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Jim Pfeiffer

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### **Abstract**

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**Jim Pfeiffer**

**Math in the Middle Institute Partnership**

**Heaton/Action Research Project**

**June 1, 2006**

## Self-Directed Learning in The Middle School Classroom

### Abstract

*The action research project took place in my seventh grade mathematics classroom and involved the study of how student directed learning impacts the ability of students in the middle level to learn mathematics. This research project uncovered issues in student learning and self-discipline of the students, as well as classroom management skills that were not readily apparent in a teacher-centered middle level mathematics classroom. As a result of this action research project, my future seventh grade mathematics students will continue to have an increased role in the educational process to which they are an audience. The student-centered learning environment seems to create more responsibility for certain students and somewhat of a disengagement in others within the same class. With an increased awareness on the part of the educator in the classroom, engagement of all students will become the goal in the future.*

Self-directed learning in the middle school classroom appears to create, in today's middle school environment, an opportunity for students to become more cognizant of their role in the educational process. As members of Cohort One, we as educators have been given the experience within Math in the Middle, where we the learners had reasonable leeway in regard to the learning opportunities we have experienced. The instructors for Math in the Middle coursework presented the materials necessary within their curriculum and then required us as students to utilize these opportunities to construct meaningful learning for ourselves. This style of learning resonated with me, and I wondered if such an approach would be feasible within the middle school curriculum.

This action research project will attempt, within the confines of a single seventh grade mathematics classroom at a small rural school district, to determine the feasibility

of such a student-centric learning environment within the middle level classroom. Within my own classroom at Berry Public Schools, where I believe that I have exceptional rapport with most of the parents of the students in my classroom, I will have an opportunity to create a student-centric learning environment. Having taught, coached, and lived in Berry for the past fourteen years, it is perhaps possible to have a different relationship with the patrons of the school district than it perhaps would be in a larger, more urban school district. The focus of this research project will center itself on the idea of a student-centric learning environment within the middle school mathematics classroom as part of the Math in the Middle action research project.

### **PROBLEM OF PRACTICE**

At the end of the work time from the fall class time in Lincoln, I felt that I would like to present the students in my classroom the opportunity to learn math and science in a fashion that we as students in the M-Squared program were given. At the time, this methodology of working collaboratively with other members of the class seemed to be very efficient in terms of instructional time spent by the teacher and with the outcomes achieved by the students. My initial problem statement was vague and perhaps, not as measurable as I had hoped. I refined the problem statement and investigated the impacts on student learning, given the idea of students working with one another in learning groupings much as we did for the math coursework in this past year of M-Squared.

For the previous fifteen years of my teaching career, my classroom has been very rigid and not very student centered. I basically have stood in the front of a classroom full of students who are all arranged in individual desks in nice neat straight rows and

lectured over the topics within the curriculum; then I demonstrated the skills that I hoped for my students to master. Some of the students in my classroom, over the years, have been very successful given this method of teaching and learning, although most likely not because of the instruction that they received from both me and perhaps many other teachers who also taught in this fashion. I knew that it was difficult for me to “attend well” in class when the format was as described above, but this was the model of instruction that was predominant during my career as a student. Thus, I did to my students what had been done to me, even though I was fairly certain that it was not an effective strategy for instruction.

It had always seemed to me that math was just a series of sequential steps followed in a hopefully logical fashion that eventually leads to a solution. If we are able to teach math well in this sequential fashion then our students would learn how to do math. This has been the disconnection that I have felt between the math classes and the science classes that I have been teaching. In the past, I have stated that numbers mean something in science but that many times in mathematics classes they are a puzzle, and if you can arrange the pieces of the puzzle properly you will arrive at an appropriate solution.

The M-Squared experience has opened my eyes to a whole different world of mathematical teaching and learning, and through this action research project it is my hope to incorporate into my teaching the idea of the students being the centerpiece of instruction and for me to become more of a facilitator of their learning experience. It seems that as we move ever further down the evolutionary path of teaching and learning, there increasingly becomes a greater awareness that the industrial model of teaching is

good for mass-producing parts of the educational experience, but does not lead to better equipped learners for our society. During the past year, I personally felt responsible for what it was that was being taught and as a result felt as if the math that we were learning was meaningful to me.

I have thought throughout this M-Squared experience that if it has worked for me as a learner, would it be possible for me as the teacher to recreate within my own classroom the same sort of learning environment? Will my students be more motivated to do well in mathematics not because I, the teacher, want them to, but rather because they, within their own groupings, are responsible for their own learning? How many times have we, as parents or teachers, heard, “You do not understand?” For me this has just meant that the student/child did not want to do what it was that they were being asked to do. The longer that I teach, the more I come to realize that the world of a pre-teen/teenager is well outside of my comfort zone, and even though we have been trained in the “methods of teaching,” sometimes those methods are not very effective for reaching our learners. In today’s educational framework, additional time constraints are being placed on teachers by issues such as Standards-based, Teacher-led, Assessment and Reporting System/Adequate Yearly Progress and other testing concerns. Budgetary constraints in many districts have led to larger class sizes, and, individually, teachers no longer have the time available to individually assist each student on a daily basis. These issues make it important that teachers find more efficient methods by which we can provide meaningful instruction to the students in our classrooms.

I have hopes that by redirecting the focus of my classroom from what it is to what my students are capable of doing, that I can provide quality mathematics instruction that

will encourage students to accept more responsibility for their learning as well as the learning of their classmates. For most of my career as a both a student and as a teacher there has been an overt competitiveness for grades as a status symbol for one's worth as both a teacher and a student. This thinking has been entrenched within our educational system, but does it provide a meaningful education for all students? Does this system of competing for grades at the expense of learning for all students provide a framework for cooperative efforts outside of the educational system in the work force?

I hope that through this action research project I can provide an environment within my classroom and perhaps in others, where the students work together as teams to provide meaning to their mathematical learning. We provide extracurricular activities within our school setting that emphasize working together toward a common goal. Perhaps it is time that we incorporate into the academic setting the idea that students can work together, be the center of the educational process, and become active participants instead of merely being "along for the ride," as so many of our lower ability students seem to be.

### **LITERATURE REVIEW**

There has been much research conducted on Self-Directed Learning and its ability to impact student learning in a positive fashion when utilized as an instructional tool. The necessity for learners to become self-reliant, self disciplined, and self-confident in their ability to direct their own learning is becoming increasingly important in today's sophisticated society. The conceptual idea of the students being in control of their educational process is powerful and seems to be an intuitively sound method of encouraging student achievement through self-directed learning. This is not a commonly

utilized method of instruction for the typical middle school student. In my classroom, as well as many classrooms in America, the primary method of instruction is the traditional teacher-centered environment with the students sitting in neat rows, taking neat notes, completing neat homework, and then taking an exam to demonstrate the learning that has been accomplished by the students. As a result, many students feel disenfranchised from the learning experience and do not feel the need to be responsible for the learning necessary for them to become successful students.

It is necessary to accurately define learning as a process that will eventually lead to an outcome that is the result of the students' attention to the educational tasks in order for the students to have successes within their own educational experiences. It is hypothesized that individual students who are engaged in self-directed learning processes are more actively engaged in self-feedback and this process energizes the learning process in contrast to other learning styles that are more externally driven (Long, 1997). The idea of student reflection and self-monitoring of their work needs to be encouraged and modeled by educators who are in the process of implementing a self-directed learning environment (Corno, 1992). The students recording in a journal, much like what we as participants in the Math in the Middle program have done, is one method to facilitate this idea of student reflection and self-monitoring.

While some question the effectiveness of self-directed learning and the impact it can have on student learning, one only needs to look at some current buzzwords in education to see that there is relevance to the ideals suggested by proponents of self-directed learning. We continually hear postulated the ideas of life-long learners, independent thinkers, and self-motivated students. However, we primarily teach in our

public school systems an ideal of independent subject matter course offerings with only cursory attempts to “teach across the curriculum.” The subject matter that is then presented is also primarily teacher directed, selected and focused with little thought given to the needs of the learners. The idea of the teacher being the center of the educational process does not allow the students to make meaningful connections or determinations as to the direction by which they will accomplish the educational goals of the student, in most cases, and undermines the objective goal of enabling all learners to become self-directed learners. This model of today’s education system is one that does not give our students any sense of individual ownership in the educational process, and as a result, allows the students to be passive recipients of their own education. Thus, we are creating students who are unable to think independently and who are dependent upon the “teacher” to provide for them what is important in their education.

A fundamental question in the design of a self-directed classroom is the idea of how much control the student has setting his or her own learning goals. Snow (1980) describes this as a continuum that ranges from the learner having complete control “Adult Scholar Model” to one where the learning is completely driven by the teacher with the learner having no control “Child Robot Model.” The NCTM Standards suggest that the students should be involved in inquiry and problem solving, a self-directed learning environment seems to support this idea of mathematical inquiry. This area of both the NCTM standards and the STARS standards is most difficult to address, as it requires the teacher to give control to the student in order to be a true inquiry experience. “The principal aim of a good teacher is not to fix in the student’s memory knowledge which others have discovered, but to enable the student as actively as possible to discover

knowledge of importance for themselves” (Howe, 1970, p. 39). Teachers today need to encourage and raise the students’ awareness of their own individual roles in the educational process to facilitate a growth in student involvement in the educational process. Additionally, teachers need to develop a more collaborative relationship with their students that will allow all students to recognize the importance of their own participation within the learning process.

There are many benefits of Self-Directed Learning, and they are described in terms of the type of learners that are created through this educational learning strategy. Self-Directed learners are more motivated, persistent, independent, self-confident, and goal-oriented, and have a greater awareness of their individual responsibility in making the learning process meaningful for themselves (Taylor, 1995).

Within this action research project, I have a goal of arriving at some point on the continuum of “Adult Scholar Model-Child Robot Model” that allows the students in the courses I currently teach to become more responsible for their learning and, as a result, become life-long learners. The ability to develop self-responsibility for one’s own learning is important in the development of confident, productive, and motivated students. This project will hopefully lead me to the ability to give up some control for the learning that takes place in my classroom to the students. By giving the students in my classes the opportunity to direct their own learning to a certain extent, my students will hopefully develop skills that will benefit them in all of their future endeavors. The development of this type of student will lead to adults who have the ability to be independent thinking life-long learners in our society.

## **PURPOSE STATEMENT/RESEARCH QUESTIONS**

The purpose of this action research project is for me to create an opportunity to allow the students in my classroom the ability to become self-directed learners. The idea of self-directed learning and student responsibility is an avenue that I, as an educator, find appealing. This research will allow me as a teacher-researcher to objectively look at the validity of self-directed learning in the middle school setting. This research project will focus on the student-centric classroom during the Spring Semester of 2006 within the researcher's classroom. Within my own classroom, there will be an opportunity to construct a learning environment that will replicate the experience of learner responsibility that I personally experienced as a result of Math in the Middle educational journey. This action research project -will attempt to answer the following research questions:

- How does the students' awareness of their learning and their self-direction of the learning impact the retention of the material?
- Within the self-directed learning environment, will the retention increase when the students are working in collaborative groups?
- Will a collaborative learning environment positively impact student-learning attitudes in the seventh grade mathematics classroom?

## **METHOD**

As part of this research project, I was interested in whether the students' awareness of their individual learning and being able to direct themselves would lead to better retention of the curriculum in seventh grade. As such, this research project took place within the seventh grade mathematics classroom at Berry Public Schools. This

project focused on both me, as an experienced teacher, as well as a heterogeneous grouping of students. Initially, this class had 32 students, although at the time of the research project there were 30 students. I would classify this group as rather diverse academically, as there are a number of students who are mathematically quite capable, and another group of roughly the same number of students who are mathematically quite challenged, with very few students to be found in the middle of the class academically.

I was interested in whether a collaborative learning environment would positively impact student-learning attitudes in the seventh grade mathematics classroom and if it could impact the disparate ability levels found within a typical Berry Public Schools seventh grade mathematics classroom.

To assess these questions, the students were asked to keep a personal journal dealing with their personal experience in the classroom and to assess their individual learning as well as their attitude toward the mathematics. In addition to the journals that the students kept, the instructor also kept a journal in which observations of the students working collaboratively and the interactions that took place between students were recorded. This journal keeping was done as the students were working on the particular problems of the day during class time.

The final question for this action research project was whether or not, within the self-directed learning environment, retention will increase because of students' work within their small groups. To assess this portion of the research project, the students' small group discussions were videotaped, and their homework scores were compared to the scores of the students from the first semester.

## ANALYSIS

Within my classroom we have spent a lot of time working within the small group setting, with two to four students per group, and we have done quite a bit of problem solving. Initially, at the end of a problem solving session that lasted several days, the students were asked the following question: *Were you able to solve this problem before working within your group, or did working in your group enable you to better understand the problem and to be able to justify your solution to others?* The student journals for this particular question seemed to support the idea that by working together and working with one another, with little direction from me, made it possible for this group of seventh graders to be more successful with the problem solving that was utilized during the spring semester of this school year. Additional questions were posed for the student journals that were more specific such as: *Was the group work for this unit beneficial when it was time to take the exam, Why or Why not?* and *Could you have solved the fly and spider problem had you worked individually?* The student journals for these particular questions seemed to also support the idea that working together and working with one another was a beneficial exercise in the seventh grade mathematics classroom that was being researched.

Additionally, the students were assessed through the utilization of the STARS mathematics assessment 8.2.2, which covers the area of problem solving during the first semester prior to the action research project. Toward the end of second semester, the seventh grade students in my classroom were again assessed through use of the same assessment from the first semester. This particular exercise did not yield conclusive evidence about the effectiveness of the action research project that I had undertaken.

From looking at what my students are writing in their journals, and what I see them doing in their group work, it seems that those students who are the more academically capable students in mathematics are really enjoying the experience; it is most likely positively influencing their retention of the mathematics being taught. This particular group of students' (roughly 45% of the class of 30 seventh grade mathematics students) attitudes seem to be mostly positive toward the experience they are having in the classroom. An example from a student journal of this would be the following:

*Another problem that I had was with the story problems. I could not get them down into a number problem. Then some of the people in my group helped show me how to pick out the important words or numbers. So when the test rolled around I was ready for it. It made the problem a little easier because you had different ways to do the problem and figure out the answer. It helped with the Pythagorean Theorem since none of us had ever done it before, we could help each other work out the problem. I think I could have done the Fly and Spider problem after working in my group on the Pythagorean Theorem, but it would have taken me forever without my group. (Student 1, April 20, 2006)*

For some of the other students in the class however, it is the same old drudgery of mathematics that they have experienced thus far in their educational careers. An example of this in a student journal is the following:

*"The problems were easier by myself, because I didn't have to try to explain how I got my answer. If my answer is wrong the teacher will check it wrong and then we will do something else. I like working by myself because it is faster and I get*

*frustrated when it takes to long to do a problem and then it gets harder to do the problem. So it is easier working by myself. (Student 2/Student 3, April 6, 2006)*

I initially anticipated that these would be the students who benefited the most from the opportunity to learn within a collaborative group setting. It is kind of frustrating for me to have created what I thought would be an ideal opportunity for the lower achieving students that enabled them to be able to construct realistic meaning for their own learning. Having done this project with this group of students in mind, it is discouraging to see them continue to choose to be disengaged from the educational process. An entry from my journal highlights the frustrations of engaging this group of students:

*Today within the first five minutes of the class period, two of the lower achieving student within the class got off task and involved in a name calling battle involving their mothers and fathers. Sometimes it seems to me that it would be easier to just sit them in their seats and make them take notes and get the D or F that they expect to be given. These students for some reason seem to not believe that there is anything that they can do and they lots of times just don't care. This is a lot of work to try and have an impact on some who seem to care less whether or not they learn anything. (Jim, April 2006)*

In addition to watching them and journaling about what I perceive to be their indifferent attitudes toward the work we are doing in the classroom, their personal journals reflect the same indifferent attitudes that I have observed. I had hoped by making my classroom less teacher-centric and more student-centric that the learning of this particular group of students would become more meaningful, and with more meaningfulness would come a

new appreciation for the learning that they are capable of doing. Within this group of students, I sometimes wonder if the “labeling” that is initiated in the grade school years is negatively impacting both their ability, as well as their desire, to do well academically. Students in the primary grades are given a so-called box that they are fit into based on how well they do in relationship with their peers, and it sometimes seems that we are doing more harm than good by this categorization that has the intent of “helping” the slower students to catch up with their peers.

As part of this action research project focused on the dynamics of the student-centric classroom, I also looked at the scores of these students on the criterion referenced assessments that our school, like all other schools, is required to give each year. Part of my responsibility as the seventh grade mathematics teacher is to assess the students for the State of Nebraska STARS document as well as for the federal government AYP report. Both of these assessments contain a segment on problem solving, and as a result, I utilized the data from each of these assessments as part of the action research project. This data ranks the students into four categories - Advanced, Proficient, Progressing, and Beginning - with both the State of Nebraska and the federal government having set the bar at a particular percentage of students in the proficient or advanced categories. While the assessments were not identical, the STARS data comes from the fall semester prior to the beginning of the action research project at Berry Public Schools, and the AYP data comes from late in the spring semester after the implementation of the action research project.

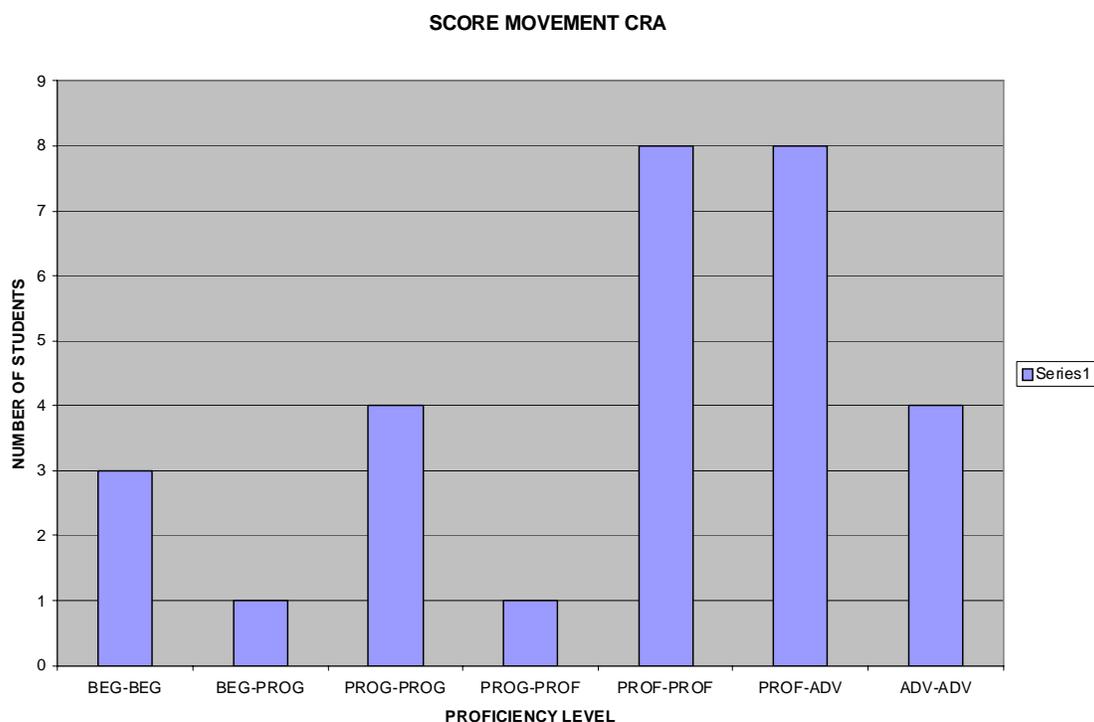
**ASSESSMENT DATA**

<b>STUDENT</b>	<b>STARS rank</b>	<b>AYP rank</b>	<b>STUDENT</b>	<b>STARS rank</b>	<b>AYP rank</b>
	<b>FALL 05</b>	<b>SPRING 06</b>		<b>FALL 05</b>	<b>SPRING 06</b>
A	PROG	PROF	B	ADV	ADV
C	PROF	PROF	D	PROF	ADV
E	PROG	PROF	F	PROF	ADV
G	PROG	PROG	H	PROF	ADV
I	ADV	ADV	J	ADV	ADV
K	PROF	ADV	L	PROF	ADV
M	PROG	PROG	N	ADV	ADV
O	PROF	PROF	P	PROF	ADV
Q	BEG	PROG	R	PROF	ADV
S	BEG	BEG	T	BEG	BEG
U	PROG	PROG	V	PROF	PROF
W	PROF	ADV	X	PROF	ADV
Y	PROF	PROF	Z	BEG	BEG
AA	PROF	PROF	BB	PROF	PROF
CC	PROF	PROF			

While these assessments were not identical, were given a semester apart, and by only having one class of students to work with this year, there is no real control group to look at, the data above does seem to yield interesting information. The students in general did show improvement from the fall semester to the spring semester in terms of what their scores were for the STARS document (Attachment 1) and then for the AYP document (Attachment 2). Within this group of students, none of the students had scores that went down, some students had scores that stayed the same, and surprisingly to me, a number of students had scores that moved up an entire category, which is the goal for all students under the STARS/AYP plan. While I question the amount of measuring/testing that we are doing in today's educational environment, these two measurement tools are similar in nature, although given about six months apart, thus allowing a reasonable

comparison to be made. This data seems to support the previous assertions made by both the student journals as well as by my personal journal as well.

Within the journals, it seemed that the group of students who perceived themselves as “good mathematics students” felt that the groupings enabled them to understand the mathematics more completely and helped them with the retention of the material as well. The students, who do not perceive themselves as “good mathematics students,” did not believe that this student-centric classroom was beneficial to them. The data from the Criterion-Referenced exams that we are required to give at Berry Public Schools shows interesting correlations to the journals.



The lower achieving students, those in the beginning or progressing category in the class, seem to be less inclined to show movement out of the beginning or progressing categories than do the higher achieving students in the proficient category. In the fall, there were four students in the beginning category and only one of the students advanced

to the next higher category. If this idea is continued, comparing the fall numbers with the spring numbers, we see that in the fall there were five students in the progressing category and again only one student on the spring assessment advanced into the proficient category. In the proficient category in the fall there were 16 students in this category; these students showed more upward mobility on the assessments than did the lower achieving students. From the fall semester to the spring semester this group went from sixteen proficient students and four advanced students to eight proficient students and twelve advanced students. While this data represents two different assessments given in two different semesters separated by several months of learning in the classroom, there seems to be a difference in the two groups of students within the seventh grade mathematics classroom.

### **INTERPRETATION**

The action research project that I undertook led me to several interesting conclusions about my own teaching and about the learning that takes place within the classroom for different groups of students. I have in the past felt strongly about the inclusion of all students within the regular classroom as being an equitable method by which students have the opportunity to learn mathematics. This action research project leads me to question those beliefs in equity that I have held for most of my teaching career. I initially started this project to determine if it were possible to positively impact the learning of the lower achieving mathematics student in the regular classroom by making the classroom more student-centric and less teacher driven. This was accomplished by creating student groups within the classroom and then allowing these

groups to solve problems with less teacher influence than the students were perhaps used to. These groups were randomly created and were of heterogeneous abilities.

By creating these sorts of groups, I felt that those students with lower mathematical ability would benefit the most from the interactions they were able to have with their peers. It was my feeling that these lower achieving mathematics students did not participate in the whole class setting with me the instructor, and as a result they did not achieve the level of understanding nor did they retain the material as well as their higher achieving peers did. Through the utilization of the peer groups, it was my hope that these lower achieving students would be in a small group environment where they could more comfortably participate. I have strongly felt that the participation of the students in the mathematics classroom is critical for success. Through this study, I have found that while the participation is important for success of the mathematics student, it does not automatically occur because of small heterogeneous groupings of the students.

Those students who did well in my teacher-centric classroom, and whom I had classified as higher achieving students, seemed to thrive in the more student-centric classroom. This was evidenced by the writings in their journals as well as the scores that these higher achieving students demonstrated on the two Criterion-Referenced assessments that they were given. The lower achieving students wrote in their journals that they did not care for the group work; I noted that they had difficulties with the interactions within the groups with their peers, and they showed little improvement on the Criterion-Referenced assessments.

This action research project shows me that there needs to be something else if I am to more positively impact the lower achieving student in my seventh grade

mathematics' classroom. It seems as if this group of students, to some extent, has allowed themselves to be categorized in earlier years as lower ability than their peers, and as a result of this subtle tracking feel that they are not capable of being successful in the mathematics classroom. However, for those students of average or above ability, the action research project showed that this group of students was energized by the opportunity to be more active participants in their mathematical education. In addition to the enthusiasm demonstrated by this group, the higher achieving students in my mathematics classroom also showed marked improvement in their abilities to problem solve as evidenced by the Criterion-Referenced assessments that they took over the course of the past school year.

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