IMPLICATIONS OF PLANNED FORMATIVE ASSESSMENT TRAINING IN A

SCIENCE, MATH AND HUMANITIES CLASSROOM

By

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STATEMENT OF PERMISSION TO USE

In presenting this professional paper in partial fulfillment of the requirements for a master's degree at Montana State University, I agree that the MSSE shall make it available to borrowers under rules of the program.

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ABSTRACT

The purpose of this Action Research project was to investigate the implications of implementing planned formative assessment in a high school classroom. This Action Research endeavor looked at seven teachers as they were trained and subsequently asked to utilize two Classroom Assessment Techniques in their individual classrooms and record information on their successes, failures and ideas. It was found that teachers were willing to implement new formative assessment techniques provided they took little time to prepare, implement and analyze. However, the information gathered from the formative assessments did not necessarily lead to a change in instructional technique. The project also showed that the level of engagement in the project was correlative with the number of relationships each teacher had with the individual leading the professional development

INTRODUCTION

In an age where students are competing on a global level rather than a local level, it is imperative that the educational resources available are constantly being modified to fit the needs of our future innovators, entrepreneurs, engineers, and thinkers. This change must begin with the most essential element of the equation: the teacher. Teachers in the public school system are faced with an increasing number of standards and expectations to meet on summative tests, but to ensure the evolution of the craft, it is equally important that teachers and educators engage in formative assessment. It is widely known that the implementation of formative assessment increases student achievement. My research focused on the implications of implementing planned formative assessment (PFA) in a high school classroom (Black and Wiliam, 1998b). PFA is defined as, "teachers eliciting and interpreting assessment information and then taking action" (Cowie & Bell 1999, p.101).

Although I have only worked in public education for five years it soon became apparent that there was resistance from teachers when it came to receiving feedback or piloting new techniques which assessed not only student learning, but also provided information about the "gap" between what the students actually learned and what the teacher thought they had taught effectively.

In completing this Action Research (AR) investigation I aimed to study the following questions:

- What instructional impact does implementing formative assessment have on a high school classroom?

- How do teachers adjust their instructional technique?

- What effect does implementing formative assessment have on teacher motivation and attitude?

I chose to work with and study seven teachers at Hamilton High School (HHS), Montana as they were trained, and then subsequently asked to implement planned formative classroom assessment techniques (CAT's) in their classroom. This was of particular interest to me since I had observed that a vocal population of our staff was resistant to using planned, formative classroom assessment techniques due to their assertions that it was something that "teachers did naturally." Having completed Assessment and Evaluation in Education (EDCI 504), I knew the importance of analyzing the data gathered from the CAT's and sharing the data with students, aka "closing the loop" (Angelo and Cross, 1993). I saw this investigation to be of critical importance since it could be used to remind teachers that in order to instill the value of being a life-long learner to our students, we must also be willing to continue our own educational development.

This Action Research (AR) endeavor would not be possible without the diligent work of my support team. With a stroke of luck it just happened that one of my colleagues, Holly Faris enrolled in the Montana State University Master of Science in Science Education (MSSE) program at the same time as I did. Although we were in different sections, our studies have paralleled each other in the sequencing of the education classes. We are both well versed on the implementation of CAT's and the significance of the recorded data and the subsequent benefits to a high school classroom.

Neill Massey is a close friend and English teacher at HHS and has been of assistance when it comes to proofing my writing. Neil acted as editor as I completed my

capstone paper. Last, but certainly not least, is my colleague Birch Fett who is my student council co-advisor and HHS math teacher who holds a masters degree in Curriculum and Instruction. He has been very helpful when I have needed to voice ideas and concerns about statistics and data analysis methods. These three individuals have been of immense assistance at keeping me focused and on task. Upon the finalization of my support team I began searching for information by conducting a literature review.

CONCEPTUAL FRAMEWORK

In order to familiarize myself with the topic of formative assessment, I leaned heavily on the textbook, *Classroom Assessment Techniques*, that we used through the duration of EDCI 504. The importance of this text was twofold. Primarily, it served to provide clear and concise explanation of formative classroom assessment as learner centered, teacher directed, and mutually beneficial (Angelo & Cross, 1993). Secondly, it provided me with a variety of CATs, illustrated their connection to the included Teaching Goals Inventory (TGI), and gave many anecdotal examples of their implementation in different subject areas (Humanities, Science, Math, and English).

Dylan Wiliam and Paul Black wrote one of the keystone articles that I assessed during my early literature review. Together they made the argument on the importance of distinguishing between formative and summative assessments. They made the point that, "studies show that innovations include strengthening the practice of formative assessment produce significant and often substantial learning gains" (Wiliam & Black, 1998b, p.3). As previously mentioned, formative assessment is used to gauge the gap between actual student understanding and the expected standards. This paper did a solid job of communicating the definition of *feedback* that is now widely accepted in the field of

education. The information, which is gathered during the planned formative assessment

is feedback (Wiliam & Black, 1998b). It is important to remember that when paired with

the results from summative assessment, the data gathered from formative assessment can

increase and tell us more about ability with increased reliability than either method alone.

Summative assessments often can test how well a student can perform a certain

task, but may become contaminated due to the students ability or inability to understand

the language or task at hand. Formative assessment can increase the integrity and

reliability because it probes the student to self-assess and verbalize their understanding on

a certain subject. In a close echo to the Angelo & Cross' text, it was also pointed out that

the "Assessment Cycle" consists of the following components: eliciting evidence,

interpretation, and finally action (Wiliam & Black, 1998b).

One of the cornerstones of PFA is the idea of student self-regulation. In essence

by helping students to take command of what they know, how they know it, and what

they want to know, they can better understand the steps they need to take in order to

achieve that mastery. In order to carry out formative assessment a learner has to, "(a)

possess a concept of the *standard* (or goal, performance level) being aimed for, (b)

compare the *actual* (or current) level of performance with the standard, and (c) engage in

the appropriate *action* which leads to closure of the gap" (Sadler, 1989 p.121). This was

a common theme throughout my literature review.

Sadler also provides a strong discussion on reliability vs. validity and states,

"Reliability is usually and correctly said to be a necessary but not sufficient condition for

validity, because measurements or judgments may be reliable in the sense of being

constant over time or over judges and still be off-target (or invalid)" (p.122). This helped

to shape my research because it forced me to design a research matrix that utilized three methods of data collections for each questions so that the data could be triangulated.

There are many activities that qualify as formative assessment. Generally speaking they all fall under two categories, planned or interactive. This paper was of particular interest because I was mostly looking at PFA rather than interactive. PFA provided hard data and results, which can be reviewed and tabulated. Interactive formative assessment is a more casual version of formative assessment which can be implemented at any moment during instruction. One common example of interactive formative assessment would be asking the students to respond by raising their hands, who understood the answer to a selected question. In my pilot data survey several of the respondents indicated that they used formative assessment all the time when they called on students or had class discussions, but the same respondents also indicated that they had low confidence in "closing the loop" or thus, the gap. Cowie & Bell (1999) made the argument the data from planned assessment is more formal.

There have been several studies done regarding professional development for teachers. Of particular interest was a study completed in 2009. In this study McGatha, Bush and Rakes tracked a group of 20 middle school path teachers as they were taken through a year long professional development project on increasing the amount of formative assessments they utilized in their classroom. They taught the formative assessment techniques over thirty hours during the summer as well as an additional 30 hours during the school year. Their research determined that their was a significant rise in student achievement from those under the tutelage of teachers in the professional development program versus the students whose teachers were not part of the

professional development program (McGatha, Bush & Rakes, 2009). Furthermore, much as I did in my AR project, they went on to assess teacher attitudes. This piece of research demonstrated that student achievement can in fact rise due to intensive professional development.

Reviewing these papers gave deeper insight into the language that I would need to use when discussing assessment. They helped to define the terminology, and provide a standard vocabulary that would be understood across the board. When I had selected my sample population of teachers, I took careful measures to communicate with them using this standard vocabulary and reiterated the distinct importance of the term planned versus interactive. Once I had completed the literature review I began to construct a methodology for my AR project.

METHODOLOGY

Treatment

The sample population for my AR project consisted of seven HHS teachers. Due to the small size of the faculty, it was necessary to include teachers from all subject areas, not just science. The goal for my treatment was to provide training on PFA to the entire faculty at HHS. I was afforded a 45-minute speaking block during an in service meeting to do such.

My presentation defined PFA as well as provided the staff with training on how to implement, use, and analyze six methods of CATs. All participants in the training received a packet, with pertinent definitions, detailed instructions of each of the six CATs and directions for implementing these techniques into their classrooms. The packet also contained a bibliography so anyone interested could find further information. Beyond the

information contained in the packet I also provided a blank self-confidence survey, a prompt for a minute paper, and a blank teacher-directed feedback form which I asked those at the in service to complete after the presentation.

Once the training was complete I held a conference individually with each teacher in the sample group. They were provided with a list of suggested and necessary deadlines, and any questions regarding specifics of the CATs were explained in more depth. They were also reminded that the text *Classroom Assessment Techniques* was available should they desire to read more vignettes and examples of each method. I kept in contact with all the teachers involved in my group through weekly emails and conversations to ensure that each participant felt comfortable with the tasks required. I also wanted to be available if they were in need of further training or assistance in understanding the material.

During the in-service I presented the staff the following six CATs.

- The Minute Paper

- The Muddiest Point

- Self-Confidence Surveys

- Student Self-Assessment

- Teacher Designed Feedback Form

- RSQC2 (Recall, Summarize, Question, Connect, Comment)

I deliberately chose these CAT's for several reasons. First and foremost, I decided on CATs that I had success with in EDCI 504. Secondly, I chose CATs that I viewed as "easy" and "non-threatening" since it had been eluded to in casual conversations with several staff members that formative assessment was nothing new,

just a fairly bothersome rose by another name. Finally, I chose the six CATs because I felt that they each assessed a different angle of classroom education. The Minute Paper and Muddiest point easily assessed student misconceptions, Course Related Self-Confidence Surveys and RSQC2 assessed student content knowledge and finally, to assess student self-management and instructor effectiveness, I chose the Interest/Knowledge/Skills Checklist and the Teacher Designed Feedback Form (Angelo & Cross, 1993).

Following the in-service training, I asked my group of sample teachers to implement two of the provided CATs in their classroom and subsequently fill out journals and participate in interviews to collect data on the ease of use, and effectiveness of the CATs. The final step of the process was asking them to re-take the same self-confidence survey administered at the beginning of the project. The in-service training was given on January 16, 2013, and the group was asked to turn in their journals, surveys and complete the interviews by February 22, 2013.

Research Design

Data collection methods were straightforward, comprised of surveys, observations, journals, and interviews. Each teacher was asked to complete a Teacher Demographic Sheet (Appendix A) so that I was able to ascertain if there is any correlation between the years they have been teaching and their views, confidences regarding formative assessment.

In order to help insure validity and reliability, I employed at least three methods of instrumentation to collect data on each research question. Data collected for my primary research question was collected in the form of observations, journals, and

interviews; data for the second question was collected using the three methods above as well as surveys and finally the final research questions was addressed by using surveys, journals and interviews.

My research questions are as follows:

1. What instructional impact does implementing formative assessment have on a high school classroom?
2. How do teachers adjust their instructional technique?
3. What effect does implementing formative assessment have on teacher motivation and attitude?

Data will be obtained for each question in the following ways as shown in my research matrix below:

Table 1
Data Triangulation Matrix

Research Question	Surveys	Classroom Observations	Journals	Interviews
#1		X	X	X
#2	X	X	X	X
#3	X		X	X

As previously mentioned in order to get a baseline, or witness teachers as they went through the "non-treatment" portion of my AR project, I conducted short classroom observations using a rubric (Appendix B) that has been set up so that I can easily tabulate both qualitative and qualitative data trends. I designed this step specifically so that I

could quantify the number of certain occurrences of events in each classroom event

though the subject matter being taught was different. I also designed the Self Confidence

Survey with the same standardization in mind. The questions had to be broad enough to

be accessible for all disciplines, but focused enough to provide me with the information I

was looking for. The main questions included in the journal prompts were as follows:

- Why did you choose this particular CAT?

- What information were you hoping to garner?

- Did you find any trends in the data that were surprising? Why?

- What adjustments did you make to your instruction resulting from the

  information you gathered in this CAT?

- What was the most powerful thing you gained as an educator with the use

  of this CAT?

Due to the fact that teachers were already feeling the pressure to implement their

state required curriculum, I always made it a priority not to add copious amounts of work

to their load. I asked them only to review the journal questions prior to implementing the

CATs in their classroom and then complete the structured journals after implementation.

Each teacher was asked to complete the journal twice. As previously hinted at, teachers

were willing to participate as long as it would not require large amounts of added work.

Unfortunately, this meant that some of the responses were not as in depth as I would have

liked, and it was necessary to scour over their responses to pick up on the slightest trends.

Since I asked the teachers to try something new in their classroom, I tried to stay

away from having them do much added work. I created the Teacher Journals (Appendix

C) with that in mind. The feedback and journaling experience had to be easy, accessible

and worthwhile. In speaking with several teachers when asking them to get on board they all indicated that they would appreciate some leading questions in the journal so that they knew what sort of information I was looking for. By analyzing the teacher journals I was able to pick up on certain phrases and themes shared by all.

One other tool that was used to assess the nature of the individual's classroom dynamics was a short classroom observation of each participating teacher. The observation rubric involved such prompts as:

- What was the frequency with which the teacher checked for understanding?
    - Checks to individual? Whole class? Cold call?
    - How many minutes between checks?
- How frequently did the teacher utilize planned formative assessment?
- How active was the class? How often were the students instructed to move or participate?

Observations of each teacher were conducted during the first or last half hour of class when teachers were doing their bell work activities or closing activities. The reason for these time constraints was due to the 90-minute block-scheduling periods at HHS, and the purpose was to see how interactive the class was prior or following direct lecture time.

After the implementation of the planned formative assessment took place, I conducted final interviews and asked teachers to repeat the original Self Confidence Survey. This served as a method to collect data on teacher attitudes and motivation and indicated if they are more or less willing to try PFAs in the future. Prior to conducting

the interviews, I laid out a set of main questions I was concerned with as well as a list of

follow up probe questions. The questions ranged from simple answers, "what was your

motivation to join my action research group?" through complex questions inquiring about

their thoughts on the validity and usefulness of data driven formative assessments. The

recorded interviews varied in length from zero (non-compliant participant) through

approximately 20 minutes. There was a slight correlation between their active

involvement in the project and the length of their interview.

Since the primary focus of this AR project was to ascertain the implications for

teachers, I did not formally solicit information in the form of interviews from students.

Due to the open door policy of the Tutorial program, students often share unprompted

opinions of their class dynamics with me, and these casual conversations did provide

some insight into awareness about their teachers implementing new techniques.

Instrumentation

As previously mentioned in order to get a baseline, or witness teachers as they go

through the "non-treatment" portion of my AR project, I conducted short classroom

observations using a rubric that has been set up so that I can easily tabulate both

qualitative and qualitative information. I designed this step specifically so that I could

quantify the number of certain occurrences of events in each classroom event though the

subject matter being taught was different. The rubric took count of how many times

teachers checked with students for understanding, the amount of times they "cold called"

students (randomly selecting a student to answer a prompt) as well as the number of

times they took questions. I also designed the Self Confidence Survey (Appendix E) with

the same thought in mind. The questions had to be broad enough to be accessible for all

disciplines, but focused enough to provide me with the information I was looking for. When creating the journals I took into account the fact that the teachers indicated they would like to have some prompts so that they knew what information was being looked for. By analyzing the teacher journals I was able to pick up on certain phrases and themes shared by all the teachers.

After the implementation of the planned formative assessment took place, I conducted final interviews and asked teachers to repeat the original Self Confidence Survey. This served to collect data on teacher attitudes and motivation, and indicated if they are more or less willing to try planned formative assessments in the future.

Demographics

Hamilton High School is a Class A school in the rural town of Hamilton, MT. There are currently 556 students in grades 9-12 attending the school. 94% of the student body is Caucasian and 46% qualify for free or reduced lunch (Hamilton School District, 2012). Initially I would have preferred to have my sample population of teachers consist only of those in the science department, however that was not a reality due to the small number of faculty that we have. I was pleased with the adjustment to include those that taught math, humanities and computer sciences as it provided a broader spectrum of the staff and has even allowed for a better cross section. It should be noted that originally I had planned on using only six teachers, however due to some issues of non compliance, I had to add a seventh teacher half way through the project. Implications and insight due to the change will be discussed in the data analysis section. One other plan that had to be adjusted was the idea to compare attitudes and motivations of veteran vs. non-veteran teachers, with "veteran teachers" being decided as someone who has ten or more years in

the field. It was not possible to set up a study in this manner because only two non-

veteran teachers were interested in taking part in the AR project.

Table 2 illustrates the demographics of the teacher sample population for my AR

project.

Table 2
Teacher Demographics (*N=7*)

NAME	Teacher 7 *Highly Engaged*	Teacher 5 *Highly Engaged*	Teacher 4 *Highly Engaged*	Teacher 2 *Moderately Engaged*	Teacher 3 *Moderately Engaged*	Teacher 6 *Moderately Engaged*	Teacher 1 *Mildly Engaged*
What Subjects do you teach?	Physical Science	Biology, Biotech-nology, Forensics	Health 1& 2 Anatomy & Physiology	Pre-Algebra, Algebra 2 AP Calculus	English 1, Creative Writing, AP Language + Composit-ion	Compu-ters, Business	Global Studies
How long have you been teaching?	18 years	22 years	23 years	7 years	17 years	33 years	5 years
How many years have you been at HHS	9 years	20 years	20 years	2 years	12 years	33 years	2 years

As shown in the table above the majority of the teachers who were open to work

with me have been teaching in the Hamilton School District for the majority of their

careers. Having also spent the past five years employed at Hamilton, I can attest to the

fact that there has been little or no formal staff training on planned or interactive

formative assessment. While the district has professional growth and development

reviews in place, there has been little incentive to focus professional development on instructional techniques until 2012 with the revision of the Professional Growth and Development Plan. Instead the major push for professional development had been on Montana Behavior Initiative (MBI) and Response to Intervention (RTI). Both MBI and RTI are centered around positive behavior interventions which, in theory, will lead to higher achievement in the classrooms.

Due to the fact that the nature of this AR project required the participation and the solicitation of information from human subjects, it was necessary to attain a waiver from the Institutional Review Board (IRB) at Montana State University. The research methodology for this project received and exemption by Montana State University's Institutional Review Board and compliance for working with human subjects was maintained. The Montana State University IRB approval can be found in Appendix (D).

DATA ANALYSIS

The data collection instruments that yielded the most information were the pre-treatment and post treatment Self Confidence Surveys as well as the teacher journals. Interviews with teachers provided little new information, but served to reinforce what they had written in their journals. Unfortunately, classroom observations provided very little usable information about each teacher's individual routine, but did give me a general feel for the level of engagement by the students. Several trends emerged throughout the sample population, but it is important to address each teacher individually as well.

The cohort as a whole was easily classified into three groups; those who exhibited high engagement, those who were somewhat engaged, and those who were only mildly

engaged or exhibited non-compliance during the process. This was correlated to the personal and professional relationships that I have had with each teacher. Table 3 illustrates the level of relationship that I have with each teacher. For example, the teacher who exhibited the highest level of engagement in the project was a science teacher, my Envirothon Co-Coach/parent helper, and a family friend. Conversely, I had no added professional, co-curricular or personal relationships with the teacher who was only mildly engaged in the project.

Table 3:
Teacher Engagement Profile (N=7)

	Highly Engaged	*Moderately Engaged*	*Mildly Engaged*
Teacher number	4, 5, 7	2,3,6	1
Professional Relationships	Envirothon Co-Coach (2), MSSE Student (1), Science Teacher (3)	Student Council Advisor (1) Freshman Team Member (1)	none
Personal Relationships	Family friend (3)	Horseback Riding Trainer (1)	none

This chart was compiled based on the information garnered from the journals, surveys and length of interviews. On a whole, interviews with the Highly Engaged group lasted 10-20 minutes, Moderately Engaged were between five and ten minutes, and the teacher who was Mildly Engaged chose not to participate in the interview at all. Analysis of the number of emails and conferences between the group showed that the success of the planned formative training was to a degree dependent on the personal relationship and contact with the presenter.

One of the points of interest that is not easily shown in the data is that although the highly engaged group of teachers demonstrated that they felt very involved in the process, it was still important for them to utilize a CAT that was time efficient and easy to implement without much planning as was shown by the responses from the journals and surveys. It was shown that 56% chose a CAT that required 15 minutes or less to prepare, and the same 56% also indicated that the CAT was "very easy" to implement. It was apparent that the choice of CAT was determined both by the time necessary for planning, but also determined by the type of information the teacher was hoping to uncover as seen in the Table 4. The table also indicated whether or not the reason for a choice of CAT was either teacher centered or student centered. The Muddiest point was chosen often because it is easy and quick to prepare, implement and analyze. It is also easy to implement and analyze. The main motivations did not include any student centered reasoning such as "state learning objectives" or "wanted students to practice writing in a science classroom."

Table 4
Motivation for Choosing CAT (*N*=11)

Name of CAT	Muddiest Point	Self Confidence Survey	Minute Paper
Number Uses	5	4	2
Motivation	Easy, quick, familiar	Easy, good way to state learning objectives	Wanted students to practice writing
Reason for Choice	Teacher centered	Teacher/Student Centered	Student Centered

The choice of CAT also correlated with the HHS school calendar. The time constraints of this AR project dictated that all teachers were signed-on to the project by

December of 2012. At that point, each was presented with a timeline outlining the

sequencing of activities that would need to be completed over the course of the AR

project. While the phases of implementation were flexible in their dates, a deadline of

February 20th was set for the completion of implementation and completion of the tasks.

Coincidentally, the available time for implementation overlapped with the end of HHS's

second quarter, which fell on January 25, 2012. While unintentional, Teacher 7 from the

highly engaged group as well as Teachers 2 and 6 from the moderately engaged group

made me aware that this could potentially pose a rushed trial of planned formative

assessment techniques. Teacher 7, also in the highly engaged group and late entry to the

project, detailed that she was also in the midst of her AR project and was hesitant to

"bombard" her students with more "experimental" techniques than she was use to doing

to her data collection deadline.

Research Question 1

The primary research question focused on the instructional implications of

implementing formative assessment in a high school classroom. In order to address this

question, I designed prompted Teacher Journals (Appendix D) and surveys (Appendix E),

which provided me with the greatest amount of information. I also gathered information

through the interview process. I tasked the sample population of teachers with

implementing two CATs I had presented during the in-service in their classrooms. The

results were mixed. Even after communicating with me for clarification and more

training Teacher 3 (moderately engaged group) did not end up using any of the CATs that

were provided and instead used her own, "sticky note quiz." Essentially the students

were asked to organize and group a list of words onto one of two sticky notes. The idea

was to check and make sure the students were able to differentiate the subtleties between two groups' similar subjects. When asked what her reasoning was she informed me during the interview that "it was something she already was familiar with and used often." I would have to infer that she chose this CAT because it did not require any extra time or planning to implement in her classroom, and she was comfortable using this method.

One other setback in my study was the non-compliance of Teacher 1. As the first to sign on and volunteer to be part of the sample group, I was confident that the tasks would be accomplished with enthusiasm and in a timely manner. However, this was not the case at all. After numerous attempts at initiating communication by email, school mail, face to face, plus telephone and text message on almost a daily basis, Teacher 1 failed to respond with any meaningful information by any of the calendar dates I had set for the project. It should be noted that this particular teacher also responded with the lowest marks on the Self Confidence Survey so it was indeed puzzling at his apparent lack of motivation to add new instructional techniques to his skill set.

In order to maintain a relevant sample population it was necessary to include another teacher at this point, and I was enthusiastic to add Teacher 7 to my project as she was also in the MSSE program, and has really remarked how her views of formative assessment have changed since completing EDCI 504. Out of the three teachers that turned out to be highly engaged, this teacher exhibited the deepest buy in to the process and dedication to providing pertinent and well thought out information. When asked for her thoughts on planned formative assessment in her final interview, she responded honestly that, "Before I started this whole process and EDCI 504 I would have thought

that some formative assessment and CATs were junk and just the newest thing. Now I have the opposite opinion." She continued on to remark that, "Aside from finding value in it for myself, the students have really begun to enjoy the activities and respect that we are in this journey together."

Teacher 7 was in the highly engaged group for several reasons. It is important to mention that she had increased familiarity with the use of CATs due to the fact that she was an MSSE student and had completed EDCI 504. In fact, she has created a Self Confidence Survey for every unit over the course of the year as well as using minute papers for part of her own MSSE AR project. We have shared several conversations on the use of CATs, and I supported her when she shared with the administration that, "All teachers should be required to complete the Teaching Goals Inventory section of the text (Angelo & Cross 1993) and then try out some CATs. That exercise really helped me to shape my instruction for the year to focus on mastery and metacognition." While there was no movement from the administration considering her suggestions, it might be necessary to require that staff engage in some standard school wide professional development so that it is possible to create a common language and theme throughout the faculty.

In order to investigate the implications of planned formative assessment in a classroom I asked teachers to complete a simple Self Confidence Survey prior to the in-service. When designing the Self Confidence Survey it was necessary to create statements that would assess various components of their knowledge and comfort level with implementing planned formative assessment. Statements (Appendix B) 1 and 2 were designed to give an idea of these teachers background knowledge of formative

assessment. Statements 3 through 8 were designed to garner more information about how

the teachers implement formative assessment and analyze data. Finally statement 9 was

designed to gauge the confidence level of the participants regarding their ability to

collaborate and share learned CATs with other faculty.

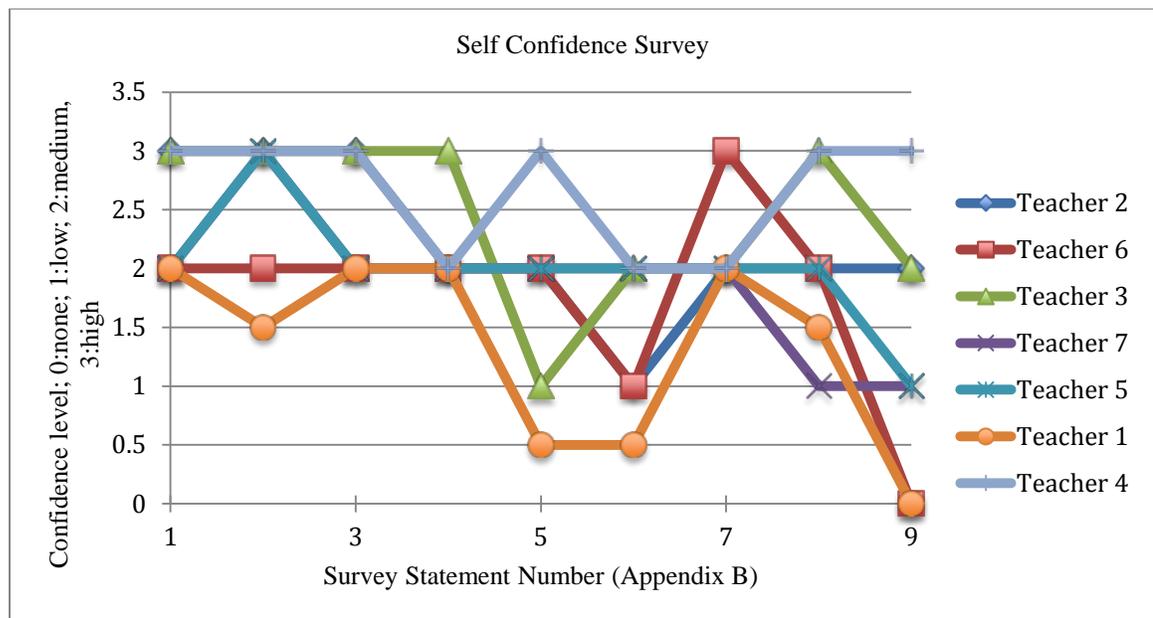Figure 1 illustrates the data gathered from the pre-treatment survey.

Figure 1. Pre-treatment self confidence survey results, *(N=7).*

Interestingly, confidence levels dropped for statements, five and six which dealt

with teacher's ability to analyze hard data from PFA and share the results with students.

This theme was echoed in the interviews as well as the Teacher Journals. In particular,

Teachers 6, 2, 3 (moderately engaged) and 1 (slightly engaged) all had a drop in

confidence. As mentioned previously, in order to elicit directed responses from teachers

on their experiences implementing CATs in their classroom I created a prompted journal

entry form. Teachers 1,2,3, and 6 shared similar responses to the prompts, *How did you*

plan to look at the data? And, *How did you plan to 'close the loop' and share*

information with your students? How did they respond? This group responded that they "briefly looked at the data" or "read responses quickly." They all "closed the loop" by "sharing/telling the results to the class." The four teachers above also chose to use either the Muddiest Point or Self Confidence Surveys which would indicate that they were more interested in choosing a CAT for teacher centered reason, instead of working on student or learner centered reasons.

The phrase, "closing the loop" was new to all but one of the teachers in the sample group, and I made sure to highlight that it specifically focused on data driven information that should be shared with the students to increase their buy in to the formative assessments. It would appear that this group of teachers may not have spent the time to do so in a meaningful way unlike Teacher 7 who showed a rise in confidence and mentioned in her journal that she, "spent approximately 20 minutes reviewing results, created a graph and shared the information with students during the next class and provided a five minute discussion period." In hindsight this is probably due to the extensive training that Teacher 7 has received on formative assessment over the course of the MSSE program.

It became clear that providing a 45 minute in service training to the entire staff might not be a sufficient amount of time necessary to instruct on the intricacies of planned formative assessment versus regular assessments. It is no secret that it would require more time and commitment to require that they continually add techniques and material into their own practice. It does not appear that teachers are always willing to voluntarily take on the task of doing so. This was evident by the fact that only eight out

of forty (20%) staff members took time to complete and return the Teacher-Designed

Feedback Forms that I had prepared.

Subsequent to the in-service training, I asked each of the teachers participating in

my AR project to pick two of the six CATs to implement in their classroom and complete

a prompted journal and survey for each CAT. I had hoped to have an even distribution of

the CAT choices, however, not one participant used either the Teacher –Designed

Feedback form or RSQC2. From the data gathered on the Teacher Journal Surveys

(Appendix F) it was evident that participants were willing to try a CAT that did not take

very much preparation, class time or analysis time.

How much time did you spend preparing the use of this CAT?
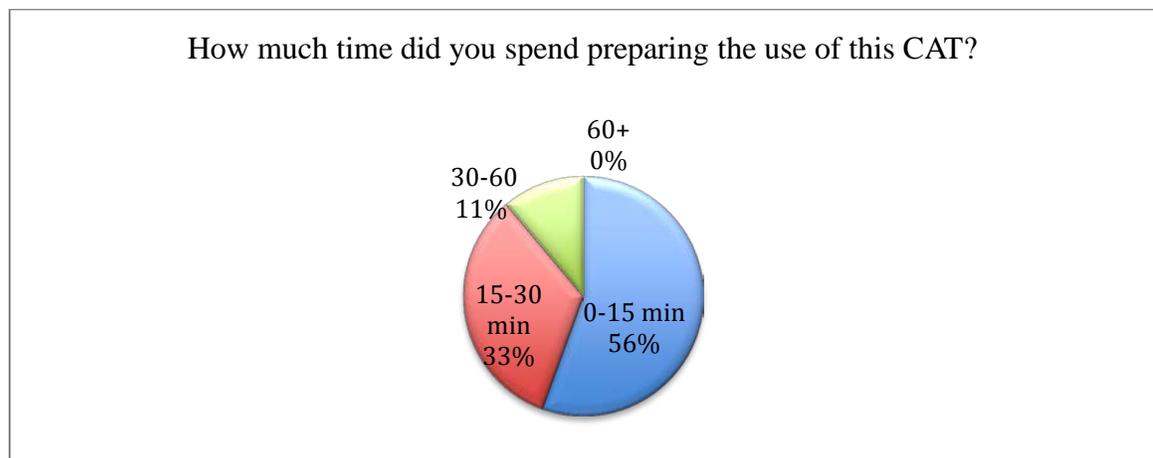
Figure 2: CAT Preparation time, *(N=12).*

It was evident by the Figure 2 regarding the preparation time expended on the 12

CATs that were utilized (two of the seven teachers only completed one CAT each instead

of two), that 86% spent 30 minutes or less on their preparation. These data were gathered

from the surveys that were handed out and supported by their journal responses that

dictated that they primarily chose CATs because they "looked easy" (Teacher 2) and was

"something I have used before" (Teacher 1). Likewise the Figure 3 shows that it was

also shown that teachers did not want to spend more than five to ten minutes

implementing the CAT in their classroom (Figure 3).

Furthermore, the data from the surveys also showed that teachers chose to spend

more that 15 minutes on CAT data analysis only 44% of the time (Figure 4). Once again,

the majority (56%) only spent 0-15 minutes on analysis.

How much time in class (in minutes) was spent implementing this
CAT?

10.-15.
11%
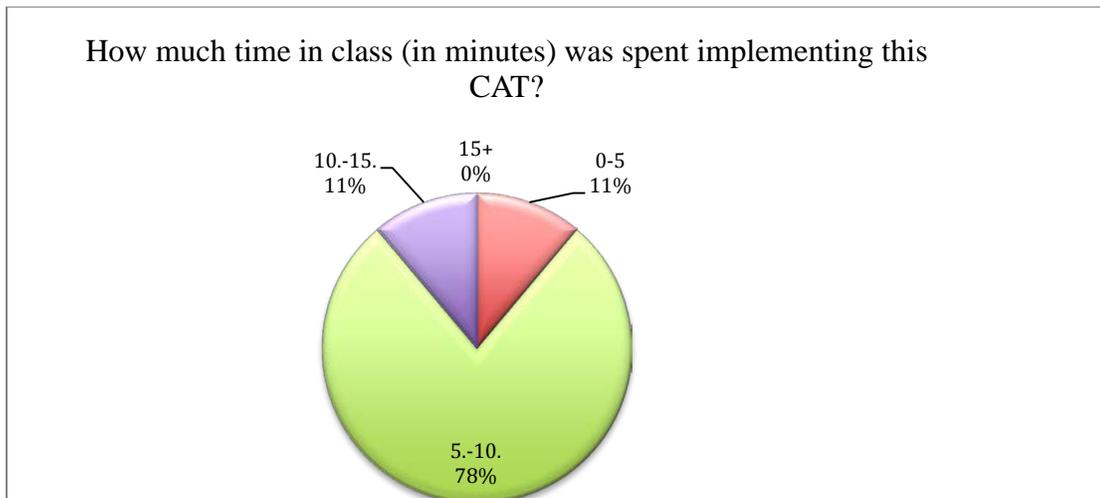
15+
0%

0-5
11%

5.-10.
78%

Figure 3: *CAT Implementation time, (N=12).*

Having constructed and analyzed CATs in EDCI 504 I know that it typically takes

longer than 15 minutes to look at the data and find meaningful or surprising trends.

Teachers who completed the Muddiest Point typically spent the least time on analysis

which seems typical because it is such a straightforward and quick activity.

One way to possibly acquire more data from the students would be to further

include the phrase, *and why…*, following the statement, "Please write your muddiest

point from todays lecture." Teacher 6 from the moderately engaged group who teaches

computer science and technology classes also found an efficient way to analyze data.

She employed the use of Socrative.com, which is an online feedback site. She was able

to set up some prompts in which the students had to log in and answer. The results of her

Muddiest Point survey were then cataloged so that she could quickly and easily see who

authored each response. She was also able to graphically share the results with the class.

This is an example of how technology like Socrative.com, Google Forms, and clickers

can cut down on analysis time. Should I repeat the project again, I would make the

suggestion that teachers create an online survey where the results are tabulated

automatically. That way one could focus their time looking for trends and outliers

instead of data entry.
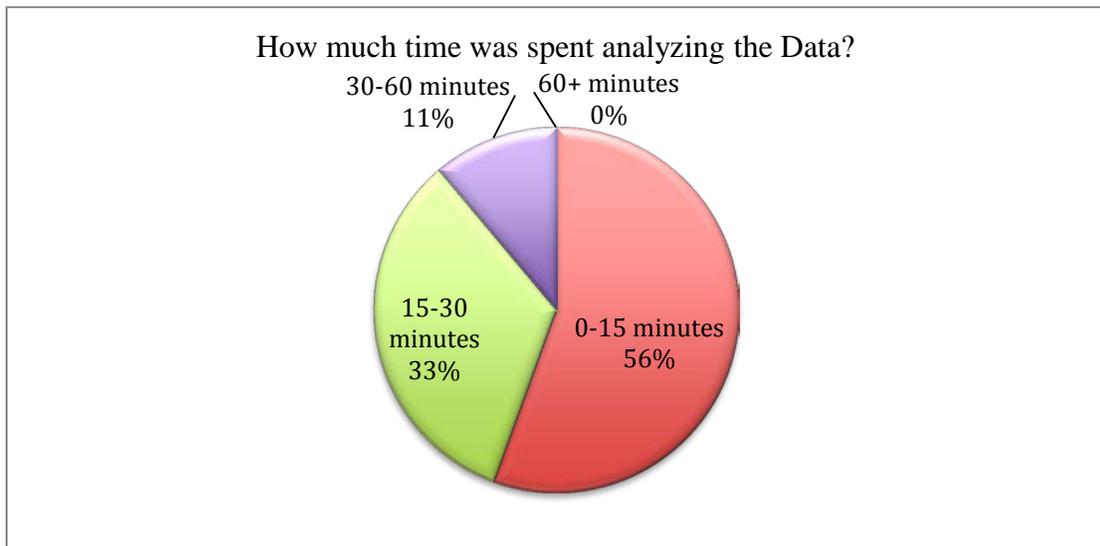
Figure 4: *CAT Analysis time,* (*N*=12).

It was evident by the Teacher Journals, that those who spent 15-30 minute

analyzing the information gathered from their CATs were able to uncover some

surprising information in their data. Upon analysis of Minute Paper data, the biology

teacher from the highly engaged group remarked, "the difficulties the students had were

as I expected, however, the range of quality was quite surprising." He went on to

confirm that the range of knowledge, writing skills and mechanics were what had

surprised him. He further elaborated on this point in his interview and spoke about the value of formative assessment as a way to gauge the gap in levels of mastery among the students.

The highly engaged physical science teacher who spent close to 60 minutes on CAT analysis chose to implement the Self Confidence Survey. She shared some very interesting information. She had been administering the CATs at the start of a unit as a way to clearly state the chapters learning objectives. She found that over the course of the semester, student confidence rose when she handed out the surveys, but their actual ability as shown on their summative assessment indicated otherwise. She suspected that students were getting to familiar with the surveys and had built false confidence in their abilities knowing that there was no grade for the activity. Essentially, she inferred that students were use to the task and were not "thoughtfully self- assessing their actual abilities. Freshmen tend to give you what you want to hear."

Surprisingly, the "non-compliant" teacher from the mildly engaged group also had an instructional epiphany and found some information surprising. He indicated on his journal that students all shared low confidence on the topic of Muslim/Hindu relationships, even though he felt he had explained it very well. He adjusted his teaching to reinforce the complex relationship between the two groups and asked the students to recount the lesson to him to make sure they understood correctly.

Of interest were those teachers in the moderately engaged group who spent a shorter period of time on implementation and shared similar responses from each other such, "expected results (Teacher 3)," or they found nothing surprising, but did think that the CAT was a "decent use of time to check in with students" (Teacher 6). Perhaps an

inference could be made that the highly engaged group were always striving to find significance and improve their practice; those who were mildly engaged were surprised that thy would find anything of importance or usefulness; and those in the moderately engaged group were borderline going through the motions not expecting or looking for anything. The minimal time spent planning, implementing and analyzing the CATs leads me to believe that there was resistance to trying new techniques or fatigue from always being asked to try new techniques. One teacher at the training who was not part of my project group remarked, "Isn't this just the same old stuff by another name?"

One other interesting piece of information that further echoes the limited amount of time spent on CATs was garnered through the Minute Paper prompt I had included on the bottom portion of the initial Self Confidence Survey in order to elicit candid responses about their personal opinion to planned formative assessment. All participants noted that formative assessment was something that teachers "did naturally" and it provided an "instant feedback gauge." During the in-service training I had also shared with teachers the importance of "closing the loop." This was important because unplanned or interactive formative assessment is valuable, but the distinction of planned formative assessment is that it is data driven and hinges on closing the learning gap between perceived and actual mastery. It soon became apparent that I might not have made clear the critical importance of the closing the loop step enough in my presentation since the feedback I received through journals, surveys and interviews was minimal.

Research Question 2

The secondary research question asked how teachers adjusted their instruction to meet the needs of the students. When asked, "What adjustments did you make in to your

instruction resulting from the information gathered in this CAT?" it became clear that while teachers were comfortable restructuring their reviews or re-teaching material only one teacher (Teacher 4) was able to articulate an actual plan of how they were going to change their instructional techniques "by spending more time writing engaging introductions to lessons." One would have thought that if enough students were confused enough on a topic that it warranted re-teaching, one would be curious as to how they needed to adjust their instructional methods in order to better meet the needs of those students. Teacher 7 shares the qualities with the other two in the highly engaged group. She is a science teacher (Health 1& 2; Anatomy & Physiology), my Envirothon Co-Advisor as well as a personal friend outside of work. She spent several additional conference times with me while planning her portion of the project and always took the time to check in when deadlines were approaching. During the final interview I also discovered that she had spent time, unbeknownst to me, helping to clarify and assist the computer teacher from the moderately engaged group with the choices/planning of her CATs.

When asked a follow up question in both the interview and journal regarding the most powerful thing they gained as an educator, both the mildly engaged and one highly engaged teacher remarked that the use of PFA was a good way to attain feedback from all students and a good way to evaluate their instructional methods. In summation, the teachers in my sample population group all seemed to understand that the CATs provided them with information about their student's content knowledge, but it was unclear that they could effectively articulate specific changes that they would make to their techniques or methods.

Research Question 3

Also of particular interest in the AR project was assessing the motivations and attitudes of teachers. Through the use of surveys, interviews, and journals I was able to reveal several key pieces of information. Motivation to implement formative assessment was low across the board, all responded to a minute paper prompt included on the Self Confidence Survey that it was something teachers did naturally.

When asked, "Why did you choose this particular CAT?" the responses were all similar for those that chose the Muddiest Point: "looked easy", "done a variation before", "something I already do". During an interview with the math teacher, Teacher 2, from the moderately engaged group I asked for an honest account of why he signed on to my AR project team. He commented that he was, "mostly just doing it as a favor, since I've been to several professional development trainings before I came to Hamilton." When I asked a probe question to ascertain what, if any value, he was hoping to find he went on to say, "Honestly, I know my students so well at this point in the year, and I am pretty in tune with them so the results don't really surprise me anymore."

These responses illustrate an indifference to using PFA and speak to the low motivation to try something new. Additionally those teachers who chose to utilize the Self Confidence Survey noted that it was also easy, a different version of something already used in class. However, there were two stand out responses that bucked the trend and showed that at least two teachers had higher motivation and placed priorities on gathering meaningful feedback.

Both highly engaged science educators, Teacher 5 and 7, chose to try the Minute Paper in their classrooms and shared similar reasons for doing so. With Montana's

adoption of Common Core Standards and its focus on literacy, Teacher 2 chose to use the

Minute Paper because he, "wanted students to do more technical writing" and Teacher 7

was looking for students to, "practice writing with a focus on accurate use of

vocabulary."

Due to the fact that the responses were surprising to them, they looked more

favorably on using the CATs in the future because it provided information contrary to

what they had always thought to be true. I would go as far as to say that these teachers

spent more time constructing the questions/statements on their CATs to illicit deeper

information than the first group of teachers did. One other piece of information that could

have a potential influence on their motivation and attitudes requires taking in the

differing aspects of each teacher's relationship with me. Those teachers with whom I

have a closer working relationship (Teachers 3, 4, 5 &7) were more punctual about

deadlines, insightful in their journaling, more positive in their responses and all thought

that the CATs were a good use of their time.

Surprisingly, one data collection instrument I had designed which yielded little

useful information was the teacher observations. Due to time constraints set by my

administrator I was only able to visit each classroom once for 20 minutes for the primary

observation. While each teacher knew I was coming to do an observation at some point I

felt that it was necessary to perform and unscheduled observation to have a more candid

glimpse into the classroom. Mainly, it showed that 0% of the teachers were using PFA

during their warm-up or bell ringer activity, which was surprising because I had expected

that would have been a time that formative assessments would be used. However most

engaged in some informal interactive formative assessment that included show of hands

or questions to the whole class. I propose two reasons for this. Primarily, I don't think that all the teachers were necessarily comfortable being observed for the project. Along with several other teachers, the moderately engaged English teacher commented that they would like to be observed when they were doing "a project, or something exciting! Today we aren't really doing anything." Secondly, one would need to either increase the length or frequency of observation. Unfortunately my current position as the Tutorial Instructor did not afford me the ability to do that since I do not have a prep period. Time and scheduling allowed for one 20-30 minute observation of each teacher in the sample group.

Looking at the data I was able to confirm my hypothesis that in education there are very strong, involved motivated teachers as well as those who are only moderately or mildly engaged. Overall, when looking at the data from the pre and post project Self Confidence Surveys it was shown that there was a rise in confidence levels.
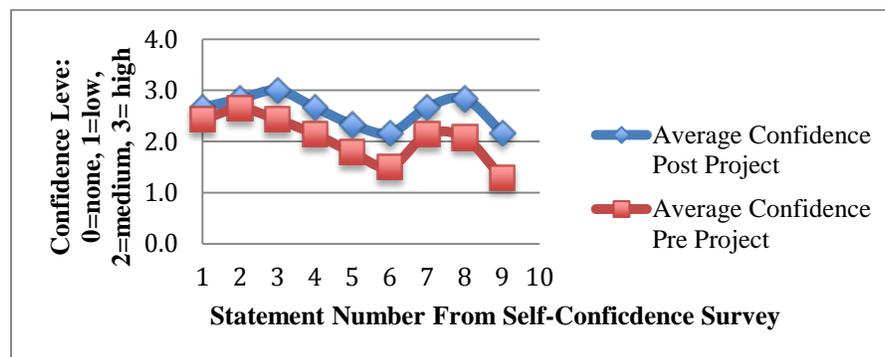

Figure 5: Average self-confidence le*vels, (N=7.)*

I can infer that this boost in confidence will lead the teachers to feel more comfortable using PFA because they have now had an opportunity to practice and become familiar

with some new techniques. After all, it was shown that teachers chose to use CATs that they were familiar with and found easy.

<div align="center">CONCLUSION</div>

The purpose of my research project was to investigate the implications or implementation of planned formative assessment in a high school classroom. In response to my main research question regarding the implications of implementing formative assessment in the classrooms the results were mixed. Overall, there were teachers who felt that planned formative assessment was something they did naturally, and thought being asked to participate in my AR project was a good reminder to try some techniques. All of the teachers in my group agreed that they would likely use these CATs again.

Furthermore, teachers showed little enthusiasm for making adjustments in their instructional methods, which was the central focus of my second research question. As previously mentioned, only one of the seven teachers provided an explanation of how they would change their instructional techniques. While willing to restructure or reteach, there was infrequent mention of how they would specifically adjust their technique. Without a requirement from the district or administrations some teachers might not have enough time or desire to make changes to their teaching techniques.

Perhaps the most interesting information gathered pertained to the study of teacher attitudes and motivations. It became clear through the post-treatment interviews that 70% of my sample group chose to work with me on the AR project as a favor to a friend, not because they were excited about the material. After combing through the data it was also apparent that teachers were essentially only willing to use PFA if it was easy and quick, or if they had prior familiarity with it. Upon conclusion of my AR project, I

asked each teacher to complete the original Self Confidence Survey. The results showed that on average, there was a rise in confidence levels across the board. Perhaps the rise in confidence level will continue to motivate teachers and encourage them to try something new.

The lack of teachers in my sample group willing to try the Teacher Designed Feedback Form was disappointing. However, I think this spoke to the trend that some teachers were uncomfortable with receiving potentially negative feedback from students. This was corroborated with my interviews since the majority of the teachers were worried if they were providing "the right answer" or giving me information that I wanted to hear.

In fact, I think that teachers would be interested to know that their students took notice of changes in the classroom. During informal conversation in the Tutorial room a student asked me if the Physical Science teacher had always done this much writing, or if she was doing it with every class. I asked if they found it helpful or fun, to which they answered, "Sometimes." It was also interesting to me that the students were worried about faculty getting peer evaluations. During one of my observations a student asked me if their teacher was, "in trouble" and was I going to report the observations to the principal. I assured him that peer evaluation as a necessary part of professional growth and there was no reason to be alarmed. This attitude from students was an echo to my previous experience in EDCI 504 when I asked those in the tutorial room to fill out a Teacher Designed Feedback Form. At first the students were worried that I was under review and their responses were superficial "Ms. Lord is AWESOME! Don't CHANGE!" However, once assured that I was merely gathering feedback for myself and no administrators would see it, they began to give me more in depth feedback on how I

could improve. One response that has stuck out in my mind was the student telling me

to, "stop making up you own examples. Stick with the ones in the book."

On the other hand, the data showed that teachers were more apt to use a technique

that they were familiar with. This has a direct implication on professional development

because it illustrates that some teachers need administrative requirements to continually

improve their craft. Administrators should also set aside time for in-depth training and

practice of newly acquired skills. Unfamiliar terminology and concepts such as "closing

the loop" will need in depth training and continual reinforcement.

To conclude, there were bright lights but on a whole there appeared to be few

implications for implementing formative assessment, with only slight adjustments to

instructional methods and low motivation to incorporate these techniques into regular

classroom activities. Conversely, the attitudes seemed to be more positive in that some of

the teachers found surprising results and found that this was a good tool to attain

feedback from all students.

VALUE

Over the course of this AR endeavor I was constantly confronted with information

that challenged my current view of teachers, administrators and education. At times the

project seemed insurmountable and unending. However, once finished with data

collection there was so much valuable information to be synthesized that I felt energized.

There were several themes overall. Primarily, motivation and attitudes to use or try

formative assessment will be fairly low overall unless the staff has many positive

relationships, and is led by an energizing administration that puts a priority on

professional development and meaningful trainings. Luckily, there will always be a

highly engaged individual in schools who can lead be example and assist in the motivation of others.

Additionally, there is a culture of assessment anxiety that needs to be broken within the educational field. Much like students trying to perform "correctly" on open-ended or formative tasks, teachers were also wary that they were not providing me the "right" information. Even with constant reassurance from me that their instructional methods were in no way under-attack, being subjectively scrutinized, or otherwise, all but one were self- deprecating or defensive at times. One might conclude that this sort of subconscious assessment anxiety from educators feeds into the rising wave of test taking anxiety in the student population. Perhaps with enhanced and more frequent utilization of planned formative assessment students would become more comfortable and therefore perform to their potential abilities once the stigma of completing an "assessment" was removed.

In addition to that, without in-depth training on the use of formative assessment, such as the training teachers received in EDCI 504, there will be little buy in to trying something new unless a teacher is particularly highly self-motivated and uninhibited by the potential of discovering that they might somehow need to adjust their teaching techniques. Being fairly new to the field of education I have found that even as teachers instruct on the value of becoming a life-long learner, there is an air of stubbornness that can be exhibited in all ranks, veterans and newcomers alike.

One other critique I must include is that perhaps I did not find the information I was quite looking for because I was not asking the right questions. As this is my first AR project, the learning curve seemed quite steep and moving forward I certainly am more

self-aware of the changes I can make in order to improve the research design and instrumentation methods. One of the obvious shortcomings of this project was the time allotted for planned formative assessment training. Less than an hour is simply not enough directed time to adequately train staff on assessments. However, it should be noted that none of the teachers took the initiative to seek out added information either.

If this project were to be repeated, special consideration should be paid to the academic calendar. A suggestion would be avoid trying to complete this project when there are grades due for semesters and other busy items. It felt as though the responses were hurried and a lower priority. I would also involve a greater number of teachers. It would have been nice to have the backing from the administration suggesting that all teachers who received training participate in the AR project.

Completing this action research project has opened my eyes professionally and reminded me that it is important to be a self-starter, highly motivated, and be willing to try new techniques. The whole focus of planned formative assessment is self-monitoring and tracking your progress towards mastery so it is only fitting that I must keep this a priority in my own professional development as I move on from Hamilton at the end of this school year.

On a whole, the main implication for teachers as they read this is that they should feel free to try out new forms of assessment, constantly be driven to solicit feedback in various forms from all students, and initiate activities that will help to bring a deeper understanding of content matter to all students in their classes.

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APPENDICIES

APPENDIX A

<u>TEACHER DEMOGRAPHIC SHEET</u>

Appendix A: Teacher Demographic Sheet

NAME	Teacher 4 Highly engaged	Teacher 5 Highly Engaged	Teacher 7 Highly Engaged	Teacher 2 Moderately Engaged	Teacher 3 Moderately Engaged	Teacher 6 Moderately Engaged	Teacher 1 Mildly Engaged
What Subjects do you teach?	Physical Science	Biology, Biotechnology, Forensics	Health 1& 2 Anatomy & Physiology	Pre-Algebra, Algebra 2 AP Calculus	English 1, Creative Writing, AP Language + Composition	Computers, Business	Global Studies
How long have you been teaching? (At HHS?)	18 years (9)	22 years (20)	23 years (20)	7 years (2)	17 years (12)	33 years (33)	5 years (2)
Where did you earn your Bachelors? What was your Major?	Montana State University; Chemistry and Physics	Montana State University; Biology BGSU; Nursing	U. of Washington; Zoology, MSU; Biology/Broad field Science of MT; health endorsement.	University of Montana; Mathematics	Colorado State University; Language Arts Education	Business Education	University of Montana Secondary ED; Social Science Broadfield
Did you Earn a Masters degree or higher? If yes, in what subject?	Almost done! Science Education	No	No	Yes; Curriculum and Instruction	Special Education; Affective Needs emphasis	No Masters, BA+ 75 Credits	No
What were your main motivations to enter teaching?	Science Enthusiasm/ inspiring next generation	Enjoyed young people and science	To support myself in a field that I love- Health and Science	Influential Teachers	I never considered doing anything else, I played "school teacher" as a kid.	Working w/young adults, helping them be productive in workforce	I enjoy teaching and being apart of the growth of our youth [sic]

APPENDIX B

OBSERVATION RUBRIC

Appendix B: Observation Rubric

Over the course of the observation how many instructional tools were used? What was the nature of their use?		Smartboard Calculators Rulers, etc Lab Equipment Projector PowerPoint Computers Internet Textbook Handouts
With what frequency were the tools used?		
Was the class primarily:		Lecture Lab
With what frequency did the instructor stop to check for understanding? Please chart each time that was done, and indicate the type of checking: Question to individual student; Question to class; written formative assessment (please describe); Other (please describe)		
Did the instructor utilize any formal, formative Classroom Assessment Techniques?		
Was the class active? With what frequency were the students instructed to move/be active? Take several 5 minute intervals and mark what percent of the class was on task at that particular 5 minute interval.		Out of seat Group work Board work Take notes
When students were called on the instructor primarily chose students who…		Hand-up Cold call mix
How many minutes between checks for understanding (Also number of checks for understanding)		
Did the teacher provide several different explanations of the concept in an attempt to reach all types of learners? List Examples		Yes No

Did the teacher adjust they adjust their teaching style to meet their students needs? Please list the ways that this happened.		

APPENDIX C

TEACHER JOURNAL

Appendix C: Teacher Journals

TEACHER JOURNAL FEEDBACK:	
Why did you choose this particular CAT?	
What information were you hoping to garner?	
Did the students seem engaged while doing the CAT? Can you give me an example?	
How did you plan to look at the data?	
Did you find any trends in the data that were surprising? Can you give me an example?	
Why was it surprising?	
How did you "close the loop" and share the information with your students? How did they respond? Would you do this again? Why or why not?	
What adjustments did you make to your instruction resulting from the information you gathered in this CAT	
Do you feel that using this CAT was worthwhile?	
What was the most powerful thing you gained as an educator for the use of this CAT?	

Would you use this CAT in the future? Why, or why not? How would you rate your experience with this CAT. Poor Fair Excellent 1 2 3 4 5	

APPENDIX D

MONTANA STATE UNIVERSITY IRB FORM

Appendix D: Montana State University IRB Approval Form

INSTITUTIONAL REVIEW BOARD
For the Protection of Human Subjects
FWA 00000165

MONTANA STATE UNIVERSITY

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MEMORANDUM

TO: Martha Lord and Walt Woolbaugh

FROM: Mark Quinn, Chair *Mark Quinn CY*

DATE: December 11, 2012

RE: *Implications of Implementing Formative Assessment in a High School Classroom* [ML121112-EX]

The above research, described in your submission of November 30, 2012, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

X (b) (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

X (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

_____ (b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

_____ (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.

_____ (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

_____ (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

APPENDIX E

SELF CONFIDENCE SURVEY

Appendix E: Self-Confidence Survey

This survey is to help both of us understand your level of confidence, attitude and understanding of formative assessment. Please indicate how confident you feel about your abilities.

Activity _____ *Self-Confidence in Your Ability to do this*

I am able to define Formative Assessment. Why did you answer that way?	None	Low	Medium	High
I can describe more than one type of formative assessment.	None	Low	Medium	High
I can implement Formative Assessment in my classroom.	None	Low	Medium	High
I can engage students in formative assessment, even though they will not receive a grade for the assessment. Why did you answer the way you did?	None	Low	Medium	High
I can analyze the data gathered from the Formative Assessment of your choice.	None	Low	Medium	High
I can provide students with meaningful feedback of the data from the assessment in timely manner. AKA "close the loop"	None	Low	Medium	High
I can adjust my instructions to fit the needs of my students based on the information from the assessment	None	Low	Medium	High
Based on my subject area I can choose the best and most applicable formative assessment to fit my needs. Why did you answer the way you did?	None	Low	Medium	High
Based on my use of formative assessment I can train other staff and educators on the use and implementation of formative assessment.	None	Low	Medium	High

Please use the back of this page to write a write either a "Minute Paper" about your views of formative assessment. Thank You!

APPENDIX F

TEACHER JOURNAL SURVEY

Appendix F: Teacher Journal Surveys

QUESTION or STATEMENT	1	2	3	4
NAME:_____ DATE:_____ UNIT:_____ CAT:_____				
1. How much time did you spend preparing the use of this CAT?	0-15 minutes	15-30 minutes	30-60 minutes	60+ minutes
2. Prepping for the CAT was _____	difficult	Somewhat difficult	somewhat easy	Very easy
3. I was enthusiastic when I presented/implemented this CAT in Class	Not enthusiastic	Mildly enthusiastic	Normal	Very enthusiastic
4. The students were_____	Not engaged	Somewhat engaged	Engaged	Very engaged
5. How much time did you spend administering the CAT in class	0-5 minutes	5-10 minutes	10-15 minutes	15+ Minutes
6. How much time did you spend analyzing the data	0-15 minutes	15-30 minutes	30-60 minutes	60+ minutes
7. How easy was the data analysis	Difficult	Somewhat difficult	Somewhat easy	Very easy
8. How much time did you spend "closing the loop"?	0-5 minutes	5-10 minutes	10-15 minutes	15+ minutes
9. While closing the loop the students were_____	Not engaged	Somewhat engaged	Normal	Very engaged
10. How useful was this CAT to you?	Not useful	Somewhat useful	Useful	Very useful
11. How likely are you to use this CAT again? Please explain your answer to this question.	Not likely	Somewhat likely	Likely	Very likely
12. This CAT was a _____ use of my time. Please explain why you answered the way you did.	Waste	Decent	Good	Fabulous