and ought to include local knowledge and ways of knowing as well (Lipka, 1994, p.19). In my own teaching practice I have an advantage over non-American Indian teachers in that I know where my students come from, I know how parents, grandparents, siblings, and extended family members interact with one another and how important these roles are. I can tell a student I know their grandmother and I will have to have a talk with them almost always results in a student's compliance. I understand how humor plays a major role in our culture, and how it teaches us not to take ourselves so seriously. I can relate to whatever challenges a student may face such as worry over a family member who may not be doing well. Another distinct advantage that I have over non-American Indian teachers is that I can also function in their world, having

been educated in the same or similar school systems as they have, allowing me to navigate the bridge between our Crow culture and the mainstream American culture efficiently.

Solano-Flores & Nelson-Barber (2000) write that culture influences the ways in which people construct knowledge and create meaning from experience, and how they think about things, reason, and solve problems. This directly relates to the way individuals learn and teach (Solano-Flores & Nelson-Barber, 2000).

Cultural responsiveness and validity can be referred to as the effectiveness with which science assessment addresses the socio-cultural influences that shape student thinking and the ways in which students make sense of science test items and respond to them. Culture and society shape the ways in which individuals construct knowledge and create meaning and this has implications for science assessment (Solano-Flores & Nelson-Barber, 2000). It is proposed that the concept of cultural validity as a form of validity should be incorporated into assessment practices. This can come in the subtle variance in how a question is worded such as “how did you get this answer” versus “explain to me how you got this answer.” Solano-Flores and Nelson-Barber conclude that the preliminary evidence shows the way students interpret and respond to science items is influenced by personal experience over experience in formal instruction (Solano-Flores & Nelson-Barber, 2000).

In order to fully understand and incorporate culturally responsive and culturally valid assessment it is necessary to look at formative assessment as the foundation of instruction. Formative assessment is referred to as all those activities undertaken by teachers--and by their students assessing themselves -- that provide information to be used as feedback to modify teaching and learning activities. Such assessment becomes

formative when the evidence is actually used to adapt teaching to meet student needs (Black and William, 2003). Black and William (2003) believe that assessment can support learning as well as measure it.

Formative assessment is ongoing day-by-day assessment that builds on children's knowledge so it is imperative for teachers to know what a student's understanding is based upon. Understanding student's perception of the task allows the teacher to understand what they need to build knowledge from. Ayala (2005) shares these formative assessment guideposts: "thinking beyond the test; it's all about learning, not ranking; all hands on deck; go deep for understanding; and let the students be guideposts." (p. 46, 47) Thinking beyond the test is about looking at the assessment in two ways. First to look at what students know and second to give constructive feedback. The phrase "It's all about learning not ranking," expresses a view of formative assessment as informing teaching and learning. It is not about giving a grade for the sake of grading but to look at the information and act on any misunderstanding. Formative assessment should look for students' deep understanding. Teachers must allow students to make mistakes and be corrected later once mistakes have been identified (Ayala, 2005).

According to Keeley (2005), use of formative assessment probes shifts the focus to looking at what student's are thinking to inform instruction and learning. Assessment probe information can be looked at quickly and used to design instruction that caters to students' ideas and used to guide conceptual understanding. Focusing on misconceptions and finding gaps in students' knowledge is a powerful method of facilitating learning.

It is necessary that a culture of success be backed by the belief that all learners can achieve. Formative assessment can help all learners. It has been shown that low achievers

can achieve fair results when concentration is placed on specific deficits in their learning and instruction is targeted to clear whatever misconceptions are present (Black and Dylan, 2003). Given this information, it is most necessary to assess for understanding and design instruction for facilitating student learning.

Formative assessment fits well in science inquiry teaching and learning. Enabling students to build scientific understanding through student interaction with real situations and materials is the goal. According to Black and William (1998) students whose teachers systematically applied formative assessment techniques outperformed students who did not receive such treatment. These differences were significant, both statistically and educationally. Formative assessment (assessing for learning) occurs during the course of learning and is distinct from summative assessment (assessment of learning) (Harlen, 2003). The evidence shows that formative assessment results in positive growth of students' achievement. This clearly indicates the need to encourage teachers to incorporate formative assessment in their teaching. Teachers need to see the powerful effect formative assessment has on learning. It is imperative that training and resources be provided to teachers to become skillful in the use of formative assessment to drive instruction and promote positive student outcomes (Harlen, 2003).

Keeley offers the use of misconception probes. Formal and informal assessment is imbedded in varying stages of an instructional cycle. The use of misconception probes indicates student misconceptions and gaps in their understanding and offers information to the teacher. Gathering of information from the misconceptions is not formative unless the information is used to improve teaching and learning (Keeley, 2010). The information gained from the probes must be used to design instruction to correct the misconception

and fill any gaps or missing links resulting from students who sometimes have no idea, or a very incomplete idea, in place about a particular topic. In this era of accountability and standardization of assessments formative assessment as a tool to inform and drive student learning may have faded because of the focus on summative assessment of student learning. Gareis (2007) states that formative assessment is not a new idea but has been around as long as teaching itself has been around. Socrates' *modus docendi* (that is, his "preferred way of teaching") was to question the learner. What we now call the Socratic method is essentially the use of questioning to assess understanding, guide learning, and foster critical thinking (Garies, 2007).

Improving student learning and test scores calls for first improving schools and teacher quality. Quality teachers could mean those that are willing to put in the extra time and effort necessary in the quest for increasing students' learning outcomes. This in turn leads to providing teachers with professional development to reach the goal of increased achievement among the American Indian populations in schools. Opfer and Pedder (2011, p. 385) conclude that collaborative professional development produced changes in teacher practice, attitudes, belief, and student achievement.

METHODOLOGY

Statement of Research Focus

The purpose of this study is to determine whether teachers are using culturally responsive formative assessment of inquiry-based science and math instruction in their practice. Culturally responsive teaching builds on a student's background to further the

student's understanding of concepts being learned. Formative assessment determines the student's level of understanding. When combined culturally responsive formative assessment is a best practice for helping students to gain understanding of concepts being learned and play a positive role in their quest for academic success. My research focus questions are as follows: In what ways will the process of understanding culturally responsive formative assessment affect teacher's implementation of culturally responsive formative assessment? In what ways will the process of understanding inquiry-based science and math instruction increase teacher's implementation of inquiry-based science instruction? Do teachers think implementation of inquiry-based science and math instruction play a positive role in student success? In what ways will the process of integrating culturally responsive formative assessment and inquiry-based math and science instruction affect teacher's implementation of CRFA of inquiry-based math and science instruction? What strategies are effective in fostering teacher participation in a voluntary professional learning community, and in providing support that teachers find valuable to themselves and their students?

A checklist of formative assessment examples was given to teachers (Appendix E) in March of 2012. They were asked to indicate to what extent each formative assessment example was used on a scale from 0= never; 1=very rarely; 2= occasionally; 3=frequently; and 5=very frequently. They were also asked to indicate which subjects they were used in, and to describe how they used them in a culturally responsive manner.

The formative assessment (FA) checklist includes examples of observations, graphic organizers, and other. Observation types include anecdotal notes, anecdotal notebooks, anecdotal note cards, and labels or sticky notes. Graphic organizers included

the Venn diagram, KWL (what I Know, what I Want to know, and what I have Learned) chart, KWLS (what I Know, what I Want to know, and what I have Learned, and what I Still want to learn) chart, KNWS (what I need to Know, what I don't Need to know, What does this problem ask me, and what Strategy will I use), brainstorming web, Alphaboxes (a method of brainstorming), mind map, T-chart, Double entry, journal, sense-o-gram, chain of events, problem solution chart, somebody-wanted-but-so, summary star, Frayer model, knowledge rating scale, concept map, word detective, decision making chart, show my thinking chart, map the character, and make a math connection. Other forms of FA include questioning, discussion, exit slips admit slips learning logs, response logs math journals, peer/self assessments, practice presentations, mind map, verbal and visual word association, kinesthetic assessments, individual whiteboards, laundry day, four corners, constructive quizzes, thin-pair-share, and appointment clock.

Mapping the Baseline

This research was conducted as a collection of baseline data to determine to what degree teachers are using culturally responsive formative assessment in inquiry-based science and math instruction to improve student learning. Participation in this study was on a voluntary basis. The subjects of this study included a group of three first-grade teachers, one second-grade teacher, and one fifth-grade teacher at Crow Agency Public School. The group was given a survey on Culturally Responsive Formative Assessment (CRFA), interviewed, observed teaching, and given a checklist of formative assessment examples used by each individual teacher. A key role that I as an Instructional Coach can

fill is to support the teachers to successfully translate concepts into successful classroom practices- helping them cross that bridge from theory to practice.

The goal of this study is to determine where the teachers are implementing CRFA, and the extent of the need to highlight for teachers the importance of using culturally responsive practices to increase student understanding and achievement. A professional learning community (PLC) is a best practice worth utilizing in this quest. Liberman & Miller (2011), suggest that learning communities are best defined as “ongoing groups...who meet regularly for the purposes of increasing their own learning and that of their students” (p. 2). The authors propose that when teachers believe that all students can learn and focus on engaging students, learning occurs. PLC’s can be utilized in the future once the level and nature of teachers’ learning needs has been determined through this research.

Data Collection and Analysis Methods

The Triangulation Matrix in Table 1 presents the data sources used to address each of the research questions in this study.

Table 1
Data Triangulation Matrix

| Focus Questions <i>Primary Question:</i> | Data Source 1 | Data Source 2 | Data Source 3 | Data Source 4 |
|--|-----------------|------------------------|--------------------|--|
| 1. In what ways will the process of understanding culturally responsive formative assessment affect teacher's implementation of culturally responsive formative assessment? | Teacher Surveys | Classroom Observations | Teacher Interviews | Checklist of formative assessment types. |
| 2. In what ways will the process of understanding inquiry-based science and math instruction increase teacher's implementation of inquiry-based science instruction? | Teacher Surveys | Classroom Observations | Teacher Interviews | Checklist of formative assessment types. |
| 3. Do teachers think implementation of inquiry-based science and math instruction play a positive role in student success? | Teacher Surveys | Classroom Observations | Teacher Interviews | Checklist of formative assessment types. |
| 4. In what ways will the process of integrating culturally responsive formative assessment and inquiry-based math and science instruction affect teacher's implementation of CRFA of inquiry-based math and science instruction? | Teacher Surveys | Classroom Observations | Teacher Interviews | Checklist of formative assessment types. |
| 5. What strategies are effective in fostering teacher participation in a voluntary professional learning community, and in providing support that teachers find valuable to themselves and their students? | Teacher Surveys | Classroom Observations | Teacher Interviews | Checklist of formative assessment types. |

A survey on Culturally Responsive Assessment and Pedagogy (Appendix A) was given to staff members at the Crow Agency Public School in March of 2011 to determine the level of understanding among the staff about formative assessment, culturally

responsive assessment, and their effects on learner outcomes. This survey was given to the staff as a whole and included classroom teachers and Title 1 intervention teachers.

Based upon the results of the Culturally Responsive Assessment and Pedagogy survey (Appendix A) a Culturally Responsive Formative Assessment (CRFA) In Inquiry-Based Science and Math Instruction Survey (Appendix B) was developed in October of 2011 to measure teachers' comfort levels, and understanding of cultural responsiveness, formative assessment, and inquiry-based science and math instruction. This survey was given to all classroom teachers and Title 1 intervention teachers with the option to participate on a voluntary basis: five teachers volunteered. The survey was administered during a staff meeting to a sample of five classroom teachers. The sample of five teachers included three first grade teachers, one second grade teacher, and one fifth grade teacher.

A CRFA Interview (Appendix C) was conducted in February and March of 2012 with each of the five teachers who responded to the CRFA survey. The Culturally Responsive Formative Assessment (CRFA) in Inquiry-Based Science and Math Interview addresses teacher's opinions, understanding, needs, and concerns regarding cultural responsiveness, formative assessment, and inquiry-based science and math instruction. Semi-structured interviews were used to allow the researcher an in-depth glimpse of teachers' perceptions about CRFA.

The CRFA interview was conducted with the goal of gaining baseline data of teacher understanding and implementation of formative assessment to drive instruction to increase teacher's comfort levels in the use of formative assessment in inquiry-based math and science instruction. Interim analysis will be utilized allowing for changes of data collection strategies, as problems or questions occur while analyzing the data

(Hendricks, 2009) This data showed comfort levels and understanding of CRFA and provided a starting point for my research goal of using CRFA in inquiry-based math instruction to drive instruction and raise students' ability.

The interview was developed in the spring of 2012 with the guidance of Dr. Elisabeth Swanson, and Gail Whiteman, MSSE student who implemented a similar research study on culturally responsive pedagogy. Guided by what was found in the literature about the importance of cultural responsiveness in teaching, I wanted to determine what teachers knew and felt comfortable with in regards to cultural responsiveness, formative assessment, and inquiry-based science and math instruction.

Classroom observations were conducted using the Culturally Competent Classroom Observation Protocol 2 (CC COP2). This instrument was developed by Regina Sievert (2010) to measure key indicators of cultural competent content, pedagogy, classroom environment, and language use strategies. The CC COP2 instrument found in Appendix D rates these key indicators from a scale of 1 to 5, don't know, and not applicable. Ranging from not relevant, responsive and respectful to students' cultures and learning preferences to very responsive (1) to respectful to students' cultures and supportive of students' learning needs (5).

Validity and Reliability

Data collection focused on a baseline about participants' level of understanding and implementation of formative assessment to drive instruction and thereby raise student understanding and achievement. A type of validity called catalytic validity/trustworthiness allows the researcher to address how understanding has deepened and changed over time, and addresses the necessity for qualitative research. Interviews

allow for this type of deep understanding and reflection over time (Anderson, Herr, & Nihlen as quoted in Mills, 2011).

DATA AND ANALYSIS

I conducted a pilot study survey in March 2011 on culturally responsive and formative assessment (Appendix A) for certified classroom teachers and Title 1 intervention teachers. A description of the pool of possible respondents, and those actually responding, follows. Thirty-five percent of the classroom teachers are members of the Crow tribe. Sixty-five percent of the certified classroom teachers are non-Native. One hundred percent of the three Title staff member are members of the Crow Tribe. Of the 13 instructional aide staff 93% are American Indian. The survey was offered to all certified teaching staff with the instructional aide staff being asked to participate on a voluntary basis. None of the instructional aide staff volunteered at that time. Fifteen out of the 20 certified staff members responded to my survey, including seven Native and eight non-Native instructors. The survey, which consisted of six open-ended items, was conducted during a staff meeting. I analyzed the data by looking at each question and separating the responses from one another. Criteria for responses included answered correctly, answered partially correctly, answered incorrectly or did not know, and gave no response.

Culturally Responsive Assessment and Pedagogy Survey Data

Formative assessment is referred to as all those activities undertaken by teachers-- and by their students assessing themselves -- that provide information to be used as feedback to modify teaching and learning activities. Such assessment becomes formative

when the evidence is actually used to adapt teaching to meet student needs (Black & William, 1998, p.1). The responses to question 1a of the Culturally Responsive Assessment and Pedagogy Survey (see Appendix A) indicated that six out of 13 or 46% of the responses gave some indication of an understanding of formative assessment as assessment that is ongoing and informing instruction (Appendix A). Teachers' responses varied from one responding that, "formative assessments are day to day assessments done in the classroom to see if the student has learned what was taught." Another answered, "assessments show the needs of students," and a third responded that, "formative assessment is testing that guides instruction."

Question 1b asked what teachers knew in regards to culturally responsive assessment. Johnston (2010) quoted from Morehu and colleagues (2008) to argue that the notion of culturally preferred assessment, needs to move beyond cultural practices to include:

an understanding and acceptance that the transmission and acquisition of knowledge are not neutral activities devoid of values, particular ideologies, attitudes, and isolated from the power relations at the macro and minor levels which empower or limit participation and outcome in formal education in its many forms. (Morehu as quoted in Johnston, 2010, p. 232)

Answers ranged from sensitivity towards the culture, assessments that take culture into account, elimination of bias, and testing according to students' cultural background and what they know in their culture. For example, one teacher responded, "Culturally responsive assessment is assessment that takes into account the cultural difference of a given area." A second teacher answered, "Formative assessments are assessments based

on lessons and teaching about culture” and a third teacher stated, “You consider the students culture when assessing them.” All responses took cultural practice into consideration. How students acquire and interpret knowledge and learning, as well as helping students relate lesson content to their own background, was overlooked.

The next question pertained to building bridges between the culture of the community and the culture of the school, which has been found to be effective, and asked whose responsibility it was to promote or help build that bridge. Responses included teachers, administration, parents, community, and Native teachers. There was an overall consensus that all stakeholders in a school were responsible to work collaboratively in this effort. For example one teacher responded that, “Teachers and staff in the schools are responsible,” another responded that, “ The responsibility of the families and the school in a collaborative effort, “ and a third teacher responded that, “The school along with the community need to work together to promote building bridges.”

The next question asked teachers to share examples of how culturally responsive pedagogy is actually applied. Twenty-six percent of the respondents left this question blank, which indicates that they did not have any examples of culturally responsive pedagogy. For example, one teacher responded, “Using culturally appropriate stories and information into the general curriculum,” a second teacher answered, “Social studies, Native American Week, and a third teacher responded, “Being a Crow teacher, using both the Crow and English languages.” A fourth teacher responded, “ Cognitively Guided Instruction (which is an approach to math instruction we are using at Crow School) questioning strategies, and getting to know students and families,” and a fifth teacher

responded, “Sharing of knowledge between Native and Non-Native staff and including parents.”

The next question asked, “How have you learned to understand this definition or application of culturally responsive pedagogy?” Eleven out of 15 or 73% of the respondents did not give an answer to this question, indicating that the staff does not understand and apply culturally responsive pedagogy. There were four teachers that gave answers to this question. The first teacher shared, “That they’ve worked in this school for a long time, a second teacher answered, “I have background knowledge for bridging the gap of two worlds,” a third teacher responded that, “I have experience working with Native Alaskans and Americans Indians.”

When asked what more they felt they needed to learn about culturally responsive pedagogy one third said they needed to learn a lot or everything, one third did not respond, and the rest asked questions ranging from how to implement strategies, how to accomplish culturally responsive pedagogy, and wanting more ideas from Crow teachers about what is most important to include. For instance one teacher stated, “I have a lot to learn,” a second teacher responded, “ I need to learn how to implement it and learn specific strategies to use,” and a third teacher stated, “I would like to get more ideas from Crow teachers about what is most important to include.”

The next question asked “How comfortable do you feel infusing culturally relevant content such as during the implementation of CGI (cognitively guided instruction) across the curriculum? Why? “Although two out of twelve felt they need to know more the rest responded to feeling comfortable on account of all the CGI training we have had. This may indicate that the CGI training with a math content focus teachers’ received did not

allow for a sure transfer of what they learned into other subjects. All responses indicated its use in math but did not give any specifics about other subjects. For instance one teacher responded, “I feel fairly comfortable, but I would like to learn more specifics about the Crow culture,” another teacher responded, “I use story problems that students can relate to so I am comfortable using culturally relevant content,” and a third teacher stated, “I don’t mind implementing cultural content as long as I have factual information to use.”

Finally, the last question asked, “Is there anything else you would like to share such as another thought that you feel you didn’t have a chance to share?” Two out of the fifteen respondents answered this question. One response stated that they felt Crow teachers needed to take a leadership role with the culture and the other suggested the need for culture to be taught as a special topic, with an educated professional teaching the Crow culture with some type of scope and sequence. One teacher responded, “I feel that Crow teachers need to take the leadership role with the culture,” and the other teacher stated, “There needs to be a special class that is taught to all classes with an educated professional teaching the Crow Culture with some type of scope and sequence.”

Culturally Responsive Formative Assessment in Inquiry Based Science and Math Instruction Survey

The detailed findings from the Culturally Responsive Formative Assessment in Inquiry Based Science and Math Instruction Survey (CRFA, Appendix B) are presented immediately below. Key lessons from the survey and implications for the work of the PLC follow here and give a clear picture of where the staff is in their understanding and implementation of formative and culturally responsive assessment. Throughout the survey it is evident that Native teachers feel they are doing what needs to be done in

regards to cultural responsiveness based on their personal knowledge of the culture. Non-Native teachers have voiced the need for Native teachers to share their knowledge and work collaboratively in their implementation of culturally responsive instruction and assessment. These results led me to conclude that collaboration between American Indian and non-American Indian staff must be arranged so that the knowledge and skills American Indian teachers have can benefit not only non-American Indian teachers but the students as well.

There is evidence that teachers at Crow School know that formative assessment is ongoing, but there is very little indication that formative assessment is being used to inform and drive science instruction. The application of culturally responsive assessment and pedagogy are areas that also need clarification and work. Perhaps these are areas that could be worked on with ongoing professional development and on designing instruction centered on student understanding based on the culture.

The Culturally Responsive Formative Assessment Survey was given on November 18, 2011. The CRFA survey was intended to help answer my research questions about the implementation, level of comfort and understanding of culturally responsive teaching and assessment, and whether these necessitate formation of a professional learning community (PLC).

A group of five teachers responded to the invitation to explore the CRFA themes of this study. The five teachers include three first grade teachers, two of whom are Crow Natives each with 20 plus years of teaching at Crow School, and with one being non-American Indian in her first year as a classroom teacher; one second grade teacher who is non-American Indian and in her 15th year as a classroom teacher; and one fifth grade

teacher who is non-American Indian (but grew up on the reservation and is familiar with the area and the people), and in her third year as a classroom teacher.

This survey asked eleven questions. The questions were rated on a scale of three including: “to a great degree” (3), “to a small degree” (2), and “not at all” (1) with the data collection results being summarized in Table 2.

Table 2
CRFA Survey Results

| CRFA Survey Results | 3=to a great degree | 2=to a small degree | 1=Not at all |
|---|---|---------------------|--------------|
| 1. To what degree do you understand the meaning of culturally responsive assessment? | 2 | 3 | 0 |
| 2. To what degree do you understand how to implement culturally responsive assessment in the classroom? | 0 | 3 | 2 |
| 3. To what degree do you understand the meaning of formative assessment? | 3 | 1 | 1 |
| 4. To what degree do you implement formative assessment in your classroom? | 4 | 0 | 1 |
| 5. To what degree do you understand the meaning of inquiry-based science teaching and learning? | 3 | 1 | 1 |
| 6. To what degree do you implement inquiry-based science teaching and learning in your classroom? | 0 | 4 | 1 |
| 7. To what degree do you understand the meaning of inquiry-based math teaching and learning? | 2 | 2 | 1 |
| 8. To what degree do you implement inquiry-based math teaching and learning? | 1 | 3 | 1 |
| 9. To what degree are you implementing an inquiry-based approach across different subject areas in your classroom? | 0 | 4 | 1 |
| 10. To what extent are you getting the support, professional development, and resources you need to effectively implement, inquiry-based teaching and learning in your classroom? | 0 | 5 | 0 |
| 11. Please add what kinds of PD, resources, etc. you would like to become more confident and effective in implementing: Culturally responsive approaches | Four people indicated that they would like to become more confident and effective in implementing culturally responsive approaches. One person, a Crow teacher, commented that they she would like to implement cultural traditions in her approach and another person, a non-Crow teacher, commented that she doesn't really understand culturally responsive approaches. | | |
| Formative assessment | One person indicated that she would like to become more confident and effective in implementing formative assessment. This person commented that she understands formative assessment but finds it difficult to use formative assessment effectively. | | |
| Inquiry-based approaches | One person indicated that she would like to become more confident and effective in implementing inquiry-based approaches. One person responded that our curriculum and materials are conducive for the implementation of inquiry. One person commented that she understands an inquiry-based approach but finds it difficult to use in all programs. | | |

I tallied up the number of responses to each of the questions. Question number one asked, “To what degree do you understand the meaning of culturally responsive assessment (CRA)?” with two people answering to a great degree, three answering to a small degree and none of them answering not at all. Based on these responses I can conclude that there is some understanding of the meaning of culturally responsive assessment.

Question number two asked, “To what degree do you understand how to implement CRA in the classroom?” Three responded to a small degree, and two answered not at all. I can conclude that although this group may understand the meaning of CRA they are not comfortable in their understanding of how to implement CRA in the classroom.

Question number three asked, “To what degree do you understand the meaning of formative assessment?” Three teachers responded to a great degree, one to a small degree, and one responded not at all. These responses tell me that levels of understanding for the meaning of formative assessment are varied in this group. The more experienced teachers were more likely to state that they understood formative assessment than those who have less experience in the classroom.

Question number four asked, “To what degree do you implement formative assessment in your classroom? As in question three, the responses varied with the majority of respondents answering that they implement formative assessment to a great degree and one choosing to a small degree. Again indicating more experienced teachers

were more likely to state that they implemented formative assessment than those who have less experience in the classroom.

Question number five asked, “To what degree do you understand the meaning of inquiry-based science teaching and learning?” Three responded to a great degree, one responded to a small degree, and one responded not at all. Again these responses point toward the more experienced teachers being more likely to state that they understood inquiry-based science teaching and learning than those who have less experience in the classroom.

Question number six asked, “To what degree do you implement inquiry-based science teaching and learning in your classroom?” None responded to a great degree, four responded to a small degree, and one responded not at all. This could be an indication that although many of the teachers understand the meaning of inquiry-based science teaching and learning they are not readily implementing inquiry-based science teaching and learning in the classroom. This could be a direct result of teachers not teaching science very often and therefore not responding “to a great degree.”

Question number seven asked, “To what degree do you understand the meaning of inquiry-based math teaching and learning?” Two responded to a great degree, two responded to a small degree, and one responded not at all. These responses indicate the levels of understanding inquiry-based math teaching and understanding vary, and more experienced teachers were more likely to state that they understood formative assessment than those who have less experience in the classroom, indicating an ongoing pattern.

Question number eight asked, “To what degree do you implement inquiry-based math teaching and learning?” One responded to a great degree, three responded to a small

degree, and one responded not at all. Again this tells me that although teachers may understand the meaning of inquiry-based math teaching and learning they are not implementing it in their math teaching and learning.

Question number nine asked, “To what degree are you implementing an inquiry-based approach across different subject areas in your classroom?” None responded to a great degree, four responded to a small degree, and one responded not at all. Although the majority of respondents (four out of five) implement inquiry-based approaches to a small degree across different subject areas there is still a level of improvement needed.

Question number ten asked, “To what extent are you getting the support, professional development, and resources you need to effectively implement, inquiry-based teaching and learning in your classroom?” All five responded receiving this support to a small degree. Again this indicates that there is room for improvement in this area.

Finally question 11 stated, “Please add what kinds of PD, resources, etc. you would like to become more confident and effective in implementing: Formative assessment; inquiry-based approaches; other (please explain).” Four people indicated that they would like to become more confident and effective in implementing culturally responsive approaches. One person, a Crow teacher, commented that she would like to implement cultural traditions in her approach and another person, a non-Crow teacher, commented that she doesn’t really understand culturally responsive approaches. One person indicated that she would like to become more confident and effective in implementing formative assessment. This person commented that she understands formative assessment but finds it difficult to use formative assessment effectively. One

person indicated that she would like to become more confident and effective in implementing inquiry-based approaches.

Based on responses to the last item in the CRFA survey that asks what kinds of professional development, and resources would be needed to implement inquiry-based teaching and learning in the classroom I can conclude that implementation of the cultural traditions, understanding of culturally responsive approaches, implementation of formative assessment, and inquiry-based approaches, the foci of my original research questions, are all areas of need in this group.

CRFA Interviews

In addition to the CRFA Surveys, an interview on CRFA was conducted with the same five volunteer teachers, using a focus group approach. When asked what brought them to teach at Crow School, three out of the five or sixty percent responded that they choose to teach at Crow School because they live or lived here to begin with. A friend brought two out of the five or 40% here, although one of these two grew up on the reservation, having left and returned because of a career change.

All those interviewed described varying modes of completing their teacher preparation. Two of the five or 40% of the teachers received their teacher preparation online. One of the two received her teacher preparation through Montana State University-Billings and the other through Western Governors University. The other three out of the five or 60% received their teacher preparation in the traditional face-to-face way. Two through MSU-Billings in Billings, Montana and one from Moorehead State University in Minnesota. During the course of the interviews an interesting trend that arose was that the two teachers who received their teacher preparation courses out of

state, one online and the other traditionally, both took a course that addressed teaching students from differing cultures.

When asked to describe any preparation that was received on implementing inquiry-based science instruction three out of the five or 60% responded that they did receive preparation for inquiry-based science instruction through their science methods class. Two out of the five or 40% took a method of science course that did not offer any preparation in inquiry-based science instruction.

When asked about any on the job professional development or classroom experience in implementing inquiry-based science instruction three out of the five or 60% have received no professional development on teaching science. Two out of the three or 40% said that they received professional development for teaching science through a grant from Little Bighorn College, which is the Crow Tribal college located in Crow Agency.

The interviewees were asked to describe the difference between pre-service, early career, and present practice in their implementation of inquiry-based science instruction. Responses varied from being able to plan out and actually have time allotted for inquiry-based science while student teaching. Being required to put it in a lesson plan by two of the five or 40%, to three out of the five or 60% having nothing pertaining to inquiry-based science instruction in their pre-service experience. Two out of the five or 40% received professional development (PD) on science instruction early in their teaching careers. Four out of the five or 80% say they have received nothing in their present practice and one out of the five or 20% has received some science instruction PD from a science summit brought in by scientists from MSU.

Teachers were asked to describe the preparation they received for implementing formative assessment. During their pre-service preparation three out of the five or 60% responded that they received little or nothing at all pertaining to formative assessment. Two out of the five or 40% received some preparation ranging from learning how to include formative assessment in lesson plans to assessing individual students. Interviewees' responses about on-the-job professional development and classroom experience ranged from receiving training from the District in Reading First, guided reading training, cognitively guided instruction (CGI) training for math, and training for the District's math curriculum. However, none of the teachers responded that they received any PD for implementing formative assessment in science.

When asked to describe the preparation they received for implementing culturally responsive teaching two out of the five or 40% of the teachers indicated having taken courses on how culture affects schools and eliminating bias in the classroom. Three out of the five or 60% responded to receiving nothing.

Regarding preparation received for implementing culturally responsive teaching through on-the-job PD and classroom experience two out of the five or 40% of the teachers benefited from the Indian Education for All mandated by the state of Montana through (IEFA) conferences and the Office of Public Instruction's website. One of the five or 20% of the teachers responded that she has not received any PD on culturally responsive teaching. Two out of the five or 40% acknowledged that being Crow Natives themselves helps them to bring their personal experiences into the classroom. Two out of the five or 40% responded that being immersed in the culture (as 100% of the students, 44% of the classroom teachers, and 94% of the paraprofessional staff are Native

American) has benefited them. One out of the five or 20% responded that although she is not a Crow tribal member she grew up locally and has an understanding of the culture, which she believes gives her some experience with the culture.

When asked to describe the preparation they received in their pre-service experience for implementing culturally responsive formative assessment all or 100% of the teachers responded that they did not receive any preparation for CRFA.

When asked to describe the preparation they received since coming to this community regarding integrating local culture into instruction in science or other subject areas, the results were varied. The first teacher responding voiced that integrating culture into instruction is a hard thing to figure out and she hasn't received any preparation from Crow School. Three out of the five or 60% were born and raised here so growing up in this area has benefitted them. One out of the five or 20% noted that the IEFA lessons are available but are not specific to the Crow Reservation area and would not know how to implement them.

The interviewees were asked what they knew about the idea of culturally responsive teaching. Responses stressed the importance of knowing how students live and learn, and using students' background to build upon.

When asked what they knew about the idea of formative assessment to drive instruction, the teachers' responses ranged from using questioning, consistency, building knowledge through strengths and weaknesses, starting points, and developing ways to get where kids need to be.

Responses concerning what was known about the idea of inquiry-based science instruction were as follows. Interviewee #1 responded: not that much; kids are

experiencing the lessons for themselves; student based; student driven; not looking in a science book and saying can you whip out the definitions. Interviewee #2's responses included: not much no time to even teach science; and a little bit of science is discussed in the reading units but no assessments. Interviewee #3 stated: I have not had any PD in that; just what I've learned as a teacher to try and make it more meaningful by allowing them to take ownership of their learning; it is hard to motivate kids; hardly any curiosity. Interviewee #4 said: want kids thinking on their own; thinking about things; wanting to try things about why things work the way they do; thinking; asking questions light bulbs are lighting; instead of just showing them getting them to think about why. Interviewee #5: Nothing really in science although we have had CGI training for math.

When asked to give an example of one time they felt that they successfully reached one of their Native students, and what made this particular experience a success, responses were varied. One teacher explained how she was counting back for subtraction and how a student made it his own by using the number line to gain understanding. Another interviewee voiced that she could reach a lot of her students on their level of cultural beliefs and prayer. One interviewee could not think of any one student or event, but stated that when you see students in high school and greet them and are told that you were their favorite teacher, then you know you've done something right. One teacher said that just seeing growth in a student from where they started, and where they are now, showed success. Finally one interviewee voiced that seeing students graduate from high school or college and knowing that she had a part in this gave her a sense of success.

Cultural Competency Observations

Classroom observations were conducted using the Cultural Competency Classroom Observation Protocol (COP) (Sievert, 2010). Introduced in detail in the Methodology section above, it is a measure of key indicators of cultural competency in these four areas: content, pedagogy, classroom environment, and language use and strategies (Appendix D). Observations were conducted during cognitively guided instruction (CGI) for math. CGI math is an approach to math instruction that the Crow School utilizes as a best practice for cultural responsiveness. CGI is an approach to teaching math that focuses on students' understanding and problem solving strategies through questioning and facilitating discussion and sharing children's thinking. During the previous interviews on CRFA it became evident that science is rarely taught at Crow School and is a direct result of the focus on No Child Left Behind's focus on raising scores in reading and math. Therefore it was decided that math would be observed since Crow School has been implementing a culturally responsive math approach through the use of CGI.

In order to gain a more accurate picture of the results in Table 3 I will combine key indicator ratings 1, 2, and Don't Know (DK) together as rating low in culturally competent content and combine ratings 3, 4, and 5 as moderate to high in culturally competent content. Any key indicator rating not applicable (NA) will not be included in the formula because the key indicator was not observed and/or did not pertain to the lesson.

80% of all ratings assigned in Table 3 were a 1, 2, DK, or no response and only three responded to 3 or above, indicating that cultural competency with respect to the content of the observed math lessons was extremely low.

Key indicator number 6 states that the lesson addresses the responsible and ethical use of science and technology. Since math lessons were observed, I looked for references to the responsible and ethical use of math and technology. Four out of the five or 80% observed received a rating of NA because there was no use of technology during this math lesson. One out of the five or 20% of those observed received a one because they were presenting their math lesson on an interactive whiteboard.

Key indicator number seven, states that content is inclusive and accurate, with no stereotype or bias (by omission, defamation, imbalance, generalization, etc.). One out of five received a rating of one indicating that content is not relevant, responsive and respectful to students' cultures and learning preferences. Three out of the five or 60% received a rating of three, which is a moderate range rating between content that is not relevant, responsive and respectful in these areas and content that is. One out of the five received a rating of NA because this indicator was not observed during this lesson.

Table 3
Culturally Competent Content

| Ratings of Key Indicators | 1 | 2 | 3 | 4 | 5 | DK | NA |
|---|---|---|---|---|---|----|----|
| 1. Lesson connects to the local community, balances contemporary and historical content, and/or includes other local tribal knowledge. | 4 | | | | | | 1 |
| 2. Lesson concepts are contextualized in a scenario or problem that is relevant and significant to local tribal community(s)/culture(s). | 4 | | | | | | 1 |
| 3. Content is practical, with potential benefits to local tribal community(s) | 4 | | | | | | |
| 4. Content reflects respect for Indigenous science knowledge, Western science knowledge, and multiple worldviews | 4 | | | | | | |
| 5. Content is presented from a holistic perspective, addressing relationships, interactions, and/or cycles. | 4 | | | | | | |
| 6. Lesson addresses the responsible and ethical use of science and technology. | 1 | | | | | | 4 |
| 7. Content is inclusive and accurate, with no stereotype or bias (<i>by omission, defamation, imbalance, generalization, etc.</i>) | 1 | | 3 | | | | 1 |
| 8. Cultural content is significant and designated as appropriate for sharing in classrooms by local tribal communities. (<i>Content is not presented as a sidebar, extension or novelty; is not taboo or offensive</i>) | 4 | | | | | | 1 |

Observations of culturally competent pedagogy were varied. In order to gain a more accurate picture of the results in Table 4, I will combine key indicators 1, 2, and don't know (DK) together as rating low in culturally competent pedagogy and combine ratings 3, 4, and 5 as rating moderate to high culturally competent pedagogy. Any key indicator rating not applicable (NA) will not be included in the formula because the key indicator was not observed and/or did not pertain to the lesson.

As shown in Table 4, 58% of all ratings assigned were a 1, 2, DK, or not observed and 37% were a 3 or above, indicating that culturally competent pedagogy of the observed math lessons was low. 80% of observations of key indicator 2 were a 1 indicating that collaborative work and social construction of knowledge was not encouraged in the observed math lesson. 100% of key indicator 5 rated 1 signifying that

elders, tribal professionals, family and/or other community members hold significant roles in classroom curriculum and instruction is extremely low. Another significant indicator would be key indicator 9 which shows 80% of all ratings assigned were a 1, 2, DK or not observed signifying methods of integrating creativity and art are being used to support student learning is very low.

Table 4
Culturally Competent Pedagogy

| Ratings of Key Indicators | 1 | 2 | 3 | 4 | 5 | DK | NA |
|---|---|---|---|---|---|----|----|
| 1) Mentor → apprentice observational learning method is employed. (e.g., modeling or demonstration, adult to student or student to student). | | 1 | 3 | | 1 | | |
| 2) Collaborative work and social construction of knowledge is encouraged | 4 | | | 1 | | | |
| 3) Private practice before public demonstration of proficiency is supported. Teacher does not unexpectedly single out students to respond or demonstrate proficiency. | | | 3 | 1 | 1 | | |
| 4) Lesson requires practical application of knowledge by students to answer relevant questions or solve problems. | 2 | 1 | | 2 | | | |
| 5) Elders, tribal professionals, family and/or other community members hold significant roles in classroom curriculum and instruction. | 5 | | | | | | |
| 6) Lesson is experiential, utilizing natural and authentic contexts | 2 | 1 | 1 | | | | 1 |
| 7) Instructional time is flexible and adequate time is available for individual student's learning needs. | | 2 | 1 | 2 | | | |
| 8) Lesson provides time for and encourages student reflection and meta-cognition. | 1 | 2 | | 1 | 1 | | |
| 9) Methods integrating creativity and art are used to support student learning (symbols, metaphors, storytelling, visual arts, music, etc.). | 4 | | | | | | 1 |
| 10) Multiple sensory formats and resources are used to teach and represent content (aural, visual, kinesthetic, etc.). | 1 | 2 | 1 | | 1 | | |
| 11) Teacher uses extended wait time and flexible conversational pace to encourage meaningful student discussion. | 1 | 2 | | | 1 | 1 | |
| 12) Meaningful and frequent assessments, including alternative forms of assessment, are used to inform instruction, support student learning and assist students in monitoring their learning. (e.g, oral presentation, artwork, storytelling, problem based assessment, performance assessment, practical use of tools and resources, technology use). | 1 | 2 | | 1 | | | 1 |

In order to gain a clear picture of the results in Table 5, I will combine key indicator ratings 1, 2, Don't Know (DK), and no response together as rating low in culturally competent classroom environment (CCCE) and combine ratings 3, 4, and 5 as

moderate to high in CCCE. Any key indicator rating not applicable (NA) will not be included in the formula because the key indicator was not observed and/or did not pertain to the lesson.

80% of CCCE ratings assigned in Table 5 were a 3, 4, or 5, and only 17% were a 1, 2, DK, or no response, indicating that cultural competency with respect to the classroom environment of the observed math lessons was moderate to high. 80% of key indicators 2, 3, 4, 6, and 7 assigned in Table 5 were given a rating of 3, 4, or 5, and only 17% were given a rating of 1,2, DK, or no response indicating that cultural competency with respect to the classroom environment of the observed math lessons was moderate to high. 100% of rating 5 were a 3, 4, or 5 indicating that the classroom community is safe and respectful, and not risky for student's dignity and self-esteem.

Table 5
Culturally Competent Classroom Environment

| Ratings of Key Indicators | 1 | 2 | 3 | 4 | 5 | DK | NA |
|---|---|---|---|---|---|----|----|
| 1) Classroom is student centered, allowing students choice and power sharing and supporting the development of self regulated learners; hierarchies are minimized | 1 | 1 | 2 | | 1 | | |
| 2) Classroom interactions show appreciation and respect for diverse cultures, differing perspectives, life experiences, values, and norms. <i>(between adults/students and students/students)</i> | | 1 | 2 | 1 | 1 | | |
| 3) Teacher's disposition is personable, caring, warm, humorous, respectful, and supportive, not authoritarian, formal and/or rigid. | | 1 | | 2 | 2 | | |
| 4) Teacher is discrete in communications with individual students. <i>(in addressing behavior, offering assistance, giving praise, etc.)</i> | | | 1 | 3 | | | 1 |
| 5) Classroom community is safe and respectful, not risky for student's dignity and self esteem. | | | 1 | 3 | 1 | | |
| 6) Access to resources is equitable, providing all students with ample opportunities to use them as needed | | 1 | 1 | 3 | | | |
| 7) Teacher demonstrates high expectations for all students. | | 1 | 1 | 2 | 1 | | |

100% of all ratings assigned in Table 6 were a 1, indicating that cultural competency of language use and strategies was extremely low or non-existent.

Table 6
Culturally Competent Language Use and Strategies

| Ratings of Key Indicators | 1 | 2 | 3 | 4 | 5 | DK | NA |
|---|---|---|---|---|---|----|----|
| 1) Native language is used in instruction and informal interactions by students and/or teacher (<i>written and/or oral</i>). | 5 | | | | | | |
| 2) Language scaffolding is evident in instructional strategies and resources (<i>Instruction moves from concrete to abstract; frequent contextualized use of vocabulary by students and teacher; use of multiple resources to illustrate concepts such as graphics, models, simulations, visuals; etc.</i>) | 5 | | | | | | |
| 3) Classroom resources employ significant and effective use of Native language to enhance learning (in books, bulletin boards, worksheets, etc.) | 5 | | | | | | |

Formative Assessment Checklist

A formative assessment checklist was given to teachers. Introduced in detail in the Methodology section above FA checklist included examples of formative assessments typically used by teachers in the classrooms. The four types of observations (anecdotal notes, notebooks, note cards, and labels or sticky notes) were combined and percentages were as follows: 30% were never used, 30% were used very rarely, ten percent were used rarely, 20% were used occasionally, zero percent were used frequently, and ten percent were used very frequently (Table 7).

The 22 types of graphic organizers were combined and percentages are as follows: 59% were never used, eight percent were used very rarely, five percent were

used rarely, seventeen percent were used occasionally, eleven percent were used frequently, and zero percent were used very frequently (Table 7).

All others were combined and percentages are as follows: 51% were never used, three percent were used very rarely, eleven percent were used rarely, fourteen percent were used occasionally, thirteen percent were used frequently, and six percent were used frequently (Table 7).

Table 7
Percentage of Formative Assessment Types Used by Teachers

| Types of assessments | % | | | | | |
|----------------------------|-------|-------------|--------|--------------|------------|-----------------|
| | Never | Very rarely | Rarely | Occasionally | Frequently | Very frequently |
| Formative Assessment Types | | | | | | |
| Observations | 30% | 30% | 10% | 20% | 0% | 10% |
| Graphic Organizers | 59% | 8% | 5% | 17% | 11% | 0% |
| Other | 51% | 3% | 11% | 14% | 13% | 6% |

The majority of teachers who filled out the checklist (60%) indicated that they never or very rarely used observations as formative assessment versus zero percent indicating that they used observations as formative assessment frequently. The majority of teachers (59%) indicated that they never used graphic organizers as formative assessment versus zero percent indicating that they used it very frequently. Other types of formative assessment used by teachers was more varied ranging from three percent to fourteen percent with only six percent using formative assessment very frequently versus a little over a half or 51% indicating that they never used formative assessment.

INTERPRETATION AND CONCLUSION

This study provides evidence that implementation, level of comfort, and understanding of culturally responsive teaching and assessment through a professional learning community would be beneficial. The experience of developing and conducting the preliminary data collection for this capstone has led to significant insight into the process' of culturally responsive instruction and assessment in inquiry-based math and science instruction as pieces of pedagogy that all work simultaneously. All are important pieces and must coexist in the pursuit of positive learner outcomes.

The most common concern revealed by the study was the need for more professional development regarding how to effectively implement culturally responsive formative assessment in inquiry based math and science instruction. Another concern voiced by the focus group was lack of time allotted for instruction of science and math inquiry. This could be alleviated through increased classroom management skills and planning.

There is evidence attained through the Culturally Responsive Formative Assessment survey, that teachers at Crow School realize the importance of ongoing formative assessment to inform and drive instruction. The most obvious concern is the lack of evidence for CRFA gathered through surveys, interviews, classroom observations, and formative assessment checklists of the actual implementation of CRFA in math and science instruction.

The data from the CRFA survey shows evidence that a teacher's background knowledge of the area, the Crow Indian reservation, plays a huge role in comfort levels

for the implementation of CRFA in math and science instruction. The teachers that have grown up in the area regardless of being Native or White feel increased confidence in infusing the culture into their instruction to build student understanding. Those that have come to teach from different parts of the country lack confidence in bringing culture into their daily practice and instruction. There is an indication (Table 2) that teachers would like to become more confident and effective in implementing culturally responsive approaches, formative assessment, and inquiry based instruction in their practice. Non-Native teachers pointed out a desire for Native teachers to collaborate and take the lead in providing them with guidance in applying culture into their instruction.

There is a correspondence between the CRFA survey and the CRFA interviews of each person's background and culture playing an important part in comfort levels for the implementation of cultural responsiveness of instruction, formative assessment, and inquiry based instruction. Those that know the culture, as well as having classroom experience with FA, and inquiry based instruction feel at ease imparting that knowledge to build student's understanding of instruction. Teacher's classroom experience also plays a considerable role in the whole process of cultural responsiveness formative assessment of inquiry based math and science instruction. One commonality among the group as a whole was the request for additional PD in every aspect of the study. A clear definition of cultural responsiveness, inquiry based instruction, and a method for increasing the use of formative assessment is desired by all teachers.

The classroom observations and the formative assessment checklist (Table 7) correspond showing a lack of teacher implementation of all aspects of this study of cultural responsive formative assessment. The resulting disappointment is further

amplified by the fact that science as a subject is seldom taught at Crow School. In consideration of this fact classroom observations were conducted during math instruction. It was assumed that with the Crow School's implementation and PD devoted to CGI, results would be positive. Teachers are focusing their resources on math, reading, and language arts leaving them with little time and energy to put toward the subject of science.

This information should be utilized to inform school administrators, education policymakers, teachers, and parents of the need to place more value in the instruction of inquiry based science instruction in a culturally responsive manner through the use of formative assessment.

VALUE

The experience of developing and conducting this capstone project has led to substantial changes in my approach to teaching and my role as an instructional coach. I began with the intention of forming a PLC to increase teacher's comfort levels in the practice of cultural responsiveness using formative assessment to drive inquiry based science and math instruction. I could have focused on one piece of CRFA of inquiry based science and math instruction but felt it all needed to be addressed, because each piece is equally as important in the quest to provide the best learning environment for students, especially Native children, who hold a place close to my heart.

I have attained a driving force greater than before to impart all the necessary components needed in the quest to provide Native children with at least an equal chance,

hopefully better, at reaching their full potential. This requires that teachers be provided with all the resources and opportunities for professional growth to impart Native student learning. I know first hand the difficulties of living in two distinct cultures. It is a continual struggle to keep my Apsaalooke culture alive and pass it down to my children while living in the dominant American culture. The American culture is filled with great promise and endless opportunity and is something I also treasure. My father once said that although our lives as Apsaalooke can be difficult at times we are more fortunate than our White neighbors. We are rich in culture. We live in two cultures others only live in one. We have been afforded our right to keep our Apsaalooke culture and still live in the American culture. We are in a better place than our ancestors were.

This by no means lessens the urgency I feel to build a solid educational foundation for the children that attend Crow School or any other school on the reservations across Montana and the United States. As I observe and hear classroom teachers needs and concerns in their quest to increase student learning I am compelled to do all I can to support them with their goal of increasing student knowledge.

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APPENDICES

APPENDIX A

CULTURALLY RESPONSIVE FORMATIVE ASSESSMENT AND PEDAGOGY
SURVEY

Appendix A
Culturally Responsive Formative Assessment and Pedagogy Survey

Date: _____

1. Tell me what you know regarding (a) formative assessment and (b) culturally responsive and culturally valid assessment.

2. Whose responsibility is it to build bridges between the culture of a community and the culture of a school? Why?

3. Culturally responsive pedagogy can be defined as “strategies that are congruent with the traditional cultural as well as contemporary ways of knowing and learning, and that stress traditional cultural characteristics and adult-child interactions.” How comfortable do you feel in your understanding of this? Explain?

4. How comfortable do you feel infusing culturally relevant content across the curriculum? Why?

5. How comfortable to you feel ensuring that the content is accurate and free of bias and stereotype? Tell how and/or why.

6. Do you know of one or more possible Crow role models with whom a Crow child can identify?

APPENDIX B

CULTURALLY RESPONSIVE FORMATIVE ASSESSMENT OF INQUIRY BASED
SCIENCE AND MATH INSTRUCTION

APPENDIX B
Culturally Responsive Formative Assessment in Inquiry Based Science and Math
Instruction

Name: (optional) _____

Please respond on a scale from: 3=to a great degree; 2=to a small degree; 1=Not at all

1. To what degree do you understand the meaning of culturally responsive assessment?
3 2 1
2. To what degree do you understand how to implement culturally responsive assessment in the classroom?
3 2 1
3. To what degree do you understand the meaning of formative assessment?
3 2 1
4. To what degree do you implement formative assessment in your classroom?
3 2 1
5. To what degree do you understand the meaning of inquiry-based science teaching and learning?
3 2 1
6. To what degree do you implement inquiry-based science teaching and learning in your classroom?
3 2 1
7. To what degree do you understand the meaning of inquiry-based math teaching and learning?
3 2 1
8. To what degree do you implement inquiry-based math teaching and learning?
3 2 1

9. To what degree are you implementing an inquiry-based approach across different subject areas in your classroom?

3 2 1

10. To what extent are you getting the support, professional development, and resources you need to effectively implement, inquiry-based teaching and learning in your classroom?

3 2 1

11. Please add what kinds of PD, resources, etc. you would like to become more confident and effective in implementing:

Culturally responsive approaches

Formative assessment

Inquiry-based approaches

Other (please explain)

APPENDIX C

CULTURALLY RESPONSIVE FORMATIVE ASSESSMENT OF INQUIRY BASED
SCIENCE AND MATH INSTRUCTION INTERVIEW

APPENDIX C
Culturally Responsive Formative Assessment in
Inquiry-Based Science and Math Instruction
Interview

General Background and Preparation for teaching

I'd like to start by asking a few questions about your background and experiences, and how you came to teach (and live) in this school and community.

1. Grade level and subjects taught:
2. How did you come to teach at Crow School? (How did you learn about this position? Were you seeking a position in an American Indian community?)
3. Where did you complete your teacher preparation coursework? How long ago?
4. Please describe the preparation you received in your pre-service program to implement inquiry based science instruction.
5. Please describe the preparation you received in your pre-service program to implement culturally responsive teaching?
6. Please describe the preparation you received in your pre-service program to implement formative assessment?
7. Please describe the preparation you received in your pre-service program to implement culturally responsive formative assessment?
8. Describe the preparation you received regarding integrating local culture into instruction in science or other subject areas.
9. When you began teaching, how well prepared were you in implementing formative assessment?
10. When you began teaching, how well prepared were you in implementing culturally responsive teaching?
11. When you began teaching, how well prepared were you in implementing inquiry based instruction?
12. How well did your pre-service teaching program prepare you to teach in this school? Explain.
13. Describe the teacher professional development you receive in this school/district. What is offered and how often?
14. Please describe any professional development you receive through your school/district or other programs regarding integrating local culture into instruction and assessment.
15. What do you know about the idea of culturally responsive teaching?
16. What do you know about the idea of formative assessment to drive instruction?
17. What do you know about the idea of inquiry based science instruction?
18. Can you give an example of one time that you felt that you successfully reached one of your Native students? What made this particular experience a success?
19. To what extent have you been able to know and understand the local culture?
20. Now that you have taught here for _____years, has the experience been what you had anticipated?

APPENDIX D

CULTURALLY COMPETENT CLASSROOM OBSERVATION PROTOCOL

Appendix D
Culturally Competent Classroom Observation Protocol

Culturally Competent Content

A. Ratings of Key Indicators

- 1) Lesson connects to the local community, balances contemporary
DK NA
and historical content, and/or includes other local tribal knowledge. 1 2 3 4 5
- 2) Lesson concepts are contextualized in a scenario or problem that is
DK NA
relevant and significant to local tribal community(s)/culture(s). 1 2 3 4 5
- 3) Content is practical, with potential benefits to local tribal
DK NA
community(s). 1 2 3 4 5
- 4) Content reflects respect for Indigenous science knowledge, Western
DK NA
science knowledge, and multiple worldviews 1 2 3 4 5
- 5) Content is presented from a holistic perspective, addressing
DK NA
relationships, interactions, and/or cycles. 1 2 3 4 5
- 6) Lesson addresses the responsible and ethical use of science and
DK NA
technology. 1 2 3 4 5
- 7) Content is inclusive and accurate, with no stereotype or bias.
DK NA
(*by omission, defamation, imbalance, generalization, etc.*) 1 2 3 4 5
- 8) Cultural content is significant and designated as appropriate for
DK NA
sharing in classrooms by local tribal communities. (*Content is not
presented as a sidebar, extension or novelty; is not taboo or offensive*) 1 2 3 4 5

B. Synthesis Rating

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|--|
| Content is not relevant, responsive and respectful to students' cultures and learning | | | | Content is very relevant, responsive and respectful to students' cultures and learning |

| | | | | |
|--------------|--|--|--|--------------|
| preferences. | | | | preferences. |
|--------------|--|--|--|--------------|

C. Supporting Evidence for Synthesis Rating

Culturally Competent Pedagogy

A. Ratings of Key Indicators

- | | | | | | |
|---|---|---|---|---|---|
| 1) Mentor → apprentice observational learning method is employed. 5 DK NA (e.g., modeling or demonstration, adult to student or student to student). | 1 | 2 | 3 | 4 | |
| 2) Collaborative work and social construction of knowledge is encouraged. 5 DK NA | 1 | 2 | 3 | 4 | |
| 3) Private practice before public demonstration of proficiency DK NA is supported. Teacher does not unexpectedly single out students to respond or demonstrate proficiency. | 1 | 2 | 3 | 4 | 5 |
| 4) Lesson requires practical application of knowledge by students to 5 DK NA answer relevant questions or solve problems. | 1 | 2 | 3 | 4 | |
| 5) Elders, tribal professionals, family and/or other community members DK NA hold significant roles in classroom curriculum and instruction. | 1 | 2 | 3 | 4 | 5 |
| 6) Lesson is experiential, utilizing natural and authentic contexts. DK NA | 1 | 2 | 3 | 4 | 5 |
| 7) Instructional time is flexible and adequate time is available for DK NA individual student's learning needs. | 1 | 2 | 3 | 4 | 5 |
| 8) Lesson provides time for and encourages student reflection and 5 DK NA metacognition. | 1 | 2 | 3 | 4 | |
| 9) Methods integrating creativity and art are used to support student 5 DK NA learning (symbols, metaphors, storytelling, visual arts, music, etc.). | 1 | 2 | 3 | 4 | |
| 10) Multiple sensory formats and resources are used to teach and 5 DK NA represent content (aural, visual, kinesthetic, etc.). | 1 | 2 | 3 | 4 | |
| 11) Teacher uses extended wait time and flexible conversational pace DK NA to encourage meaningful student discussion. | 1 | 2 | 3 | 4 | 5 |
| 12) Meaningful and frequent assessments, including alternative forms of DK NA assessment, are used to inform instruction, support student learning | 1 | 2 | 3 | 4 | 5 |

and assist students in monitoring their learning. (*e.g., oral presentation, artwork, storytelling, problem based assessment, performance assessment, practical use of tools and resources, technology use*).

B. Synthesis Rating

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|--|
| Instructional methods are not responsive and respectful to students' cultures and learning preferences. | | | | Instructional methods are very responsive and respectful to students' cultures and learning preferences. |

C. Supporting Evidence for Synthesis Rating

Culturally Competent Classroom Environment

Ratings of Key Indicators

- 1) Classroom is student centered, allowing students choice and power
5 DK NA
sharing and supporting the development of self regulated learners;
hierarchies are minimized. 1 2 3 4
- 2) Classroom interactions show appreciation and respect for diverse
5 DK NA
cultures, differing perspectives, life experiences, values, and norms.
(between adults/students and students/students) 1 2 3 4
- 3) Teacher’s disposition is personable, caring, warm, humorous,
5 DK NA
respectful, and supportive, not authoritarian, formal and/or rigid. 1 2 3 4
- 4) Teacher is discrete in communications with individual students.
5 DK NA
(in addressing behavior, offering assistance, giving praise, etc.) 1 2 3 4
- 5) Classroom community is safe and respectful, not risky for students’
5 DK NA
dignity and self esteem. 1 2 3 4
- 6) Access to resources is equitable, providing all students with ample
5 DK NA
opportunities to use them as needed. 1 2 3 4
- 7) Teacher demonstrates high expectations for all students. 1 2 3 4
5 DK NA

B. Synthesis Rating

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|--|
| Environment is not responsive to students and their cultures, and supportive of their learning. | | | | Environment is very responsive to students and their cultures, and supportive of their learning. |

C. Supporting Evidence for Synthesis Rating Culturally Competent Language Use and Strategies

A. Rating of Key Indicators

- 4) Native language is used in instruction and informal interactions 1 2 3 4

5 DK NA
by students and/or teacher (*written and/or oral*).

- 5) Language scaffolding is evident in instructional strategies and resources 1 2 3 4
5 DK NA
(*Instruction moves from concrete to abstract; frequent contextualized use of vocabulary by students and teacher; use of multiple resources to illustrate concepts such as graphics, models, simulations, visuals; etc.*)
- 6) Classroom resources employ significant and effective use of Native 1 2 3 4
5 DK NA
language to enhance learning (in books, bulletin boards, worksheets, etc.)

B. Synthesis Rating

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|--|
| Language use and strategies are not responsive and respectful to students' cultures and supportive of students' learning needs. | | | | Language use and strategies are very responsive and respectful to students' cultures and supportive of students' learning needs. |

C. Supporting Evidence for Synthesis Rating

APPENDIX E

FORMATIVE ASSESSMENT CHECKLIST

Appendix E

Formative Assessment Checklist

Formative Assessment Checklist

Name (optional): _____

Please indicate to what extent you use each of the following examples.

0= Never; 1=Very Rarely; 2=Rarely; 3=Occasionally; 4=Frequently; 5=Very Frequently

| Formative assessment | Definition | Please indicate the subjects in which you use these and describe how you use them culturally responsive manner. |
|-----------------------------|--|--|
| Observation | <p>The more we know about students, the more we can help them. Observations, sometimes called kid watching, can help teachers determine what students do and do not know. There are several instruments and techniques that teachers can use to record useful data about student learning. Here are a few:</p> <p>____Anecdotal Notes: These are short notes written during a lesson as students work in groups or individually, or after the lesson is complete. The teacher should reflect on a specific aspect of the learning (sorts geometric shapes correctly) and make notes on the student's progress toward mastery of that learning target. The teacher can create a form to organize these notes so that they can easily be used for adjusting instruction based on student needs.</p> <p>____Anecdotal Notebook: The teacher may wish to keep a notebook of the individual observation forms or a notebook divided into sections for the individual students. With this method, all of the observations on an individual student are together and can furnish a picture of student learning over time.</p> <p>____Anecdotal Note Cards: The teacher can create a file folder with 5" x 7" note cards for each student. This folder is handy for middle and high school teachers because it provides a</p> | |

| | | |
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| | <p>convenient way to record observations on students in a variety of classes.</p> <p>___ Labels or Sticky Notes: Teachers can carry a clipboard with a sheet of labels or a pad of sticky notes and make observations as they circulate throughout the classroom. After the class, the labels or sticky notes can be placed in the observation notebook in the appropriate student's section</p> | |
| Questioning | <p>___ Asking better questions affords students an opportunity for deeper thinking and provides teachers with significant insight into the degree and depth of student understanding. Questions of this nature engage students in classroom dialogue that expands student learning. Questions should go beyond the typical factual questions requiring recall of facts or numbers. Paul Black, a noted authority on formative assessment, suggests that "more effort has to be spent in framing questions that are worth asking: that is, questions which explore issues that are critical to the development of students' understanding." (Black et al., 2003)</p> | |
| Discussion | <p>___ Classroom discussions can tell the teacher much about student learning and understanding of basic concepts. The teacher can initiate the discussion by presenting students with an open-ended question. The goal is to build knowledge and develop critical and creative thinking skills. Discussions allow students to increase the breadth and depth of their understanding while discarding erroneous information and expanding and explicating background knowledge (Black and Wiliam 1998; Doherty 2003). By activating students as learning resources for one another there is the possibility of some of the largest gains seen in any educational intervention (Slavin, Hurley and Chamberlain 2003). The teacher can assess student understanding by listening to the student responses and by taking anecdotal notes.</p> | |
| Exit/Admit Slips | <p>___ Exit Slips are written responses to questions the teacher poses at the end of a</p> | |

| | | |
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| | <p>lesson or a class to assess student understanding of key concepts. They should take no more than 5 minutes to complete and are taken up as students leave the classroom. The teacher can quickly determine which students have it, which ones need a little help, and which ones are going to require much more instruction on the concept. By assessing the responses on the Exit Slips the teacher can better adjust the instruction in order to accommodate students' needs for the next class.</p> <p>_____Admit slips are exactly like Exit Slips, but they are done prior to or at the beginning of the class. Students may be asked to reflect on their understanding of their previous night's homework, or they may reflect on the previous day's lesson if the question required a longer response time. Exit and Admit Slips can be used in all classes to integrate written communication into the content area.</p> | |
| <p>Learning/Response Logs</p> | <p>_____ Learning logs are used for students' reflections on the material they are learning. This type of journal is in common use among scientists and engineers. In the log, students record the process they go through in learning something new, and any questions they may need to have clarified. This allows students to make connections to what they have learned, set goals, and reflect upon their learning process. The act of writing about thinking helps students become deeper thinkers and better writers. Teachers and students can use Learning Logs during the formative assessment process, as students record what they are learning and the questions they still have, and teachers monitor student progress toward mastery of the learning targets in their log entries and adjust instruction to meet student needs. By reading student logs and delivering descriptive feedback on what the student is doing well and suggestions for improvement, the teacher can make the Learning Log a powerful tool for learning.</p> <p>_____ Response logs are a good way to examine student thinking. They are most often connected with response to literature, but they may be used in any content area.</p> | |

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| | <p>They offer students a place to respond personally, to ask questions, to predict, to reflect, to collect vocabulary and to compose their thoughts about text. Teachers may use Response Logs as formative assessment during the learning process.</p> <p>___ Math Journals</p> | |
| <p>Graphic Organizers</p> | <p>Graphic organizers are visual models that can assist students in organizing information and communicating clearly and effectively. Students can use graphic organizers to structure their writing, brainstorm ideas, assist in decision making, clarify story structure, help with problem solving, and plan research. These are a few of the more common graphic organizers and there are links to sites for more at the bottom of the page. Please indicate to what extent you use each of the following examples. 0= Never; 1=Very Rarely; 2=Rarely; 3=Occasionally; 4=Frequently; 5=Very Frequently</p> <p>___ Venn diagram</p> <p>___ KWL Chart</p> <p>___ KWLS Chart,</p> <p>___ KWLS Chart</p> <p>___ KNWS Chart</p> <p>___ Brainstorming Web,</p> <p>___ AlphaBoxes</p> <p>___ Mind Map</p> <p>___ T Chart</p> <p>___ Double Entry Journal</p> <p>___ Sense-O-Gram</p> | |

| | | |
|-------------------------------|---|--|
| | <p>___ Chain of Events</p> <p>___ Problem-Solution Chart</p> <p>___ Somebody-Wanted-But-So</p> <p>___ Summary Star</p> <p>___ Frayer Model</p> <p>___ Knowledge Rating Scale</p> <p>___ Concept Map</p> <p>___ Word Detectice</p> <p>___ Decision Making Chart</p> <p>___ Show My Thinking Chart</p> <p>___ Map the Character</p> <p>___ Make a Math Connection</p> | |
| Peer/Self Assessments | <p>___ Peer and self assessment help to create a learning community within the classroom. When students are involved in criteria and goal setting, self evaluation becomes a logical step in the learning process. Students become metacognitive and are more aware of their personal strengths and weaknesses. With peer assessment students begin to see each other as resources for understanding and checking for quality work against previously determined criteria. The teacher can examine the self assessments and the peer assessments and identify students' strengths and weaknesses. "When students are required to think about their own learning, articulate what they understand, and what they still need to learn, achievement improves." (Black and Wiliam 1998)</p> | |
| Practice Presentations | <p>___ Just as in sports, practice before a classroom presentation is vital. Through practice and peer review, students can improve their presentation skills and the content of the presentation itself. The practice presentation should take place a few days before the final presentation due date. Students run through their presentations with the audience, their peers, evaluating the performance based on the previously established rubric criteria. An easy way for students to furnish</p> | |

| | | |
|--------------------------------|--|--|
| | <p>feedback is through a T Chart. Students use the left column of the chart to comment on the positive aspects of the presentation, and they use the right columns to suggest changes that the presenter might make to improve the quality of the presentation. By listening to both the practice and final presentations the teacher can easily gauge the level of student understanding of critical concepts and adjust instruction to address any misconceptions.</p> | |
| Visual Representations | <p>_____ There are several forms of visual representation, or nonlinguistic representation, but one that offers assessment data for the teacher is the use of drawing. Graphic organizers can be used as visual representations of concepts in the content areas. Many of the graphic organizers contain a section where the student is expected to illustrate his/her idea of the concept. The ___ Mind Map requires that students use drawings, photos or pictures from a magazine to represent a specific concept. The) ___ Verbal and Visual Word Association asks students to illustrate a vocabulary term. Both of these offer the teacher a quick way of assessing student depth of understanding regarding a specific concept and the ability to adjust instruction immediately to address student needs.</p> | |
| Kinesthetic Assessments | <p>_____ These examples of the formative assessment process require students to incorporate movement to demonstrate their understanding of a topic or concept. Although usually connected with the Arts (dance, playing a musical piece) or physical education (dribbling a basketball, serving a volleyball), kinesthetic assessments can be used in the core content classrooms to furnish teachers with insight into their students' understandings and misconceptions concerning a concept. Kinesthetic assessments are a good way to add movement in the classroom and allow teachers to determine the depth of student learning to inform their instructional decisions.</p> | |
| Individual Whiteboards | <p>_____ Individual slates or whiteboards are a great way to hold all students in the class accountable for the work. They actively involve students in the learning and are a terrific tool in the formative assessment process because they give the teacher immediate information about student learning. When students complete their work and hold their whiteboard up, the teacher can quickly determine who is understanding and who needs help and adjust his/her instruction accordingly. Individual whiteboards are easy to make from melamine or tile board which are usually carried at a local home supply store.</p> | |
| Laundry Day | <p>_____ Laundry Day is a strategy in the formative assessment process mentioned by Cassandra</p> | |

| | | |
|------------------------------------|--|--|
| | <p>Erkens in her article entitled "Scenarios on the Use of Formative Classroom Assessment" (2007). This is a strategy where students evaluate their own learning in preparation for a chapter or unit test. They group themselves in the classroom around four different kinds of laundry detergent: Tide, Gain, Bold and Cheer. In their chosen corner they will work on activities to enrich or improve their understanding of the required content. The teacher can readily assess the students' level of understanding of the basic concepts covered in the unit or chapter. The teacher provides support as needed, as well as help being provided by students who are sure they have mastered the content. None of the work generated during this time counts as a grade, but students are scaffolded to increase their chances of success on the upcoming test.</p> | |
| <p>Four Corners</p> | <p>____ Four Corners is a quick strategy that can be used effectively in the formative assessment process for gauging student understanding. It can engage students in conversations about controversial topics. The four corners of the classroom can be labeled as Strongly Agree, Agree, Disagree, and Strongly Disagree. Present students with a statement, like "All students should wear uniforms to school," and have them move to the corner that expresses their opinion. Students could then discuss why they feel the way they do. The teacher can listen to student discussions and determine who has information to support their opinion and who does not. Another way to use Four Corners is associated with multiple choice quizzes. Label the corners of the classroom as A, B, C and D. Students respond to a teacher-created question by choosing the answer they feel is correct. They must be able to give a reason for their answer.</p> | |
| <p>Constructive Quizzes</p> | <p>____ Periodic quizzes can be used during the formative assessment process to monitor student learning and adjust instruction during a lesson or unit. Constructive quizzes will not only furnish teachers with feedback on their students, but they serve to help students evaluate their own learning. The process is outlined in the document below. By using quizzes to furnish students with immediate feedback, the teacher can quickly determine the status of each student in relation to the learning targets, and students can learn more</p> | |

| | | |
|--------------------------------|---|--|
| | <p>during the discussions that immediately follow the quizzes, instead of having to wait until the next day to see the results of the assessment in the form of a meaningless grade on the top of a paper. The teacher should use the results of these quizzes to adjust instruction immediately based on student outcomes.</p> | |
| <p>Think-Pair-Share</p> | <p>_____Think-Pair-Share (Lyman, 1981) is a summarization strategy that can be used in any content area before, during, and after a lesson. The activity involves three basic steps. During the "think" stage, the teacher tells students to ponder a question or problem. This allows for wait time and helps students control the urge to impulsively shout out the first answer that comes to mind. Next, individuals are paired up and discuss their answer or solution to the problem. During this steps students may wish to revise or alter their original ideas. Finally, students are called upon to share with the rest of the class. There is also a Think-Pair-Square-Share. In this strategy, partners discuss answers with another pair before sharing with the class. This activity ensures that all students are interacting with the information. Teachers can use this activity in the formative assessment process as they walk about the room listening to student conversations.</p> | |

| | | |
|--------------------------|--|--|
| Appointment Clock | <p>_____The Appointment Clock is a simple strategy in the formative assessment process that can be embedded within a lesson. The teacher directs students to find three people with whom to schedule appointments at the quarter hour, the half hour, and the 45-minute mark. The teacher begins the lesson and provides information to move students to higher-order thinking. The teacher determines the stopping point and asks students to meet with their quarter hour appointment to discuss their thinking about a couple of questions the teacher has posed. The teacher walks around and listens to the conversations taking place between partners, noting any misconceptions or misunderstandings. The teacher uses this information to adjust instruction by redirecting the next segment of the lesson. Students meet with their half hour appointment and the teacher conducts the same informal observation and adjusts the third section of the lesson. Students continue this process until the lesson is complete. By structuring a lesson in the manner, the teacher is able to determine the current level of understanding for the class and for individual students, and make immediate adjustments to instruction to assist students in their learning.</p> | |
|--------------------------|--|--|

Definitions retrieved from: <http://wvde.state.wv.us/strategybank/LearningLogs.html>
On April 18, 2012