

INFORMING PROFESSIONAL PRACTICE:
SECONDARY INTERN'S
INQUIRY PROJECTS



“Ideas Connect Us”

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Introduction

The Watson School of Education (WSE) has demonstrated a long-standing commitment to innovation and leadership in serving the schools of North Carolina. For example, in 1994-95, under the leadership of Dean Robert Tyndall, the WSE received the Governor's Award for Collaboration on the basis of such initiatives as Consortium for the Advancement of Public Education (CAPE) and Professional Development System (PDS). CAPE was formed by twenty-one southeastern school districts and fourteen community colleges to make measurable gains in the education of children in southeastern North Carolina. The Professional Development System is a partnership between ten school systems and the WSE. This partnership, which includes forty-seven "partnership schools," is designed to improve the professional development of educators, and thereby to enhance student performance. This model "has the potential to create an investment in blending theory and practice in "real world" classroom settings which is broad based and powerful enough to include the entire teacher education faculty, more than 300 teachers in training and some 500 public school teachers each year" (R.Tyndall, 1998). In 1996-97, the PDS program gained national recognition earning the American Teacher Education Distinguished Program in Education Award.

It is within this tradition of academic excellence and programmatic innovation that we have initiated the Secondary Education Internship Project. This initiative emerges directly from the cornerstone beliefs of the WSE that

professional educators are decision-makers guided by principles of scholarly inquiry and critical reflective application of effective practice. The knowledge and skills of inquiry, reflection, and effective decision making are developed throughout the preservice program. It is during the internship, however, that novice educators have the opportunity to apply their knowledge and skills in the crucible of the classroom. Through the guidance and support of their partnership teachers and university supervisors, interns are expected to demonstrate what they have learned as they undertake myriad tasks of lesson design and delivery, classroom management, and managing student records, etc.

Within the context of these initial classroom experiences, it is all too easy to become so preoccupied with what one is doing, that reflection upon why one is doing it or whether it is effective becomes lost. The inquiry projects contained in this handbook attest to the fact that, when given the opportunity, interns are able to engage in thoughtful inquiry which can benefit not only their own development as educational professionals but the general storehouse of professional knowledge. These projects are limited in scope and for that reason some may question their importance. We believe, however, that projects such as these are at the very cornerstone of professional practice through connecting "what works" with professional interpretation of what and how it works.

Rationale for teacher inquiry:

All teachers make hundreds of instructional decisions every day; exemplary teachers know why they make



these decisions. For the untrained observer who may only observe a teacher's behavior or action, the process used to make instructional decisions, whether it is an immediate response to an unplanned situation or a detailed assessment of various options as part of prior planning, is not visible. Only by talking with a teacher can pre-service teachers begin to learn about the factors and considerations that have shaped a particular action. In addition, much of what veteran teachers do is "instinctive;" teachers often rely on practices that they have tried and tested. If they were asked to explain why a particular approach was used, they might state, "It works." While we want beginning teachers to be able to implement practices that "work," we also want them to be able to explain why a particular strategy is effective.

When an intern is placed with a partnership teacher, the intern often models the practice of that teacher. This approach may result in desired types of practice, but it is also likely that modeling prevents the intern from having to think about why a particular approach is used. To address this challenge, we in the WSE have assigned pre-service teachers for field experience to observe a number of teachers. In observing several teachers, they are likely to be presented with different approaches to the same instructional activity e.g. questioning, classroom management, note-taking, each of which an individual teacher may justify by "It works." How then does a pre-service teacher begin to decide among the various options with which they are presented, including the ideas from their teacher education coursework?

For their field experience assignment, we ask students to identify a specific question and investigate the views or actions of their teachers. We want students to realize that there are different approaches to instruction and that instructional decisions ought to be based on a firmer grounding than that of personal preference. We want pre-service teachers to make an informed assessment of different approaches e.g. by evaluating the effects of the strategies on student learning. In addition to their own investigations, pre-service teachers have to read any research that may pertain to their question. Although an observer is unlikely to see an experienced teacher engage in a similar formal process of assessing their instruction, good teachers are continually gathering "data," whether it is informal evidence or more formal data, to help them improve their instruction. Similarly, if we want pre-service teachers to be thoughtful about their teaching practice, then we must begin to challenge their ideas and observations of instruction.

During their internship, interns are required to engage in an inquiry project, identifying and investigating a question pertaining directly to their teaching. The faculty recognizes that the internship is a stressful time for many interns and has sought to design a format that incorporates the main stages of an effective inquiry without placing an undue burden on the intern. Consequently, the emphasis of the inquiry project is on the process and not the finished written product. In addition, as this is their first attempt at investigating their own teaching practice, we do not overemphasize the details of



research design. What is important is that students have identified a meaningful question that relates to their instruction and that they have sought to answer the question, to identify the impact of the particular decision on their teaching effectiveness.

There are obviously many questions that students could choose to investigate and selecting a good question is important. In addition, it is not necessary for every teacher to investigate every question. The inquiry projects are designed so that interns can share their question and findings with their peers. This sharing is initially with peers in the same discipline. However, at the end of their internship, interns of all disciplines are brought together and share their projects organized around common topics. In this way interns can begin to see that many of the questions relating to effective instruction are common to all discipline areas.

The handbook provides snapshots of the skills of inquiry that we believe are important characteristics for our pre-service teachers. We hope that the examples of inquiry projects included in the handbook will clarify for students and partnership teachers some of the questions related to purposes and format. Inquiry projects from a range of disciplines and covering a number of different topics are included. The significance of the questions asked as well as the adequacy of the methodology used to answer the question vary. Certainly, the examples selected are not presumed to present perfect models of inquiry. Instead, we hope that the inquiry projects serve to provoke further discussion about meaningful questions

and adequacy of methods of data collection and assessment.

Robert Smith, Secondary Program
Coordinator



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How effective is the use of vocabulary cubes?

Shannon L. Scanlan – English

After observing and talking with my partnership teacher, I was surprised that the students were expected to study vocabulary so extensively. The students are required to study weekly SAT (Scholastic Aptitude Test) words. They were given vocabulary lists and tests for each piece of literature. My question developed from this situation and I began to ponder strategies for teaching vocabulary.

I looked back through my notes from EDN 403 and found a vocabulary cubes handout. In order to make a vocabulary cube one must first have a piece of paper with a drawing of a six-sided cube. One of the following goes on each side, the word, the definition, an antonym, a synonym, a picture which represents the meaning of the word, and a personal connection (this may be words or a picture). Now that I had a strategy for teaching vocabulary, I decided to develop this idea into my inquiry project. My question about the teaching of vocabulary was now more specifically an inquiry on the effectiveness of using cubes to teach vocabulary.

I spoke with my partnership teacher and asked for her opinion about my project. She felt that most of the students in Advanced English would do well on vocabulary regardless of the method of teaching, since most of them simply memorize the words. She believed that the cube activity would benefit the On-Level English students

more, since they usually needed more assistance in study methods.

My next step was to set up my experiment. I decided to give vocabulary tests to both my on level and advanced students without using the cubes. A few weeks later, I administered a test on new vocabulary, using the cubes as study aids with each student assigned one and required a presentation to the class of their cube. This way one student was responsible for working on a cube and becoming more familiar with their assigned word. It also served as a memory game, since oftentimes it was easy to remember a word and the students' personal connection.

After both tests had been administered I compared the results of each class. Using the overall averages of each class the on-level student's scores increased by 7% and the advanced student's scores increased by 2%. My partnership teacher's prediction proved true that the on-level students would benefit from the activity more so than the advanced students. Most importantly though is the fact that individual student's scores showed improvement. I am not entirely certain that we can attribute all of the improvement to the activity since the students were tested on different words. However, the results show an increase in overall and individual scores and therefore the inclusion of the activity was definitely beneficial to the students.



I have included the results of each student's test score on the following spreadsheet (Table 1). Table 2 includes first period's (advanced English) test scores with series one representing the test without the cubes and series two representing the test with the cubes. Table 3 shows the results of sixth period's test scores. It is obvious from these scores that quite a few students were able to improve their scores. 20 out of 30 students in first period improved their score, and 16 out of 21 students in sixth period improved their scores while using the cubes as a study method.

It has been rewarding as a teacher to see that such an enjoyable activity can have such positive and successful results. This activity is a break from the norm and provides a learning atmosphere that stresses the importance of relevancy and personal connection. I

believe that it is the inclusion of a square for personal connection, which makes the activity so effective. It is the drawing of words that are meaningful to the creator of each box because that is what they will use to remember the word. Out of all the cubes, the ones that I remember most are the ones with interesting personal connections. For instance, one student drew a cucumber to remember the word "encumber". Another student drew a fish bowl in order to remember the word "lucidity".

On that note, in order to teach vocabulary so that it is clearer to the students; do not hinder them with strategies like rote memorization. Instead, challenge them to create their own connections to the words. It is through personal connections and the sharing of these links that the students will build their vocabulary for life.



Table 1: Comparison of student vocabulary scores for 1st and 6th periods with and without the use of cubes

1 ST Period		6 th Period		
<u>Without cubes</u>	<u>With Cubes</u>	<u>Without Cubes</u>	<u>With cubes</u>	
42	46	8	100	
96	94	95	100	
96	27	60	51	
50	68	90	98	
62	100	77	85	
100	94	83	92	
88	98	91	99	
100	92	82	95	
68	86	100	92	
56	90	87	100	
100	100	75	27	
54	72	75	100	
78	84	53	68	
96	98	64	44	
100	102	45	51	
58	60	66	75	
78	94	89	99	
100	66	90	100	
100	102	87	100	
100	86	65	71	
64	30	90	75	
96	100			
84	96			
94	34			
70	84			
60	78			
86	100			
52	60			
48	60			
72	98			
Total	2348	2399	1572	1722
Avg.	78	80	76	82



Will students who are not required to include literary criticism in a research paper achieve a higher score?

Amy Edmundson – English

A certain degree of difficulty arises when implementing a process of instructing students in conducting and writing a research paper. In this particular research paper, these sophomore students were asked to choose any author who is considered world, not American or British. After choosing an author, their research paper would follow this outline: the major influences of the author, literary criticism, at least two critics, and the most influential work of this author. As the students began their research, the difficulties seemed to lie within the translations of the literary critics and how to document works found in a book of literary criticism.

At this point, there were those World authors that lived and wrote before the eighteenth century. Thus, in this particular school's library, literary criticism was not available. These were authors such as Boccaccio, Petrarch, Homer, Confucius, Dante, and Macheavelli and several others. The students that chose these authors were asked to replace the part of the assignment that calls for literary criticism with literary forms, in other words, the genres that the authors used.

This inquiry project deals with the question of whether those students who did not include literary criticism in their papers received a better grade than those who did, which would show a better degree of understanding. Twelve students were chosen in two class periods. Three from two classes

researched the pre eighteenth century authors, and three from two classes researched those authors that had literary criticism available to them. The students picked their authors on their own accord and were unaware of this inquiry project. The student's final grade consisted of two parts, content and documentation. This project was created to discover whether there was any significant difference in the grades achieved by each group. The content grade would reveal a true understanding of what is being written by the student. The documentation grade reveals the overall understanding of the structure and form that a research project entails.

As table 1 indicates, the content grades as well as the documentation grades were higher for those students who used literary criticism. Although the particular students themselves have an impact on the overall grade, the hypothesis of this project was proven faulty. This project was conducted and implemented with the anticipation that literary criticism in research papers for sophomores might create a degree of too much difficulty. The opinion behind this project was that literary criticism might give way to added frustration for the student as well as the teacher involved. A prior knowledge of reading and analyzing literary criticism must occur in order for a student to be able to truly comprehend the interpretation of those critics.

When conducting the instruction for the project, there was always a



feeling of tension and apprehension toward the reading of literary criticism. It is placed in research papers at the sophomore level so that the student will continue with this particular practice in later grades. Despite the opinions behind this project, these particular students have proven that they could display an acceptable quality level of understanding when discussing and documenting literary criticism,

Surprisingly enough, the students who chose an author with literary criticism also displayed a higher level of success when documenting their findings. The grades reflect that students 7-12, as shown in the table, were able to successfully document research found in books of literary criticism. This is surprising due to the complexity of properly using a bibliographical form when engaging in literary criticism. It is a much simpler task to document a research text.

Again, the personal opinion and hypothesis behind this project was that those students who used literary forms would score higher in the area of content than those who used criticism. Throughout the research process it seemed the students who were not dealing with criticism were not only more content, but more aware of the author and its subject. This of course, is irrelevant to what the table shows. By conducting this project, my opinion of literary criticism in research paper has changed. Although only twelve students were used in this study due to time constraints, it would be interesting to research the scores of every student in the four classes I instructed.

Table 1:
Comparison of the Content and Documentation Scores of Students Using Literary forms (students 1-6) and those Using Literary Criticism (students 7-12)

	<u>Content</u>	<u>Documentation</u>
Student 1	95	90
Student 2	88	88
Student 3	87	97
Student 4	84	90
Student 5	100	99
Student 6	80	76
Student 7	85	94
Student 8	90	96
Student 9	94	96
Student 10	86	92
Student 11	76	84
Student 12	100	98



Does the gender and/or seating location of a student affect his/her class participation?

Edelmir I. Segovia – Foreign Language

Introduction

For my inquiry project I chose to conduct a research project that would help my students indirectly, meaning that I could help them only after I had improved myself. I chose to study the amount of student participation in the classroom and tried to look for signs of any patterns that might have been formed based on the student's gender and seating location. My reason for conducting this research was to make myself aware of any preference or habit that I might have when calling on students to participate in class. I wanted to be aware of any patterns that might have been causing students to be excluded from participation or keeping them from participating as much as they would like to.

Background

It should be taken into consideration that: 1. The teacher is a female in her early twenties; 2. The research was conducted in two Spanish classes covering different material.

5TH PERIOD

Lesson: The subjunctive (grammar)
Attendance: 14 (8 males/ 6 females)

2ND PERIOD

Lesson: Reading (short story)
Attendance: 17 (7 males/ 10 females)

The Process

Students were told that they would be filmed during the class period

so that I would have a sample of a typical lesson on video. They were told to carry on as usual and participate in class as on any other day. Students behaved normally, they participated as they had on any other day and after a few minutes seemed to have forgotten the filming.

5TH PERIOD

Students' participation included questions about grammatical structure, volunteering for sentence formation, participation by writing on the board and correction of grammatical structures.

2ND PERIOD

Students' participation included volunteering to answer questions, reading passages, asking questions about the passage, and correcting their answers about the passage.

Results

The research shows only one pattern of preference. In both of the classes, it was found that male students had a considerably higher participation average than their female classmates. 5th period showed an average of 6.75 times participation for the males compared to only 5.5 times for the females and 2nd period showed 5 times for the males and 4.1 times for the females.

There were no signs of right or left preference having more participation



on the left side of the classroom for 2nd period and on the right side for 5th period.

Even though no real pattern was found, students who sat on the corner of the left side of the room, closest to the chalkboard, had a greater than average participation rate.

Conclusions

With this research I have found that my predictions were right. Toward

the end of my student teaching I had caught myself sometimes calling on male students more often than on female students. I also had the idea that I preferred the left side of the room over the right side, but the research shows an even rate of participation for both sides. I will take into consideration the findings in this research and try to balance the part of the students' participation over which I might have some control.



Which is the more effective teaching strategy, group work or individual work?

Hayley Roberts Beane - Foreign Language

Introduction

For my inquiry project, I decided to get some feedback from students about what projects they preferred when it comes to individual work versus group work. My results cannot be applied to all foreign language classes, but the idea of action research is for a teacher to learn about his or her own students. Therefore, I took a Spanish One high-school class and found out how they felt about the issue of group work versus individual work.

Procedure

I first assigned an individual activity to my Spanish One class. For this assignment, they were to make booklets on a recently learned concept, the present progressive. They were required to write seven sentences using the present progressive and include a picture that illustrates that sentence. They could draw their own picture, use magazine cut outs, or computer images. They had to create a title page. I gave them some example sentences and illustration examples. They were supplied with all necessary materials, and had one class period to work on their projects. I asked them to turn it in to me at the next class meeting. The students were also given the opportunity to earn extra credit by reading their booklet in front of the class.

The next activity that I assigned after the students learned new material was a group project. The students were grouped according to ability and gender. The groups were making a weather/seasons project, using the

recently learned material. Each group was given a large piece of chart paper. The requirements for this project were as follows: 1. Each person had to write one sentence about something they do during the season that was assigned to their group; 2. The group had to make three sentences describing the weather during that season; 3. The project had to be illustrated either with original drawings, computer images or magazine cut outs; and 4. They were to present their projects to the class the next class period (the following day). Each student had to say at least one sentence in front of the class. The students were given example sentences and illustration examples. The students were to be creative on both projects.

After the completion of both projects, I compared the grades from both and issued a survey for the students to complete concerning the projects. I recorded my results.

The Results

As a general statement, the majority of the class preferred group work and the Weather/Seasons project over individual work and the Booklet project. I surveyed twenty-five students from my fourth period class. When asked if they preferred group work or individual work, 26 students responded that they preferred working in groups. When asked which project they liked better, 25 students responded that they liked the Weather/Seasons group project better. When asked which project allowed the students to best express their own



creativity, 18 students chose the Weather/Seasons group project, and 10 students chose the individual Booklet project. When asked which project they learned the most from, 20 students responded that they learned the most from the group project on Weather and Seasons. As one can see, the Weather/Seasons project was favored in all areas by the majority of the class.

As far as grades are concerned, the class average for the individual booklet projects was forty-five point five. The class average for the Weather/Seasons group project was eighty-four point five. Thirteen "A's" were received by students on the individual booklet project, and twenty-four "A's" received by students on the Weather/Seasons group project. Fifteen students did not submit a booklet project, therefore, those students received zeros. Four students didn't turn in (make up) a Weather/Seasons project, therefore, those students received zeros. As the results illustrate, the students did better academically on the Weather/Seasons project.

Student Comments

"The group thing was more fun. I think I learned more with my friends."

"I learned a lot from both projects."

"I like group work best when everyone works together."

"I probably learned the most from the Weather/Seasons project because we also learned some about our group."

My Own Thoughts and Conclusions

I drew a lot of conclusions from this project. However, they may be

"biased" because during my student teaching, I got a bad perception of my students, as far as work goes. They seemed to be very lazy and unmotivated. I do think that the students were more motivated on the group project because they knew that they would be affecting someone else's grade if they didn't do their work. I also think that if the students had not finished their booklet project in class, they would not have finished it at home. My students rarely did homework, and it didn't bother them to receive a zero on it. The students were also given an extra credit opportunity on the booklet project if they read it aloud to the class. Very few students took advantage of this opportunity. It seemed they did not mind speaking in front of the class as long as somebody else is up there to be "on the spot" with them.

Overall, I received better-finished products from the group project. More creativity and time and effort could be seen in the group project. It appeared that the students wanted their group's project to be the best. It was almost a competition among the groups. It wasn't uncommon for me to hear students say, "Hey, that's my group's project! Look at it! Isn't it good?" All of the students were proud of the end results. However, if they did a great job on the booklets, they seemed to be embarrassed.

My final thoughts deal with the work I put into the projects. I put an equal amount of time into planning both projects. I gave the students an equal amount of time to work on the projects in and out of class. However, it took me longer to grade 28 individual projects than it did 5 or 6 group projects. The students still learned a significant



amount in groups, as seen from their scores. So, my thinking is, if I can assign a project that involves group work and saves me time, while efficiently teaching the students, then why not do lots of group work? It saves a great deal of time!

Student Survey

For each question, circle the answer with which you agree.

- Do you prefer working in groups or on your own?

Group Work
Individual

- Did you like our Weather/Seasons group project better than the individual Booklet project on the present progressive?

Group Work
Individual

- Of the two projects mentioned above, which allowed you to best express your own creativity?

Weather/Seasons Group project
Individual Booklet project

- Of these two projects, which do you feel you learned the most from?



What are the advantages and disadvantages of using group work as a learning tool?

Jack Townsend - Mathematics

Teens are a very social group of humans. So I decided to try using this fact to benefit both them and me. I will discuss the advantages and disadvantages of using groups of various sizes and types to help teach a lesson. The questions that will be addressed are:

- Did group size affect the learning of the students?
- Does the assignment of a task to each individual in the group benefit learning?
- Which was more beneficial, student selected or teacher selected groups?
- How did group work affect test scores when compared with classes who did not use group work?
- What were the major advantages and disadvantages to using group work?

Did group size affect the learning of students?

Size does matter. I found that by keeping group size low, students were less likely to be off task. I tried using groups of three. Students initially were working well on what they were doing. Then after a couple of minutes of working they decided to talk about the hot topic for today.

I also tried using larger groups. This time it was for a competition style game and learning. Initially, the students were very engaged in what was going on.

However, as usual the students found a topic more interesting than mathematics.

I decided that groups of two worked best. The students still tended to talk about things not related to mathematics, but it was kept to a minimum. Students tended to be able to focus more on what was required of them and talk less about what was for lunch that day.

Does the assignment of a task to each individual in the group benefit learning?

Assigning tasks to certain individuals is an excellent idea. However, in practice it is very important to be able to monitor the student's participation in their assigned roles. When I was using larger groups, I assigned each group member a task. One was to use the calculator; one was to be the recorder; and one was to be the worker. The person who had the task of being the worker depended upon his partners to help him figure out what steps were necessary to complete the assignment. The person using the calculator had to listen to the worker who told him what to compute. The recorder was required to write the final answer on the answer sheet and evaluate the participation of each group member.

My suggestion when assigning tasks to each individual in the groups is to monitor them closely to make sure they are fulfilling their assignments. If possible, have each member wear a name tag with "worker", "calculator",



and "recorder" on them. Make sure that your instructions and goals are clear to them.

Which was more beneficial, student selected or teacher selected groups?

I tried letting students choose their own groups and the result was groups of 3 or 4 friends who almost immediately engaged in off-task conversations. I then decided to assign students to groups according to ability level. The group sizes were limited to two students and each person was assigned a task. This activity did not go as planned. Students had personal conflicts with other students and some did not want to work with some students.

This was soon remedied, students still chose their partner, but group size was limited to only two students. I also gave the students the choice of working in groups or individually. This worked very well. Students were more on-task and conversations about topics unrelated to math were scarce. The students seemed to enjoy and learn more working in groups when there were less people and when they were grouped with a friend.

How did group work affect test scores?

Test scores are reflective of a variety of factors in the classroom: the teacher's ability to get a concept across to the students; the student's ability to understand the topic at hand; the environment in which, the learning is taking place; and the techniques used by the teacher to convey the concept to the students.

Group work affects test scores in an unpredictable manner. I used group work to review for a test. I gave students

a review sheet and had them work in their groups on the review sheet. The review sheet was very similar to the test. I found that the groups who divided the worksheet into two parts, with each member taking half, did worse on the test than those groups who worked together throughout the entire review.

So it is evident that group work can raise or lower test scores, depending upon the student's involvement. Other factors include the difficulty level of the subject and the amount of time spent on it.

What were the major advantages to using group work?

Students were able to use their social inclinations to achieve an understanding of a certain subject. The social interaction with a peer can be more influential than interaction with an adult. Students understand the language of their peers better than they do the language of adults. Also, students may have a different perspective on a concept, thus making it possible to help a student understand a concept with the aid of the new perspective. It also makes the experience more enjoyable for the student. If one can enjoy something, he/she is more likely to benefit from it.

Teachers are able to work more with pairs of students, rather than circulating around to each individual and helping them. This is important due to the time constraints in the classroom. Students are also more likely to help each other, even if they are not in the same group. This was not as evident when students were working individually.



What were the major disadvantages of using group work?

The disadvantages of using group work are that it is very time consuming. Unless you have a group of students who all work at a similar pace, you need to allow time for everyone to grasp the concept. Also, off-task conversations can become a problem if they are not monitored constantly. Measuring understanding of individuals is not as easy if someone else in the group has done all the work. Finally, the groups that are formed have to be appropriate in size and make-up.

Conclusions

My personal reflection on using group work as an extension of my lesson is a positive one. I enjoyed having students work together. They helped me teach them. Many times students were teaching each other how to solve a problem, thereby enhancing their understanding of the concept. It was good seeing students having fun inside a math class and not having the same old "sit and get" routine. This is what I have found true about teaching in general. You understand the "why" and "how" of something more when you teach it. You appreciate what you have learned much more.



What types of activities did and did not increase student motivation and performance?

Gregory Plow and Curt Budd - Mathematics

Problem Statement

How to raise the motivation and performance among Algebra I-B students?

Objective

To see what types of activities did and did not increase motivation and performance in the three Algebra I-B classes we taught.

Hypothesis

We predict that through a variety of activities there will be an increase in low-achieving students' motivation and performance. Once this happens, they will work harder, pay more attention in class, be more enthusiastic, get more enjoyment out of school, and take increased responsibility for their own learning.

Motivation will be observed by numbers of students who apply themselves by taking notes and working on the class exercises.

Performance will be measured by quiz and test grades.

Experiment

Controls: With some activities and teaching we chose one class to be taught using the traditional lecture/student practice methods. Specifically, a control lesson consisted of teacher centered lessons with full class, going over homework and then new examples.

Activities: (1) Pythagorean Theorem Paper-Folding Activity, (2) "I Have,

Who Has," (3) Split Groups, (4) Writing Word Problems, (5) After School Tutoring, (6) Meat-Fruit Radicals, (7) Socks in Basket Radicals

Results

(1) Pythagorean Theorem Paper-Folding Activity

Description: After learning the Pythagorean theorem, practicing some of its applications and examining one of its derivations, students were to fold a square piece of paper several ways dictated by the teacher. They then had to determine how to derive the Pythagorean theorem by fitting areas of two smaller squares into the area of the largest square. [Note: Plow tried this activity with his classes while Budd's class was the control.]

Participation: 11 out of 16 (Plow's third period Algebra. I-B)

13 out of 19

(Plow's fifth period Algebra I-B)

Budd's Algebra I-

B was the control group.

Scale from 1 to 5

Attentiveness:

3 (Plow's third period Algebra I-B)

4 (Plow's fifth period Algebra I-B)

Enthusiasm:

3 (Plow's third period Algebra. I-B)

4 (Plow's fifth period Algebra. I-B)



Learning (Motivation and Performance): A greater number of students paid attention during the teacher input and exploration of the activity. The lack of student motivation and participation came when it was their turn to complete the activity. Slightly less than half appeared as if they did not want to think about how to solve the problem. Performance was slightly higher in the student's performance of the Pythagorean theorem on a test than in the control group.

(2) "I Have, Who Has"

Description: Small cards were passed throughout the room, with algebraic expressions. (For example, I HAVE WHO HAS x^2+3 added to my expression)

Then, whoever has x^2+3 would read the card and pass it on to someone else. Budd instituted the following rule: Whoever has the next-to-last card wins. This additional rule acts as a deterrent against someone stalling once it gets to them until time runs out. [Note: Plow did not apply that rule.]

Participation:

19 out of 19 (Budd's first period Algebra I-B)

14 out of 17 (Budd's fourth period Algebra I-B)

7 out of 18 (Plow's third period Algebra I-B)

6 out of 16 (Plow's fifth period Algebra I-B)

Scale from 1 to 5

Attentiveness:

4 (Budd's first period Algebra I-B)

3 (Budd's fourth period Algebra. I-B)

2 (Plow's third period Algebra. I-B)

2 (Plow's fifth period Algebra. I-B)

Enthusiasm:

5(Budd's first period Algebra I-B)

3 (Budd's fourth period Algebra I-B)

2 (Plow's third period Algebra I-B)

2 (Plow's fifth period Algebra I-B)

Learning (Motivation and Performance): For Budd's classes this activity served as a great review. They were able to cover lots of problems in a short period. Most students wanted to do it again. Plow also used it as a review. For Plow's classes, very few problems were solved and interest was low compared with the traditional teacher-centered reviews --to which his classes were accustomed. Plow's classes' scores on that test were one grade lower than all other tests with a teacher-centered review.

(3) Split Groups

Description: Class was split in half depending on who had done their homework the night before. Budd taught the group that had not done their homework. Phyllis Melton taught the ones who attempted or finished their homework. [Budd tried this method while Plow's classes remained the control.] This most often split the class into a group that was doing well (in the class) and those who were struggling.



This avoided blatantly "tracking" the two groups. The group who had their homework went on to an extension activity of the prior day's lesson, while the other group was re-taught the prior day's lesson.

Participation:

17 out of 17 (Budd's fourth period Algebra I-B)

Plow's Algebra I-Bs were the control groups.

Scale from 1 to 5

Attentiveness: 4

Enthusiasm: 4

Learning (Motivation and Performance): Most students enjoyed the added attention though some students still felt left out. Their overall performance was higher than normal. Specifically, participation was enhanced and they were more attentive.

(4) Writing Word Problems

Description: After a lesson on point-slope formula and its applications, Plow used economy growth (linear) as a real-world application. [Budd did not do this activity with his classes.] After detailed examination of this example, the students were assigned to each write their own word problem. The only requirement was that "time" was to be on the x-axis. As an incentive, the best word problem was put on the next test.

Participation-

18 out of 19 (Plow's third period Algebra I-B)

18 out of 18 (Plow's fifth period Algebra I-B)

Budd's Algebra I-B was the control group.

Budd & Plow, 4

Scale from 1 to 5

Attentiveness:

5 (Plow's third period Algebra I-B)

5 (Plow's fifth period Algebra I-B)

Enthusiasm:

4 (Plow's third period Algebra. I-B)

5 (Plow's fifth period Algebra I-B)

Learning (Motivation and Performance): All students (except one in the third period class) turned in a word problem at the end of class as assigned. All had a majority of the required information (m , x_1 , x_2 , y_1 , y_2) provided in their word problem. About half had all of the necessary information provided correctly in order for one to solve the problem. The performance was poor on the test question. Only ten percent of the students got the correct answer. Plow feels this is due to the fact that writing this one word problem and the previous example shown in class was the only practice the students had. In hindsight, he realizes they should have had much more practice with the concept of word problems.



(5) After School Tutoring

Description: After-school tutoring was made available every day for Plow's classes and every Tuesday and Thursday for Budd's classes.

Participation: average of 2 per week (Plow's Algebra I-Bs)
average of 2 every session (Budd's Algebra I-Bs)

For those who attended (on a scale from 1 to 5):

Homework Participation: 5
Test scores: 4
Enthusiasm: 4

[Note: These ratings relate to the students' motivation / performance in their regular class setting instead of the after-school tutoring session.]

Learning (Motivation and Performance): Students gained self-confidence by not being afraid to make mistakes and getting some right answers. The motivation to be more attentive in class was greater with the students who came in for after-school tutoring compared with students who did not. The students' scores (who came in for after-school help) were slightly higher, on the average, than those who did not.

(6) Meat-Fruit Radicals

Description: The method we chose to teach multiplying radicals was "Meat and Fruit Radicals." The students were taught to think of numbers outside of the radical symbol as the "meat" and the radicand as the "fruit." The students were then taught that when they multiply radicals you can only multiply "meats" together and "fruits" together. Budd extended this analogy to adding and

subtracting radicals with the following rule: You can only add and subtract radicals with like "fruits" (radicands). [Example: 2 is an apple, while 3 is an orange.]

Budd & Plow, 5

Participation:

12 out of 18 (Budd's fourth period Algebra I-B)

15 out of 19 (Plow's third period Algebra I-B)

14 out of 18 (Plow's fifth period Algebra I-B)

Scale 1 to 5

Attentiveness:

3 (Budd's fourth period Algebra I-B)

5 (Plow's third period Algebra I-B)

4 (Plow's fifth period Algebra I-B)

Enthusiasm:

3 (Budd's fourth period Algebra I-B)

4 (Plow's third period Algebra I-B)

4 (Plow's fifth period Algebra I-B)

Learning (Motivation and Performance):

Most students were a little hesitant at first, but once they realized that they were actually grasping the concept they enjoyed it. There were a few who found the idea "corny." Plow noticed a few more students benefited from this lesson in class. The scores for his class's quiz containing multiplying radicals was higher than their normal average. However, the test scores containing multiplying radicals were average for his



classes. Both of us observed that with increased confidence they gained from this analogy they had increased motivation to learn about division of radicals.

(7) Socks in Basket Radicals

Description: At the beginning of the class period, before Plow engaged in any of the instructions regarding the mathematical processes of simplifying radicals, he illustrated the concepts to the students using a laundry basket full of socks. He showed that you break down the big pile of socks into smaller socks. This represents the step of prime factorization: breaking the radicand into smaller prime factors. Then he instructed the students to pair up only the prime factors (socks that were the same), stuff one sock of the pair inside its match, and take it out of the basket. After repeating this process, the result is pairs of prime factors which have become one of themselves on the outside of the basket and some leftover prime factors (socks) inside the basket which did not have matches. If the basket was empty after pairing up all the socks (prime factors) and taking them out, then Plow instructed them to throw the basket away. [Budd did not do this activity with his classes.]

Again, the main purpose of this symbolic activity was to give the students an easy concept to understand before moving to the mathematics.

Participation:

17 out of 17 (Plow's third period Algebra I-B)

16 out of 16 (Plow's fifth period Algebra I-B)

Budd's Algebra I-B was the control group.

Scale from 1 to 5
Attentiveness:

5 (Plow's third period Algebra IB)

5 (Plow's fifth period Algebra I-B)

Enthusiasm:

4 (Plow's third period Algebra I-B)

4 (Plow's fifth period Algebra I-B)

Learning/Motivation and Performance): This demonstration at the beginning of class had riveted both of Plow's classes attention. For one of the only times in his experience with them, they were silent the entire way through the lesson. The motivation was there for the students because they had rarely had a tool (manipulative) for discourse used before. Their performance through tests and quizzes were slightly higher than the control group. Yet because of the small sample sizes we do not consider the differences to be significant in any way. This lack of improvement we try to rationalize in the "Suggestions" section.

Summary / Conclusions

We found that many of our students lack the self-confidence to merely attempt math problems. Once students could be convinced to attend after-school tutoring or participate in one of the planned in-class math activities, they gained self-confidence. We found that these students



were more attentive and willing to take chances and drop the mental block they have with mathematics. Moreover, we found that a student who gains confidence participates more and scores better on tests. However, the challenge still exists to get students to attend tutoring sessions and to at least attempt homework.

Suggestions

As a whole, the activities we used increased student motivation and performance in comparison with the traditional teacher-centered instruction. However, we do not feel that the problems that exist in low-level

secondary mathematics classes can be solved by teaching with various activities.

High school is too late to begin forcing new habits. By the time many students get to high school they have missed so many basic skills that it is extremely difficult for them to solve math problems correctly; and therefore the cycle of negative reinforcement continues. If students are not reached at an earlier age, then they should at least start the school year practicing the basics to build confidence.



Are there teaching strategies that can accommodate the temporary physical handicap of a student while maximizing the student's learning experience in a physical education class?

Amy Grinnell - Physical Education

During my placement at Brewster Middle School I had a 6th grade girl whose participation in physical education was restricted due to her wearing a cast. She had a bad break in her radius. She was excluded from physical education the entire seven weeks during my placement. She is a student who loves to participate in physical education, and sitting on the sidelines watching was painful for her. She was the focus of my inquiry project.

The week I observed my partnership teacher I noticed that this girl was assigned various managerial tasks such as: taking roll, checking for proper footwear, turning radio on and off, and keeping score. It was obvious she was bored with these tasks. I brainstormed for tasks related to the cognitive aspect of physical education. The cast eliminated any writing assignments. I asked Abby if she thought she would be able to hunt and peck on a keyboard. She said "Yes." I checked on the availability of a computer with internet access. There was a computer available for most days.

The days the computer was available I sent Abby to the library. Her assignment was to research any web site related to physical education. She had the whole hour to complete the duty. The last five minutes of class she had to report back to me. She had to give me the web site address, verbally tell me one positive and negative aspect of the web site. She was engrossed with this responsibility. Additionally, her interest

in physical education peaked. She found new games, dances, information on popular athletes, what other countries are doing for physical activity, ammunition for a solid p.e. program, etc.

By the end of the seven weeks I had accumulated a hefty file of web sites related to physical education. I gave Abby one final exit assignment. She had to do some reflective thinking. She had to critique the quality and content of the physical education curriculum and instruction at Brewster Middle School. Her verbal report was not surprising to me. She was disappointed with the physical education program. She felt shortchanged. She could not understand why if the faculty had access to the same information, they were not using and implementing these games, dances, etc.

I felt good about the assignment. Abby got more familiar with internet usage. Her reports gradually became more focused. Additionally, she got plenty of reading practice. I would definitely do this again. Enhancing technology, reading, and communication skills is a good alternative to boring managerial tasks.



What strategies can be implemented to keep mainstreamed students with disabilities on task without depriving the other students of time, observation, instruction, and feedback from the teacher?

Johnathan Brodowski – Physical Education

1. Finding A Problem. After student teaching at Pine Valley Elementary school for a week or two I realized what I was going to do my inquiry project about. There are about ten to twelve students with disabilities at Pine Valley. For my inquiry project I did not pick one student, I used all the students. They are children with learning disabilities and others with downs syndrome. These students are all mainstreamed into physical education. The problem that I found was that I had to devote more of my time to these children.

2. State a Question. How could I keep the students with disabilities on task without depriving the other students of my time, observation, instruction, and feed back?

3. Possible Solutions to the Problem. The first thing I tried was to stand closer to these students. They are located in the front left side of the class. I would give the instructions to the class, then move towards the left side, give each of them one on one help, and look around at the rest of the class to make sure that they

were on task. If someone was not on task I would say their name or walk over to them. This worked well but I still was not able to give as much feedback to the rest of the class.

The second idea I came up with was to use the older students to help out. The fourth graders had recess while the kindergartners had PE. I asked a couple of my well-behaved students if they would like to help the children with disabilities in PE.

4. What I Observed. This worked out very well: the fourth grade students were excellent with the younger children. This made the fourth graders feel important and gave them responsibilities. Their job was to help the children perform the task which being demonstrated by the teacher. This gave me time to move around freely to observe and give feedback to the rest of the class. I did not have to devote most of my time to two or three students anymore, which in turn makes me a better teacher.



Does peer teaching affect academic performance?

Mark Chickering - Social Studies

My project was to see the effect of peer teaching on the academic performance of my students, measured by their test scores.

I used two classes for my project. In the first class, I divided the students into eight groups of three. Two of the groups actually had four members to balance out the class. The task was to let the students teach two chapters of the book. Each chapter was broken down into four sections equaling one section per group. The students were given overhead transparencies and pens, plus, newspapers to enhance their lessons.

The second group was broken down similarly, but there were only 24 members of the class so all eight groups were equal in size. Both classes taught chapters eleven and twelve of the book. The second class was approximately two chapters behind, so their teaching project was done about one week after the first class. First, I found that both classes really like this form of teaching. They really liked being in control of the lesson and class. I let them have control, even in discipline matters. For example, if someone was talking, the teaching student could call him down. I thought this might be good because it would give the students an idea of how it is to be a teacher and constantly have to be asking for quiet.

In addition to teaching the lesson, the students had to grade themselves, and each member of their group, on their

participation in the group. This gave them some sort of control in helping their grades. I instructed the students to grade each member and themselves on a scale of one-to-five, five being the best and one being the worst. I would average their scores and add those points onto their tests. The students really seemed to like this, plus, I felt they were honest in their evaluations. These points really helped their test scores.

I was pleased that the students took this teaching project seriously. They were very responsible and seemed to like this idea. This was the case in both classes. As a matter of fact, I found that the students wanted to do it again later in the semester. Unfortunately, I did not have enough time to try it again.

Results

As much as the students liked this project, I found that they did substantially worse on their tests. In the first class, I found that the class average dropped from a 72.43 on the test prior to this one, to a 68.59. In the second class, the drop was even more severe from a 68.26 to a 62.44.

I was really shocked by the drop in scores. I must admit, I expected the scores to rise, not fall, because they really seemed to enjoy the project. After viewing the results, my focus turned to figuring out why they dropped so drastically. I have come to several conclusions. The first is that I did not give the students enough guidance in



preparing their lessons. I should have probably given the students a list of key terms and ideas that needed to be covered more thoroughly. A teacher prepared outline for the students would have been a good idea. However, I did not do this. In the future, I will be sure to give more guidance to the students in preparing their lesson.

Secondly, I did not encourage the students to have more class discussion. They tended to lecture about 90% of the time. This might have had an effect on the students' performance. I will prepare a list of supplementary references for the students next time. This will include videotapes on the subject matter and games that might enhance the lesson and promote retention of the material by the learners.

The last thing was the amount of time the students used in presenting their lessons. Some groups only used about twenty minutes in presenting their lessons. Next time, I think I will put time requirements on their lessons. This will require more preparation on the students' part.

Even though the results were not as I had planned I still plan to use this method again. The students really seemed to enjoy this project. With the modifications to the program, I feel this can be a success and a valuable teaching tool. My only regret is that I did not get to try it again.



Can student performance on multiple choice tests in US History be improved by exposing the students to the format of standardized multiple choice questions (i.e. questions from a prepared testlet that incorporates SCOS)?

Micki Swords - Social Studies

Implementation Plan

On February 18 of this year, the students in the US History classes I was student teaching took their first 6 weeks test. Until that time the students had been answering essay questions from their textbook as their warm-up at the beginning of class. The students' overall performance on the 6 weeks test was poor.

The 6 weeks test consisted of multiple choice questions taken from a testlet book. These questions were of the type that the students would be encountering when they take the end of subject North Carolina Competency Test for US History. My partnership teacher and I felt that perhaps if the students were exposed to the format of the questions every day their scores on the next 6 weeks test would improve. For the next 6 weeks the warm-up was presented on the overhead projector. The warm-up consisted of from 3 to 7 multiple choice questions from the testlet book. The questions followed the SCOS objectives and the Chapter we were just finishing or had finished. The students were shown the overhead, spent 5 to 10 minutes answering the questions on their own and then we spent 20 to 30 minutes in a teacher-led discussion of the questions and their right answers.

On the day before the second 6 weeks test, we again went over each question using the overheads and discussed each one. The test was totally

multiple choice with questions directly from the testlet book that the students had already seen and discussed. The lecture and group work we had done in class all related directly back to the SCOS objectives as did the questions.

Findings

The results on the second test did not show the marked improvement we had hoped to see. The first test average was 48 with a range of 32 to 71. The second test average was 55 with a range of 38 to 76. Although the results improved, I wanted to understand the student's performance in greater detail. Using a random sampling of four students I attempted to see if the extra work on multiple choice question format had improved their test scores. The conclusion was that they had not improved significantly. Two of the students' scores had gone up slightly but there was no overall giant leap of improvement.

For the first 6 weeks test, the number of questions possible was 118. On this test 16 (or 14%) of the questions had the same wrong answer by all 4 or at least 3 of the students. Two students had picked the same wrong answer on 36 (or 31 %) of the questions.

For the second 6 weeks test, (86 questions on the test), all 4, or at least 3, of the students had picked the same wrong answer for 8 (or 9%) of the questions. Two students picked the same



wrong answer for 20 (or 23%) of the questions

Discussion

Obviously, from looking at the final test grades for the two 6 weeks tests, the extra work on multiple choice questions did not help to significantly improve their grades. The students and I worked very hard on discussing the many aspects of the content of the questions and the way in which the questions were worded. The students were provided with many instances of repetition of material and so were not unfamiliar with the content.

Conclusion

It was very disappointing to me and the students to have worked so hard on the multiple choice questions for the daily warm-up only to have their test scores be so low. From their test scores, it would seem to have made no difference that we pursued that type of learning. From looking at the questions from the testlet book I am prone to conclude that the problem may not be in the student's inability to learn the material but in the make-up of the questions themselves. Quite a few of the questions had the disclaimers: except, most likely, best, in their wording. The number of students missing the same question the same way, 45% on the first test and 32% on the second, would cause me to question the validity of some of the questions in measuring student achievement.

Student teaching in a subject that is held accountable at the State level was very stressful. As a teacher held responsible for the success of not only your own students but the school as a

whole, you need to have more input on the types of questions your students are being tested on. Judging from the sample questions, the tests may be poorly written and the questions asked may not be valid. I believe the questions history teachers must ask themselves is, "Do we teach history for the understanding of ideas and concepts and, if so, how do we best measure that understanding?"



Are grades adequate incentive for students to learn previously covered material?

Gary Nealy - Science

Teachers are constantly searching for effective methods for encouraging their students to review course content in preparation for end-of-course tests and for raising test scores in general. Often students are given bonus questions on tests as a means of adding points to their scores. These also serve as a reward for extra effort in their study habits.

The bonus question strategy is based on the apparent concern students have about their test scores and overall course grades. Is this concern for grades incentive enough for students to review prior course material? This study reports an attempt to answer the question by offering students a chance to add to their chapter test scores via bonus questions taken from earlier tests (including earlier bonus questions) and previously covered chapters in their textbook. The data collected are for a small ninth grade physical science class consisting of 17 students.

Table I shows the average number of students earning bonus points by answering questions correctly. The percentages in Table I show that the majority of students (72%) were able to answer at least one question correctly. Less than half of the students answered at least half of the questions correctly. No student answered all of the questions correctly and nearly a third of the class did not attempt the questions.

Table 2 shows the results of three questions that appeared on all of the tests

as bonus questions. These results reflect to some extent the complexity of the calculation involved, the question regarding velocity being the most complex of the group. As shown in Table 2, half of the students answered the questions on acceleration and mechanical advantage correctly. The majority of the class answered the question on velocity incorrectly. It is of interest that only 6-18 percent of the students answered a question incorrectly on earlier tests, but answered it correctly on later tests. It is also of interest that 6-44 percent of the students answered a question correctly on more than one test. Finally, 18-88% answered a question incorrectly on all of the tests.

It should be noted that this method of assessing students' study habits is only one measurement and should not be considered conclusive in an absolute sense (i.e. other factors may be involved in a student's answering a question correctly or incorrectly). The results of this study do show that only a few students (6-18%) could answer previously missed questions. This indicates that grades alone may not incite students to review previously covered material and that other incentives may be needed.

The author would like to thank Dr. Laura Rogers, Mr. Mark Bridgers, East Columbus High School, and UNC- Wilmington for their support of this project.

Table 1. Percentage of Students Answering Bonus Questions Correctly



<u>Number Correct</u>	<u>Average Percent of Students</u>
1 or more	72%
Half	40%
All	0%
None	30%

Table 2. Percentage of Students Answering Repeated Bonus Questions Correctly

	<u>Average Acceleration</u>	<u>Velocity</u>	<u>Mechanical Advantage</u>
Correct Answer	53%	8%	55%
Incorrect-to-Correct	18%	6%	6%
Correct More Than Once	32%	6%	44%
Incorrect All Times	18%	88%	24%



Given the opportunity to use the scientific format on three separate occasions, will students choose to use that format when writing up a subsequent lab activity without directions or prompts given to the style/format of the write-up?

Chris Dutton - Science

Introduction

I am completing my internship at Laney High School, teaching Oceanography and Advanced Oceanography to 11th and 12th grade students. During my first few weeks we constructed an experiment in class to test the principle of osmosis. While brainstorming and writing up the experiment I felt that the students lacked an understanding of how to present their experiment in written form, incorporating an introduction, materials/procedure, results, and conclusion. While I knew this format was not new to them, I felt that they needed more time to practice it and become comfortable with it. This became the subject of my inquiry project: Given the opportunity to use the scientific format on three separate occasions, would the students choose to use that format when writing up a subsequent lab activity without directions or prompts given to the style/format of the write-up?

Procedure

The first time the students set up their experiment we brainstormed together to write the hypothesis, list the materials needed, the procedure we would follow. Having completed the experiment we recorded the results, and wrote a conclusion. This information was written on the overhead and students copied it into their notes. We discussed

the importance of writing up an experiment in a logical, orderly fashion that could be duplicated by another student/class/scientist. Two weeks later I introduced another activity in the form of a hypothesis. Students worked in research groups to obtain their results. When it came time to write up their activity, I again directed them to the format we had used, outlining all the components on the overhead for their review. I asked them to fit their information into this format. One week after completing the second write-up, students were assigned individual activities to be researched and written in the format we had been using. Again they received a "prompt" from me in the initial directions stating the acceptable format for the activity write-up. A fourth experiment was completed in class. General directions were given for the experiment. The students were then given directions to complete their experiment and turn in their write-up using the proper format. The specific components expected in the lab write-up were not given.

Results

Sixty-eight students participated in this lab activity. Forty-three students (63%) turned in an assignment, twenty-five (37%) did not. Twenty-seven (63%) of the forty-three lab write-ups were completed in the proper format.



Conclusion

A significant number of students failed to turn in this assignment. Although 63% of the students completed the lab write-up in the format I had specified (Introduction, Procedure, Results, and Conclusion), over 1/3 did not (37%) - even after having the format modeled, and after completing two previous lab write-ups in this format. The incomplete lab write-ups generally fell into two categories: those missing an introduction and those missing and/or

combining the results and conclusion sections. I will go back and address these specific sections and provide them with more opportunities to practice this format.

I am pleased with the results of this inquiry project and will continue to model and reinforce activities with my students. It has been helpful to do "research" on teaching techniques -- it provides a clearer picture of the question asked and the results achieved.

