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Betwixt and Between

Education for Young Adolescents

A Peer Reviewed Journal of Middle Level Research

Volume 1 Issue 2
Fall 2014

Beyond the Elevator Speech

The Pennsylvania Professors of Middle Level Education and Pennsylvania Association for Middle Level Education have partnered to support a peer reviewed journal focused on research in the field of middle level education. *Betwixt and Between* is the result of this joint venture. We are pleased to welcome you to our learning community and encourage you to submit an article in the future. In the meantime, we hope to elevate your understanding of middle level students, schools, and the issues they face in these challenging times.

—The *Betwixt and Between* Editorial Board.

In This Issue

Betwixt and Between

Education for Young Adolescents

A Peer Reviewed Journal of Middle Level Research

Betwixt and Between: Education for Young Adolescents (ISSN-**2333-0813**) is the official journal of the Pennsylvania Association for Middle Level Education and the Pennsylvania Professors of Middle Level Education, P.O. Box 312 State College, PA 16801. It is published electronically twice each year in spring and fall, one volume per year in PDF format.
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Environmental Impact

The Journal is created electronically to reduce the use of paper. Please consider the environment before printing.

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About Our Cover Image

Joe Girard, a successful author, motivational speaker, and salesman, once said, "The elevator to success is out of order. You'll have to use the stairs... one step at a time."

We hope that Mr. Girard is not correct. Just as elevator call buttons allow us to select a variety of locations and move between them with ease, we hope that *Betwixt and Between* will cover a variety of middle level issues and elevate our collective ability to improve middle level education for all learners. It is our hope that becoming informed about current issues, engaging in research, and learning from others will help our middle level community move from novice to expert across many areas more quickly than going it alone. So, go ahead, take the elevator with us.

Thank you for joining us in our quest to lift up all middle level learners. We hope our journal will provide something new to enhance the professional development of each of our readers.

From the Editor's Desk

Deana Mack

Welcome to the second issue of *Betwixt and Between: Education for Young Adolescents*, The Journal of the Pennsylvania Professors of Middle Level Education and the Pennsylvania Association for Middle Level Education. Once again, I am amazed at the hard work the editorial board has put into this edition.

I truly believe B & B is of great value. Across the state, those of us in the role of developing teachers specifically for grades 4 to 8 have seen that we have smaller numbers of candidates on seeking certification than those in secondary or ECE. In response to declining numbers, we are seeing a variety of effects across our state. Duquesne is offering a discounted tuition rate to those choosing a M.S. Ed. in Middle Level Education; numerous universities have had to fill out dreaded "justification" forms to explain and reason the need for running methodology classes in grades 4 – 8 at smaller sizes instead of cancelling them. Some have also opted only to offer middle grade preparation programs at branch campuses, such as the University of Pittsburgh which does not offer middle level on the main campus but does offer the program at Johnstown.

As a result, our candidates will be in high demand for middle grade positions. Their training will need to be superior in quality, relevant, timely, and reflective of the absolute best practices in the field. It is with this reality that B & B seeks to provide professors of future middle level educators with the best relevant research we can provide. It is my hope that everyone will find the articles presented here of great value in the field of middle level education.

Sincerely,

Deana Mack Ph.D.

PAMLE Membership

Members of each organization receive notification when new issues of *Betwixt and Between* are released. Don't miss an issue! Join these professional organizations today.

Pennsylvania Association for Middle Level Education

The mission of the Pennsylvania affiliate of the Association for Middle Level Education is to promote best practices in the schools and classrooms of our Commonwealth. Membership provides and opportunity to meet like minded educators, to keep up on the latest middle level practices, and, most importantly, be confident about providing the best education possible for students.

Regional chapters of PAMLE exist throughout the state providing access to local expertise at your fingertips. Membership rates range between $20 and $199. To learn more, please visit our website.

http://www.pamle.org

Pennsylvania Professors of Middle Level Education

The Pennsylvania chapter of the Professors of Middle Level Education is provides a professional network that contributes to the development of an expanded research base, disseminates best-practices, and enhances the preparation of future middle level educators.

Chapter meetings are held three times per year in various locations throughout the state. The annual membership dues of $100 provide access to this network for all faculty members within a middle level teacher preparation program. Please take a moment and investigate about our association online.

http://www.papomle.org

More Than Just Another Meeting:

One Pennsylvania middle school's professional learning community (PLC) experience offers insights into the impact PLCs have on professional learning, as well teacher perceptions of job-embedded professional development.

Daniel W. Hartman

Abstract

The importance of continuous professional development is one idea that policymakers, researchers, and practitioners have agreed upon. Professional learning communities (PLCs) offer a process for teachers to engage in job-embedded professional development that involves collaborative dialogue and activities that can lead to school improvement and increased student achievement, as well as a conceptual framework of research-based practices that can transform schools. This article provides a summary of a recent qualitative case study of one middle schools journey with PLC implementation and aimed to measure teacher perceptions of the characteristics and conditions necessary for successful PLC implementation, perceived barriers to successful PLC implementation, and teacher perceptions of their involvement in PLCs as a means for professional growth in comparison to traditional professional development activities.

Introduction

Educational leaders have known for some time that professional learning communities (PLCs) offer a process for teachers to engage in collaborative dialogue and activities that can lead to professional learning, school improvement and increased student achievement, as well as a conceptual framework of research-based practices that can transform schools (Huffman & Jacobson, 2003; DuFour, 2007). As adult learners, teachers have unique learning preferences which should be considered when developing professional growth opportunities for teachers, and PLCs can provide the framework for job-embedded professional learning that can address these needs (Fogarty & Pete, 2009).

Future improvement efforts in education will require a shift in how learning is conceived and the conditions under which teachers learn (Fullan, 2007). It is paramount that those who are responsible for the professional learning of teachers in any educational organization be able to critically assess and evaluate the professional development activities that are taking place in their schools, and this evaluation must look at teacher behavior, specifically how teachers change their instructional practices as a result of their professional learning (Guskey & Yoon, 2009; Brown-Easton, 2008). This article offers a summary of a recent small-scale qualitative research study which aimed to elicit how teachers perceive their participation in PLCs as compared to their participation in more traditional professional development experiences.

Effective Professional Learning

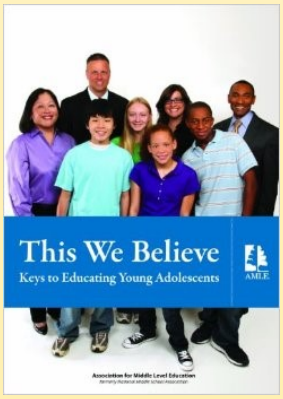
Professional development, defined by Guskey (2000) as the processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might improve the learning of students, is

Professional Development: A Middle Level Essential

Did you know *This We Believe: Keys to Educating Young Adolescents* (2010), published by the Association for Middle Level Education, identifies "*Ongoing Professional Development*" as essential element of successful middle level institutions?

The publication states, "Professional development is a continuing activity in middle level schools where teachers take advantage of every opportunity to work with colleagues to improve the learning experiences for their students."

Learn more about the 16 Characteristics of Effective Schools by visiting the AMLE website at http://www.amle.org/AboutAMLE/ThisWeBelieve/tabid/121/Default.aspx#122516-the-16-characteristics



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paramount in an era of educational reform. In *Breaking Ranks in the Middle: Strategies for Leading Middle Level Reform* (2006), having a school-wide, comprehensive, and ongoing professional development program that is aligned to individual needs of staff members is identified as a cornerstone strategy for school improvement. Furthermore, such a program should emphasize knowledge of content, instructional strategies, and student development factors.

Research has been clear that the most effective professional development, or professional learning, for teachers is job-embedded, meaning that it is grounded in the day-to-day practices of teachers and is designed to increase teachers' knowledge and usage of content-specific instructional practices (Croft, Coggshall, Dolan, Powers, & Killion, 2010). DuFour (2014) identified the following criteria that prior research has shown leads to effective professional learning:

- *Ongoing* with a sustained focus.
- *Collective* rather than individualistic.
- *Job-embedded*.
- *Results-oriented* with activities clearly aligned to high levels of student learning.
- Most effective in schools and districts that function as professional learning communities.

Multiple studies have corroborated the stance that professional learning is most effective when it is coherent and aligns with other learning activities or connects to organizational goals, is content specific, job-embedded, and collaborative in nature (Darling-Hammon, Wei, Andree, Richardson, & Orphanos, 2009; Garet, Porter, Desimone, Herman, & Yoon, 2001; Grodsky & Gamoran, 2003; Moore & Shaw, 2000; Quick, Holtzman, & Chaney, 2009).

Building a learning-oriented culture that supports this type of professional development is difficult to do in any organization. Professional learning communities (PLCs) offer hope for this type of job-embedded professional learning that embodies the characteristics that research shows are most effective.

Professional Learning Communities (PLCs)

Professional learning communities (PLCs) have become one of the most talked about initiatives in education over the past decade (Thompson, Gregg, & Niska, 2004). The term PLC has been used to define multiple types of collaborative ventures in education. Simply stated, DuFour, DuFour, and Eaker (2008) defined PLCs as "educators committed to working collaboratively in ongoing processes of collective inquiry and action research to achieve better results for the students they serve" (p. 14). DuFour and Eaker (1998) identify the following characteristics as critical for PLC implementation:

- Shared mission, vision, and values
- Collective inquiry
- Collaborative teams
- Action orientation and experimentation
- Continuous improvement
- Results orientation

These characteristics clearly embody what research has previously shown to be critical for effective professional learning to occur.

The concept of PLCs offer a process for teachers to engage in professional dialogue and activities that can lead to school improvement and increased student achievement by offering a conceptual framework of research proven practices for transforming schools (DuFour, 2007; Huffman & Jacobson, 2003). In order for PLCs to be an effective mode of professional development for teachers, it is important that PLCs are not viewed as an isolated entity, and that professional development activities and conditions which support PLCs must be viewed as interdependent in order to be effective (Hawley & Valli, 2007).

Additional research has helped to identify factors that can impact the level of success PLC implementation may have. Several studies have identified having a clear focus, strong and supportive leadership, and an emphasis on relationships as being critical to the success of PLC implementation (Annenberg Institute for School Reform, 2010; Graham, 2007; Little, 2007; Pankake & Huffman, 2011; Desimone, 2002). These attributes have been identified as being critical for sustaining long-lasting change.

One Middle School's PLC Journey

Border Middle School (pseudonym) is a public middle school in south central Pennsylvania, located in a suburban community. The school houses grades seven and eight, and serves approximately 540 students and employees 36 full-time teachers. For the past several years, Border Middle School has been one of the highest performing middle schools in its respective county, based on the *Pennsylvania System of School Assessment* (PSSA), consistently making Adequate Yearly Progress (AYP). During the school year that the study referenced in this article was conducted, 92% of students were proficient or advanced on the mathematics PSSA in grades seven and eight and 89% of students were proficient or advanced on the reading PSSA in grades seven and eight.

The PLC journey at Border has been a three-year process. This journey began with teachers receiving in-service training on PLCs, including completing a whole-

(Continued on page 10)

Want to recognize an outstanding

STUDENT TEACHER

working with middle level students (ages 10-14)?

Know a middle level ADMINISTRATOR or TEACHER

who deserves a great pat on the back

for their work with kids?

Check out the award opportunities through PAMLE

the Pennsylvania Association for Middle Level Education

Go to www.pamle.org for more information.

Learning to Teach & Teaching to Learn: Student Teacher Recognition -- This recognition is presented to outstanding student teachers or interns. PAMLE wants to recognize teaching candidates who have student taught in a middle school and have demonstrated both a commitment to middle level teaching as well as an awareness of young adolescent development. Any student teacher or intern who has completed his/her student teaching in the Fall (deadline Dec. 15) or Spring (deadline Apr. 15) is eligible for this award. These novice teachers will be recognized at the PAMLE Conference each Spring. They will receive a certificate, free one-day attendance to the conference and a one-year PAMLE Individual membership.

Outstanding Administrator Award -- By establishing this award in 2004-05, PAMLE sought to honor administrators who value, understand and support middle level education that promotes powerful learning for young adolescents.

Ann Moniot Outstanding Middle Level Teacher -- Ann Moniot was a very dynamic educator from the city of Pittsburgh. She was one of the original Board Members of PAMLE. She was also the second president of the Association for Middle Level Education. This award is presented to a middle level educator that has made professional contributions that have positively influenced middle level education as well as middle level students.

Promising Practitioners Award: New Teacher Award -- This award is presented to teachers who are just beginning their middle school careers. These beginning teachers have made a positive impact on both their school and community. They incorporate effective middle level practices in their everyday teaching. Each PAMLE member school has the opportunity to nominate up to three teachers yearly to receive this distinction. Each participant will receive a certificate at the PAMLE Conference.

Joan Jarrett Student Award -- The Joan Jarrett student award is designed to honor outstanding young adolescents who are in the "middle" and who generally don't receive recognitions. To be eligible, the student should demonstrate leadership abilities, good citizenship, and should have made positive contributions to their school and community.

(Continued from page 8)

faculty book study on DuFour's (2004) *Whatever It Takes: How Professional Learning Communities Respond When Students Don't Learn*. Through completion of the book study, as well as additional staff development, teachers were involved in developing the structure of what PLCs would look like at Border.

The teachers' PLC activities included weekly interdisciplinary meetings which focused on using student data to discuss instructional strategies that could be implemented in the classroom. Additionally, grade level departments met quarterly to use assessment data to revise curriculum and plan for instruction. After the initial book study, subsequent staff development opportunities on effective data analysis and research-based instructional strategies was provided so times could refine their professional conversations and collaborative efforts.

Recently, faculty members at Border Middle School participated in a qualitative case study for the purpose of gleaning information about teacher perceptions of their participation in PLC activities as they relate to professional learning and changing professional practice. All full time teaching faculty members were eligible to participate in the study, and twenty faculty members, 56% of the eligible faculty members, chose to participate. The study included a researcher-designed qualitative survey, as well as individual interviews. The survey questions were developed based on the characteristics identified as critical for PLC implementation by DuFour and Eaker (1998), since this was the framework for PLCs that was adopted at Border Middle School. A validity study which evaluated the clarity of questions, absence of bias in questions, and quality of questions was first conducted with a pilot group of qualified professionals who were not a part of the larger research study. Participants also participated in follow-up individual interviews which included being asked to answer the research questions, as well as being questions which involved interpreting the data that was collected from the survey. Based on the results of the survey and interviews, common themes and patterns were identified regarding the characteristics of successful PLC implementation as well as barriers to successful PLC implementation. The study was centered around the following research questions:

What characteristics and conditions do middle school teachers believe must exist in order for professional learning communities (PLCs) to be an effective model of professional development?

What characteristics and conditions do middle school teachers perceive as presenting barriers that prevent professional learning communities (PLCs) from being an effective model of professional development?

How do middle school teachers perceive the effectiveness of their professional learning community (PLC) activities compared to traditional professional development models as they relate to the application of new professional learning?

Research Results

Yates (2007) stated that although there is expert opinion of what conditions are necessary for teacher professional learning to occur, there is a lack of empirical evidence, especially from teachers' perspectives. This qualitative study aimed to measure middle school teachers' perceptions of characteristics and conditions of PLCs that must exist in order to make PLCs an effective model of professional development, as well as the perceived barriers that would prevent PLCs from being an effective model of professional development. Additionally, this study measured how middle school teachers perceived the effectiveness of their PLC activities compared to traditional professional development models as they relate to the application of new professional learning. Valuable information can be gleaned from the feedback provided by the teachers at Border Middle School in regards to their experiences with PLCs.

Through the completion of a Likert-scale survey, open response questions, and follow-up interviews, the following themes emerged as critical components necessary for the successful implementation of PLCs:

- Appropriate access to resources
- Leadership support
- Positive collegial relationships

Teachers reported that adequate resources, including time, materials, access to research, and access to translatable student data was the most critical element to have in place in order for PLC teams to be successful. Additionally, support from school leadership emerged as a necessary condition for successful PLCs. Specifically, teachers believed that a clear focus established and maintained by school leaders is an essential characteristic of PLC success. The third theme that

Throughout the study, teachers who participated in the study revealed how attributes of PLC team members such as trust, honesty, active listening, and a willingness to collaborate were critical to the success of the PLC.

emerged as a necessary condition, as identified by teachers, was Positive collegial relationships. Throughout the study, teachers who participated in the study revealed how attributes of PLC team members such as trust, honesty, active listening, and a willingness to collaborate were critical to the success of the PLC.

Teachers also identified the following barriers that can prevent PLCs from being an effective professional growth endeavor:

- A lack of leadership guidance and focus
- A lack of time
- A lack of trust and respect
- A lack of professional commitment

The first of the three barriers, a lack of leadership guidance and focus, specifically referred to the failure to maintain a focus on the mission, vision, values, and goals of the PLC process. For example, one teacher participant commented that one frustration was " 'Liquid' goals that change frequently or our unclear, and an unclear explanation of the purpose."

One result that is probably not surprising to any educator is that a lack of time was also identified by teachers as a barrier to successful PLC implementation. It is important to note, however, that teachers did not just have concerns about a lack of common planning time, as might be expected, but that several participants eluded to the importance of time to observe their peers as well as time to reflect on the collaborative inquiry process, and how the absence of time for these activities prevented their PLC experience from being as rewarding as it could have been.

The teachers who participated in this study overwhelmingly agreed or strongly agreed that that having trust for their PLC colleagues made it more likely to integrate ideas shared by their colleagues into their teaching. Conversely, the data revealed that teachers felt that a lack of respect for differing opinions among colleagues was a clear barrier.

The final barrier to successful PLC implementation that the study uncovered was a lack of professional commitment. Several participant comments eluded to this, including one teacher who stated that the most significant factor that could prevent PLCs from having the most powerful impact on teaching and learning was "an unwillingness to participate or negative attitudes of individuals." Another participant agreed, stating that "When total commitment is not school-wide, PLCs will not be successful."

The teaching faculty in every school exerts a powerful influence on the implementation of any type of program

Another focus of this study was to examine the comparison between teacher perceptions of their participation in PLCs as it relates to implementing new learning, to their participation in traditional professional development activities (trainings, workshops, courses, etc.). In regards to their overall effectiveness, teachers reported that there was value in both traditional professional development activities and with more job-embedded approaches to professional developed, such as what PLCs offer. Despite seeing the value in both models of professional development, teachers indicated that overall PLCs were more relevant to their professional growth, implication and application of new learning, and improving student achievement. Most significantly, when the conditions and characteristics that have been established as being necessary for successful PLC implementation are clearly in place, teachers indicated that PLC participation is a more effective model of professional development than participation in traditional professional development practices. Teachers preferred the PLC model because it provided a network of ongoing support, collaboration, and feedback.

The results of this small scale qualitative case study were consistent with other research on professional development and PLCs, most notably that teachers prefer professional development that involves the critical attributes that PLCs, in theory, offer, including that it is content specific, promotes collaboration, and is job-embedded and ongoing. This is especially true when the characteristics and conditions of successful PLC implementation identified through this study are evident, and when the potential barriers that were identified have been addressed and eliminated. The information gleaned from the participants holds value in that it offers insights into the thoughts of the practitioners who are participating in PLCs on an ongoing basis. The results have implications for teachers, as well as for school leaders and policy makers.

Conclusion

Professional learning communities offer a framework for providing the type of job-embedded, ongoing, professional development that the research has shown is most effective for changing instructional practice and leading to school improvement. Although the insights offered by the teachers in this study offer only a glimpse into one schools experience with PLC implementation, a lot can be gained from the insights offered. The teaching faculty in every school exerts a powerful influence on the implementation of any type of program, and having an understanding of teacher perceptions of the com-

plex factors that can lead to PLC implementation being successful or unsuccessful is imperative for all stakeholders.

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About the Author

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Dr. Hartman has spent his entire educational career working in middle level education. He is currently the principal of Emory H. Markle Intermediate School in the South Western (York County) School District.

Dr. Harman also serves as President of the East Region Pennsylvania Association for Middle Level Education and is a member of the PAMLE Executive Board.

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Recommended Quick Read

Teachers' Desk Reference:
Family and Community Engagement

This issue of Teachers' Desk Reference provides practical strategies for involving family and community members as partners in education. It also provides valuable resources for increasing successful outcomes for all students.

Available online at:

http://goo.gl/q5am5P

Image source: Pattan Publications website http://www.pattan.net/category/Resources/PaTTAN Publications/

RESEARCH REVELATIONS

Is Exposure to Older Students Associated With Body Dissatisfaction in Female Early Adolescents?

A study published in the journal *Psychology of Women Quarterly* reveals that fifth and sixth grade females who attended schools with older females reported more negative associations with their bodies when responding to questionnaires asking about eating habits, attitudes about appearance, and feelings of body consciousness. Seventh graders who had been schooled with older children during fifth and sixth grade showed similar associations.

The study examined an ethnically diverse sample of 1,536 female students between fifth and eighth grades in U.S. school districts. The researchers examined three different populations: junior high (grades K-6 together in one school and 7-8 in another), middle school (grades K-5 and 6-8) and extended middle school (K-4 and 5-8).

While media is often criticized for contributing to body image issues in adolescents, it now appears that another source for body dissatisfaction may be in play. Researchers state, "Elevated levels of body dissatisfaction, drive for thinness, thin-ideal internalization, body surveillance, and body shame may undermine young teens' social, emotional, and academic well-being both during the early teen years and in later life."

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Strauss, J., Sullivan, J. M., Sullivan, C. E., Sullivan, S. J. & Wittenberg, C. E. (2014). Contextualizing the "student body": Is exposure to older students associated with body dissatisfaction in female early adolescents? *Psychology of Women Quarterly, 38(4), 1-11. First published online September 18, 2014. doi:10.1177/0361684314550407*

"In the middle of difficulty lies opportunity."

~Albert Einstein

Dr. Tracy McCalla Published

PAMLE would like to congratulate Dr. Tracy L. McCalla, Junior High Principal at Neshannock Junior Senior High School located in New Castle, PA. Her article "Our Journey Into the Middle," was published in the February Issue of The Pennsylvania Administrator Educational Leadership of PAESSP.

The article describes the Schools To Watch Process and its positive impact on their school culture and student achievement. A quote from the article; "The Neshannock Junior High being designated as a School To Watch is evidence that if you have the desire to improve your middle level programs, you do not have to look far to find resources to help you get there."

Neshannock Junior High School is a member of the Pennsylvania Association for Middle Level Education.

Do You Know?

The Association for Middle Level Education has joined with the National Association of Secondary School Principals, The National Forum to Accelerate Middle-Grades Reform, and Adolescent Success to declare March the official month to focus on students ages 10 to 15 and celebrate middle level education.

Now known as Middle Level Education Month (MLEM), the key messages for the celebration are

- The importance of parents being knowledgeable about young adolescents and being actively involved in their lives;
- The understanding that healthy bodies plus healthy minds equal healthy young adolescents;
- The realization that the education young adolescents experience during this formative period of life will, in large measure, determine the future for all citizens; and
- The knowledge that every young adolescent should have the opportunity to pursue his or her dreams and aspirations, and post-secondary education should be a possibility for all.

Now You Know!

Please consider submitting your MLEM ideas for publication in our fall issue!

Middle School Students' Conceptual Based Errors in Variables

Xiaobao Li, Merry Staulters, Mary Gozza-Cohen,
and Susan Patricia Schaming

Abstract

This study explored students' errors and misconceptions relating to variables in school mathematics by analyzing their errors in solving well-designed problems. In the concept problem, about half of students in both pre and post-tests (N pre= 456; N post=502) cannot correctly identify the variables. In the basic application problem, 78.5% of students in the pretest and 73.3% in the posttest failed to answer the problem correctly. Analyses of students' errors revealed that they had extreme difficulties in understanding variables as a generalized number both. Such conceptually based errors are hard to change, despite almost one full year of instruction. This study interpreted students' difficulties to fully understand variables as the result of failing to transition from *process-oriented* to *object-oriented* thinking. Such *process*-oriented thinking appears to be a barrier for students when solving basic application problems. Consequently, approaches to effectively help students complete such a transition require further investigation.

Introduction

Efforts to improve students' learning have continued through designing high quality curriculum or improving teaching quality. "Despite massive effort, relatively little is accomplished by remediation programs. No one—not educators, mathematicians, or researchers--knows how to reverse a consistent early pattern of low achievement and failure" (National Research Council [NRC], 1989, p. 13). This study explored in what manner and why students fail mathematics; subsequently it reports how and why students made mistakes in learning the concept of variable with the intent to reveal the general learning difficulties.

Concepts serve as prevailing tools for thinking, communicating, learning, and understanding of any subject; consequently, students' learning difficulties in mathematics may be attributed to problems with conceptual learning. As Resnick (1982, p. 136) noted, "difficulties in learning are often a result of failure to understand the concepts on which procedures are based." Carey (2000) also claimed that the major obstacle to students' learning is not necessarily due to their lack of exposure to the content; rather, students may not fully understand what they have been taught. Additionally, the misunderstanding or incomplete understanding of prior key concepts might lead to substantial difficulties in students' learning of new concepts.

The variable is thought to be one of the more difficult key concepts in algebra and is "a demonstrable gateway to later achievement" (National Mathematical Advisory Panel, 2008, p. 3). It is also viewed as an important concept by the National Governors Association Center for Best Practices [NGA Center]

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& Council of Chief State School Officers [CCSSO] as indicated in the Common Core State Standard 7.EE.B.4 for math content (NGA & CCSSO, 2010). This standard requires students, in part, to use variables to solve real-world problems and construct equations by reasoning about the quantities (2010). It is believed that students should be able to use variables to solve word problems that lead to similar equations described in the current study, such as $px + q = r$ where p, q, and r are specific rational numbers (2010); nonetheless, studies suggest that students continue to struggle with this type of mathematical reasoning.

Prior Research on Students' Understanding of Variables

Middle school students may understand the literal symbols of variables as *a particular number*, a *range of numbers*, or *a label* (Knuth, Alibali, McNeil, Weinberg, & Stephens, 2006). To examine students' understanding of variable as represented by letters, Knuth et al., asked students to explain which is larger, 3n or n+6? To answer this problem correctly, students were required to understand the variable as a range of values. They found that about 50% of grade six students and 75% grade seven students were able to achieve a sophisticated understanding of the variable as *a range of numbers,* rather than confusing it as a specific number. This result is very encouraging as compared to prior findings (cf. Kuchemann, 1978 also cited by the authors) who found that most children (age 13-15) misunderstood literal symbols as a label for objects. However, one problematic aspect of the Knuth, Alibali, McNeil, Weinberg, & Stephens (2006) study is that their question may have implied that the variables represent a quantity since students are asked to compare which item is larger.

Conversely, the researchers in the study for this manuscript purport that students are more likely to misunderstand the variables as "label" rather than "quantities". Students reading an algebraic equation may misunderstand "variable" as a "label" thinking that the symbol represents a noun within the problem. For example, students who are informed that Cory has seven dimes and Tanisha has three times the number of dimes as Cory, may assume the variable is dimes. To further explore how students' experiences affect their misunderstanding of variables as labels at middle school, McNeil, Uttal, Jarvin, and Sternberg (2009) randomly assigned middle school students to three different conditions to interpret an expression. They discovered that students were more likely to misunderstand the variables as labels if mnemonic letters were used (such as the use of "p" to denote the amount of pennies or "s" to denote the number of students) when compared to those who used non-mnemonic letters (such as the use of "x" to denote the amount of pennies or "y" to denote the number of students, or the use of Greek letters). Furthermore, the use of mnemonic letters in textbooks is fairly high (about 28% for cases of letter used). They concluded that the use of mnemonic letters may not be a good support, and in fact could potentially hinder students' understanding of variables. The students' prior experiences with mnemonics as shorthand, the distracting effects, or inaccurate presentation of mnemonic letters used by teachers interfered with their ability to understand variables within the problems. These findings had important implications on how variables should be taught and represented.

However, as the authors noted, a major limitation to their study was the evaluation of students' understanding primarily through asking them to interpret existing algebra expressions written by researchers of the study as Knuth, Alibali, McNeil, Weinberg, & Stephens (2006) did. Their research did promote understanding of how middle school students would perform on existing expressions, and whether there are other difficulties or errors associated with that process. The complexity and varieties of students' errors and misunderstanding might be better demonstrated when they were asked to generate their own equations. To be able to understand "variable" as a range of values does not mean that students achieved sophisticated understanding on variables. One hallmark of sophisticated understanding is that they are able to self-generate equations, which require students to have *Object-thinking.* In the following equations, the concepts of *Process* and *Object* and their roles in the learning process are reviewed.

Sophisticated Understanding of the Variable as *Object*

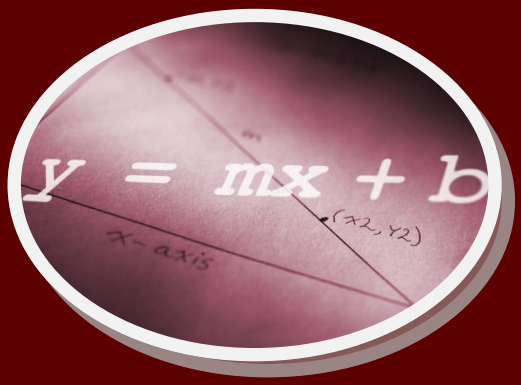
Sfard (1991) pointed out mathematics concepts could be conceived in two fundamental ways: structurally and operationally which respectively results in "objects" and "process." She distinguished these two conceptions in the following way:

> There is a deep ontological gap between operational and structural conceptions….
> Seeing a mathematical entity as an *object* means being capable of referring to it as if it was a real thing—a static structure, existing somewhere in space and time. It also means being able to recognize the idea "at a glance" and to manipulate it as a whole, without going into details…..

> In contrast, interpreting a notion as a *process* implies regarding it as a potential rather than actual entity, which comes into existence upon request in a sequence of actions. (p. 4)

Most mathematics concepts embody such duality. **The mathematics concept "number" is discussed in detail to show the meaning of *process* and *object*. When children study the concept of "number," they start from "counting" which is generally natural and relatively easy for them. "Number" over a long period of time was developed in the context of a measuring process. "Fraction" was thought of as the "ratio of two integers" to describe a measuring process, thus it is often harder for students** to comprehend. For example, "Fraction" was thought of as the "ratio of two integers" to describe a measuring process and is hard for students to comprehend according to Capenter, Corbitt, Kepner, Lindquist, & Reys (1980). In their study, the researchers found that 50% of 13-year-old students in their study were unable to represent a division problem with a fraction. For them, a fraction such as 7/4 was not an acceptable final result but a computation process. To understand the fraction as an *Object* means students are able to understand the fraction as numbers representing a quantity and a point on the number line.

The concept of "negative" embodies well the meaning of *Process* and *Object*. The concepts of "negative number" were the products of solving equations. Jourdain (1956, p. 27 as also cited by Sfard, 1991) stated that " Let a-b be c. To get c from a we carry out the operation of taking away b. This operation, which is the fulfillment of the order: "Subtract b" is a 'negative number'." Clearly, negative number is a type of computational process known first as "subtract b". Later on, negative number becomes a number that can represent a quantity (such as the temperature below zero).



The function is another good example to show the meaning of *P*rocess and *O*bject. Kieran (1992), thought "The early concept of function as an input-output procedural notion" (p. 391). As a result, if students only recognized a function as a way of computation to get output from input, then they only understand it as a *process*. To be able to understand the function as *Object* means to understand a function as a set of ordered pairs. They should be able to operate on or with functions such as the composition of functions or derivative of functions. According to Sfard (1991), if students can use a graph correctly to represent a function or to identify linear or nonlinear functions, it indicated that they also understood function as an *object*, or at least, these students had *object*-oriented thinking of mathematics concepts.

As a result, Sfard & Linchevski (1994) maintained that students need to make the transition from *process* to *object* in order to reach an advanced understanding of concepts. This is considered a fundamental change in understanding of intended concepts, which consequently presents particular learning difficulties in this transition process for many students. Weinberg (2005), in reference to algebra, maintained that to understand variable as a *process* usually means to be able to substitute it with a specific value. For example, students tend to refer to a specific number when they use variables to represent a relationship. To understand a variable as an *object* is to understand it as a generalized number. Another measure of students' understanding of variable as *object* is to see whether students can operate on or with variables. That is, if students can understand the variable as an *object*, they should be able to operate on or with it. The variable becomes the object of reflection or operation at a higher level by students. Students who understand variable as a *process* are usually unable to operate with or on variables.

Purpose of the Study

This study investigated students' pre and posttest errors in identifying a variable within a real world problem and in writing equations for another real-world problem. Students' errors were classified into different types and analyzed regarding how these errors have changed over one year of instruction. The purpose of the study is to illustrate that students' learning of a concept such as variable may be complicated, and require substantial supports to develop. Two questions are investigated in this study:

1. What are students' error patterns in solving problems related to variable during a pretest and posttest of algebra knowledge?

2. How do students change their understanding of variable after one year instruction?

Method

The data for this study were from a funded project: Improving Mathematics Teacher Practice and Students Learning through Professional Development (IMTPSL), which was a five-year longitudinal study. Researchers at two large public universities, one is in the state of Delaware and another in the state of Texas, working in partnership with Project 2061 of the American Asso-

ciation for the Advancement of Science (AAAS), investigated the interactions of teaching practices, selected curriculum materials, and professional development to understand the ways they to optimize and to improve student learning (DeBoer, et al., 2004). Key lessons were carefully selected and videotaped by the project researchers. Pretests and posttests were administered during three cohort school years (2003-04, 2004-05, and 2005-06). Although the original study incorporated both qualitative and quantitative approaches, this study focused primarily on the quantitative analysis of students' errors and misconceptions by comparing their pretest to posttest performance on word problems requiring algebraic logic.

Participants

Participants were drawn from 12 middle schools in six different school districts in Texas and Delaware. The states of Delaware and Texas were utilized because grant contributors were from these states and both states utilized similar curricula for teaching middle school mathematics.

Student participants. Student participants completed the pretest in fall 2004 (N = 456) and the posttest in spring 2005 (N = 502). A total of 317 (171 grade seven and 146 grade eight) students participated in both the pre and posttests. Both the teachers and students had a choice to participate in the project or not. As a result, the sample was based on the convenience principle. The total number of participants completing the posttest increased when new students joined the study.

Teacher participants. These grades seven and eight students were taught by the 18 teachers who participated in the study. Nine of the 18 held masters' degrees and nine had a minimum of six years of teaching experience. The teachers had a variety of professional development experiences and their hours in professional development in math and professional development related to the use of their math textbooks ranged from zero to 200. Teachers reported using varying teaching approaches, representations, and strategies (Ross, 2006; Ross & Willson, 2012). Additional background information can be found in Table 1.

Test Items

Pre and posttests with same leveled problems were administered to each cohort across five school years with the pretest administered in the fall and posttest in spring. The items on the algebra tests were developed by researchers of the project IMTPSL. The pre and post algebra tests consisted of seven multiple-choice items and nine short-response items. The test content was aligned with the Principles and Standards for School Mathematics (NCTM, 2000) guidelines for objectives of middle school algebra. Although the specific problems on the pre and posttests varied, all items were carefully developed through piloting and field-testing by the original project researchers. Three mathematical constructs, including change (function), variable, and equation were used in the development of questions and how each item was related to these three target constructs was specified. We focus on two of the original test items taken from each, the pre and posttests.

The reliability and effectiveness of test items. The researchers of the IMTPSL project employed a Confirmatory Factor Analysis method to evaluate whether the chosen algebra items adequately assessed the three concepts: change (function), variables, and equality and equations. The evaluators were strictly trained by AAAS researchers and their scoring reliability was tested by AAAS. According to project researchers, the test items adequately measure the constructs (Capraro, et al, 2004).

(Continued on page 21)

Figure 1: *Task one and two*

Write an equation to compare Tachi's age to Bill's age

Task One: Maria sells k donuts. Jinko sells five times as many donuts as Maria.

They sell the donuts for 25 cents each.

The number of donuts Maria sells is a variable.

Name another variable in the problem_____

Name something in the problem that is NOT a variable

Task Two: Tachi is exactly one year older than Bill.

Let T stand for Tachi's age and B stand for Bill's age

Write an equation to compare Tachi's age to Bill's age

Table 1:
Teachers' Background Information

Teacher	Curriculum	Teaching Grade	Highest Degree	Certification	# yrs. teaching	# yrs. at Grade Level	# hrs. PD* Textbook	# hrs. PD General Math.	# hrs. PD General Education
1	MiC	8	M	MS	6-10	6-10	51-100	0-50	51-100
2	CMP	7/8	N/A	N/A	6-10	6-10	151-200	0-50	>200
3	CMP	7	M	MS	6-10	6-10	0	151-200	151-200
4	MiC	7	B	MS	0-5	0-5	0-50	0-50	0-50
5	Glencoe	8	B	Math	6-10	6-10	0	>200	101-150
6	MiC	7	M	Math	6-10	0-5	>200	0-50	>200
7	CMP	7/8	M	MS	6-10	6-10	151-200	0-50	51-100
8	MTh	7/8	B	Math	11-15	0-5	0	>200	151-200
9	MiC	7	M	Math	6-10	6-10	51-100	0-50	51-100
10	CMP	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Glencoe	7	B	N/A	0-5	0-5	0-50	51-100	51-100
12	MiC	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	MiC	7	M	Math	11-15	11-15	101-150	0-50	>200
14	CMP	8	M	Math	11-15	11-15	101-150	0-50	0-50
15	CMP	8/7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	MiC	7	M	Other	0-5	0-5	101-150	0-50	0-50
17	CMP	7/8	M	Math	11-15	11-15	0-50	0-50	0-50
18	MiC	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note. MiC: *Mathematics in Context*; CMP: *Connected Math*; Glencoe: *Mathematics: Applications and Connections.*

M: Master Degree; B: Bachelor Degree.

Table 2
Students' error types in task 1

Types of Errors	Pretest (N = 456)			Posttest (N = 502)		Percentage Changes*
	Frequency	Percentage		Frequency	Percentage	
Five times as many as Maria	27	5.95%		24	4.78%	-1.17%
Jinko's donuts, donuts	18	3.94%		18	3.46%	+.48%
Jinko sells five times as many as Maria	37	8.11%		38	7.57%	+.54%
25 cents, price, constant number	44	9.46%		73	14.54%	+5.08%
Others /don't know	15	3.29%		15	2.98%	-.31%
No response	81	17.77%		77	15.34%	-2.43%
Total incorrect answers	222	48.68%		245	48.67%	-.01%

Note: Percentage change is calculated by using Percentage in posttests- percentage in pretests. The negative indicated this type of errors decreased and positive showed this type of errors increased from the pretests to posttests.

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(Continued from page 18)

Test items for this study. Two tasks from the MSMP pre and posttests were (shown in Fig. 1) selected for this study and were used to examine students' understanding of and application of the concept of variables. In Task one students were asked to name a variable from a word problem and to identify something that was not a variable. Task two required that students determine a relationship between elements within the problem and write an equation to represent that relationship.

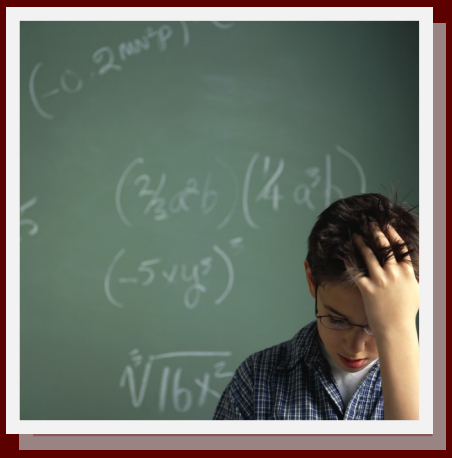
***Task one*.** Students were asked to identify a second variable within the problem after an example of a variable was provided. Because students in this study were simply asked to identify the variable the task was rated as "low" difficultly level by the project assessment specialists. Task one required basic skills/knowledge to complete so students needed only to understand the variable as a placeholder, rather than as specific numbers or as a label for something.

Task two. Task two was similar to the well-known *professor-students-problem* (Clement, 1982) for which many college students had difficulties using algebraic expression to represent a relationship in a problem. Using the problem, "A university has six times as many students as professors. If S is the number of students at the university and P is the number of professors at the university, then write an equation expressing a relationship between S and P. Clement found that 37 percent of first-year college engineering majors and 57 percent of social science students answered by 6S=P rather than S=6P. Such reverse errors may result from misunderstanding variables as labels, that is, some students literately misunderstand *S* as *students* and *P* as *professor*.

To resolve task two in this study, an additive relationship between elements was involved. Therefore, this problem was deemed easier than *professor-students-problems* in which multiplicative relationship is involved. Task two asked students to write an algebraic equation to compare Bill and Tachi's ages. As in the *professor-students-problem*, students using syntax translations may produce the reverse error, T+1=B. The deeper reason for such errors is related to students' misunderstanding of equation and variables (Clement, 1982). MacGregor and Stacey (1993) hold a similar position that students' errors were more likely related to semantic, rather than syntax translations. In their study, MacGregor and Stacey required students to write an equation by themselves, which caused particular difficulties for students who were not good at operating on generalized numbers. That is, to answer this question correctly, students needed to understand the variable as a single entity-*an object*. MacGregor and Stacey purport students should have been able to operate on or with the variables as they did with numbers.

Data Coding and Analysis of Errors

To analyze students' errors and misconceptions, a rubric with types of students' errors (Appendix A) was developed. One hundred students' answers were randomly selected from the pretest and were recorded and classified. The rubric was constructed from the analysis of students' answers on the pretest. Evaluators were trained to score students' responses using the results of this analysis. The rubric was then developed according to the error types found. An inter-rater reliability check was conducted when another graduate student independently selected one hundred students' test sheets and created a rubric by using the same procedure described above. Finally, the two rubrics were compared for consistency. With the exception of



a few problems, most types of students' errors were consistently classified. To resolve any inconsistent results, coders achieved agreement through discourse.

Results

To better comprehend students' error patterns when solving problems related to variable, the researchers examined the pretest and posttest performance on two tasks of algebra knowledge. Problem correctness, as well as the type of errors made, was analyzed on both pre and post measures to help determine changes in students' understanding after one year of teaching. The results were reported by questions.

What Are Students' Error Patterns in Solving Problems Related to Variable during a Pretest and Posttest of Algebra Knowledge?

Student errors in task one. In the task one, students were asked to identify and write another variable from the problem after one had been modeled. Students' error type and frequency are reported in Table 2. In this study, 48.68% of students in the pretest and 48.67% in the posttest answered either incorrectly or with no response. The

most frequent error was to identify a constant number as a variable (9.46% in pretest and 14.54% in posttest) which is similar to the pattern seen in Task two, whereby students tended to assign specific numbers to variables. Some students (3.94% in pretest and 3.46% in the posttest) also misunderstood the variable as a "label," such as donuts.

It is interesting to discover that about 5% more students made one type of error (to identify constant number as variable) in the posttests. These mistakes revealed that students had an incomplete understanding of variables. However, to be able to identify the constant number as variable indicates that students, unconsciously recognized variables should be an *object* like a number. In contrast, about 2% more students (14% in the pretests vs 12% in the posttests) wrongly identified the variables as "five times as many as Maria" or "Jinko sells five times as many Maria". This mistake indicates these students were not able to understand the variable as an *Object*.

Student errors in task two. Task two was used to assess students' abilities to translate a word problem into a symbolic algebra expression. It is generally assumed that this ability largely depends upon students' recognition of the relationship expressed in everyday language form. The classification of students' errors is represented in Table 3. Student errors on task two suggest a possible misunderstanding of variables and equations.

This problem clearly required students to write an equation to compare Tachi's age to Bill's age. In table three, students' error types 1, 2, and 3 reflect students' misunderstanding of the equation form. In the pretest, about 14% of students (sum of errors 1, 2, and 3) did not know what an equation looked like. These students used algebra expressions (7%), inequalities (2%) or everyday language (4.8%) to stand for an equation expressing the relationship between Tachi's age and Bill's age. The situation improved in the posttest as only about 7% of students (sum of errors 1, 2, and 3) did not use equations to express the relationship. The percentage of type four errors, students using reversed equations, in pre and posttests in-

Table 3

Error types related to understanding of variable and equation

Error Type	Pretest (N= 456)			Posttest (N=506)		Percentage
	Frequency	Percent		Frequency	Percent	Change
1.Using expressions	35	7%		23	4.6%	-2.4%
2.Using inequalities	11	2%		6	1.2%	-.8%
3.Using everyday language	22	4.8%		7	1.4%	-3%
4.Reversed equations	54	11.8%		220	43.8%	-32%
5. Other wrong equations	136	29.8%		85	16.9%	-12.9%
6. No response	76	16.7%		42	8.36%	-8.34%
7. Total incorrect percent	334	73.24%		383	76.29%	3.5%

creased from 11.84% to 43.82% which reveals students made good progress in understanding variables as an *object* since they are able to operate on and with variables by writing their relationship as an equation.

The category "others" includes the following: using everyday language, algebra expressions without simplifying T-B, or T-1 into TB or T-1. If the students wrote an algebra expression, yet wrongly simplified it into the form of T1, it was coded as "simplify algebra express as T1." "Others" also includes responses that were not classified into any categories. For example, some students' answers were B+B=B or L=1xB. It is not feasible to code them in terms of cognitive obstacles.

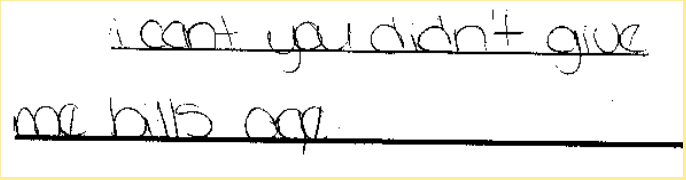
How Do Students Change Their Understanding of Variable after One Year Instruction?

Results indicated there was little to no improvement from pre to posttest regarding the percentage of change of each type of error. The overall change in percentage of errors is .01%. Teachers' knowledge and level of experiences were not considered as influential to these results because the majority of teachers held certification in mathematics and bachelor or master level degrees in education. The results presented here may indicate that students' errors in variables were highly resistant to change. Particularly, there is little to no improvement from the pre to posttest in the following errors:

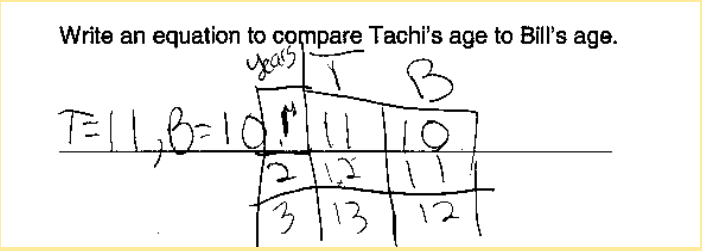
Students assign specific values to variables or use specific values to substitute for variables. Their responses showed that they clearly understood the relationship between Tachi's age and Bill's age, that is, Tachi is one year older than Bill. For example, they wrote Tachi's age as 14 and Bill's age as 13. However, those students had difficulty operating on or with letters. It seems that students had an "obstacle" which they did not know how to pass, so they reverted to an old strategy (numbers) to tackle the new situation. In this problem, students needed to represent unknown numbers by using variable and algebra expressions. For them, the arithmetic approach was a natural one because they had worked with numeric values for a long time. Thus, as is illustrated in Table 3, a faulty algorithm was invented by students: using a specific value to substitute for the variable. Those students could not understand or accept a letter used as a place holder.

Figure 2. *Student Response Related to Errors Using Specific Values*

Student 1



Student 2



The response from student one (see Fig. 2) provided some clues about why these students used specific values, although the use of T and B to represent ages was clearly emphasized in this question. Student five said she/he could not work on this problem because she/he did not know Bill's age. For this student, it seems that the variable has no meaning if it had not been assigned or related to some specific numbers.

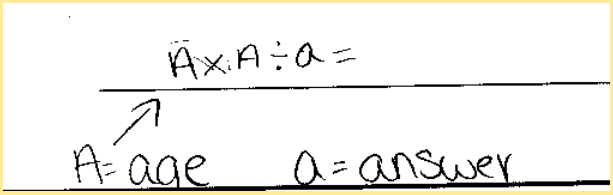
Table 4

Students' error related to specific value

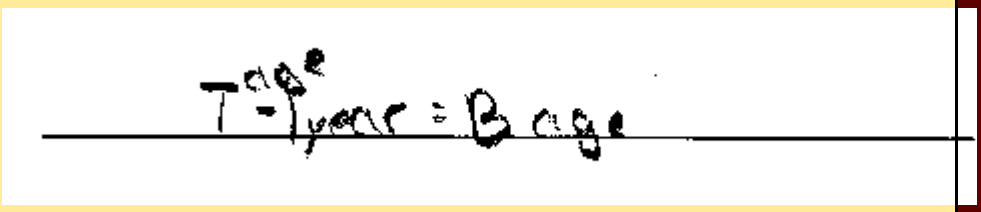
Student	Answer
1	B= 13, T= 14
2	T= 6, B = 5, T=B * 6=s
3	T=2, B=1
4	T=11, B=10 T B 1 11 10 2 12 11 3 13 12

Figure 3. *Student's misunderstanding variables as labels*

Student 3:



Student 4:



Students misunderstand variables as labels. Some students were believed to misunderstand letters as labels. Students' reversed errors in the famous Students-and-Professor Problems (Clement, Lochhead, & Monk, 1982) were interpreted as revealing students' naïve conceptions. In that problem, students used "*p*" to represent professors rather than the number of professors. However, this conclusion is mainly based on the assumption that if college students clearly understand the meaning of "*p*" and "*s,*" the number of students with reversed errors should not be so high. In this study, except for the reversed errors made by students on the pretest and posttest, some students' errors in misunderstanding of variables as "labels" are more clearly and directly illustrated in Figure 3. Here Student 3 used "A" to represent age instead of T and B. She/he tried to use two A's to represent both Tachi's and Bill's age. His use of "A" as a representation of "answer" more clearly showed that this student only understood a "letter" as a label. Student two added the units behind each letter. This representation reflects that this student misunderstood "T" as "Tachi" and "B" as "Bill." As a result, "T age" means "Tachi's age" while "B age" means "Bill's age." Other students' responses in Table four support this judgment.

Students' errors of "variables as labels" are believed to be related to students' prior experiences such as using "f" to represent "foot" and "p" to represent "pound." In the current study, the reversed errors (that is, students write the equation as T+1= B or B-1=T or T=B -1 rather than the correct answer T=B+1 or T-1=B) are still the most frequent errors found in both pre and posttests. Moreover, the reversed errors increased greatly in the posttest. Comparatively, Rosnick (1981) conducted a study using the same problem but a different design by asking students to choose correct answers for the question "what does the letter *p* stand for?" (p. 314). Over 40% of the 152 students in the study did not pick the correct answer, "the number of professors." In Rosnick's study, students' responses to Q15 "Maria's and Jinko's donut sales," which asked students to name a variable, also support this finding. In that problem, 50% of the students did not answer correctly with "the number of donut sales" or other correct answers.

Students' wrong answers varied widely in this problem which made analysis more complicated. It was difficult to explain every error and identify the misconceptions for each one. The most often used errors were coded and examined using the rubric. Students' most frequent errors were reverse errors, which is consistent with previous studies (Clement, Lochhead, & Monk, 1981). Aside from reverse errors, the current study also uncovered other students' errors to directly support the claim that some students misunderstood variables as "labels" or "specific numbers."

Error type four reflects that students already knew the equation form, though some still made mistakes. For example, some students wrote a reversed equation. The correct answers to this question include, T=B+1, T-1=B, or T-B=1. These all indicate that Tachi's age is one year older than Bill's. Students' reverse errors means that they wrote the equations as T=B-1, T+1=B, or B-T=1. These equations all indicated that Bill's age is one year older than Tachi's.

As indicated in Table 3, except for the reversed errors, the most frequent errors in both pre and posttest were errors 1, 2, 3, and 5: students referring to variables as specific numbers, using variables as labels, "simplifying" an algebra expression into a "combination form" like T1 or using special letters. What follows are some students' typical responses and the analysis of possible misconceptions.

Discussion

The Transition from *Process* to *Object* Thinking

The current study reveals that students have extremely difficulty understanding fundamental algebra concepts. The errors that they made from pretest to posttest are stable and resistant to change, which revealed the typical features of conceptual based errors, which is contrasted to computation or careless related errors. This complexity was partially demonstrated by different

wrong answers. Different wrong answers totaled approximately 180 (N=456, total) in the pretest and 110 (N=506) in the posttest for this problem. Duly noted, some of incorrect answers are not comprehensible to researcher and hard to be classified.

Students' errors and difficulty in understanding variables are highly related to how they have been taught and the textbooks that they used. For students in this study, four different textbook series were used. They were *Connected Math, Mathematics in Context, Middle Grades MathThematics, and Mathematics: Applications and Connections*. While the first three textbook series have been ranked as the first, the second, and the fourth out of 12 different published series in terms of quality in instruction, the fourth text was rated as unsatisfactory (American Association for the Advancement of Science [AAAS], 1999).

Students in grades 7 and 8 are still in the transition process from arithmetic to algebraic thinking. One typical difficulty is to use a letter to represent "generalized numbers" and operate on and with these letters. It seems they are not sure what the result of the operation of variables should be. For example, one student used "one" rather than "1" in his equation, that is, T-B = One. This student might assume that the result of an operation on letters should also be letters. To write an equation for a real situation, students must reach the level that they are able to represent quantities by using letters and to operate on these letters. It is not easy for students who have been long working with and good at using specific numbers to make this transition.

The key to improve the understanding of variable for students might be the transition from *process* to *object* thinking, which is consistent with historical development of most con-

cepts. That is, students should not always refer to specific values or concrete material to solve such problems. For the learning of variable, they need to consider a variable as a "place holder," rather than a specific value or substituted by specific values. Without such a transition, students are likely to make many errors such as: simplifying an algebra expression like T+1 to T1.

Teachers should be aware that such a transition is an ontological change from arithmetic to algebraic thinking. In the historical development of mathematics, the use and introduction of variable spans more than one thousand years. It is certainly not enough for teachers just to teach students the definition of variables, as the transition from process-thinking to object-thinking is the source of students' errors and difficulties. Succinctly, more effective interventions should be used to help students facilitate such transitions.

The Importance of Initial Teaching and Learning

Some errors made by students did not change even after one year of instruction as demonstrated by the comparison of students' pre and posttests in this study. The researchers interpreted this phenomenon partly as entrenched misconceptions being reinforced in students' ongoing studies. Therefore, it is important for students to gain correct understanding of concepts at the outset. "The best time to learn mathematics is when it is first taught; the best way to teach mathematics is to teach it well the first time" (National Research Council [NRC], 1989, p. 13). Based on the results of this study, the researchers claim as to whether it is recycling curricula characterized by increasing complexity, yet repeating the same contents are beneficial for students' learning of mathematics. East Asian countries in which students typically outperform United States students in math do not present mathematics contents in such a way (e.g., Li & Ding, 2008; Ding & Li, 2010). Continued study of how East Asian

Table 5

More examples of students' misunderstanding a variable as a "label"

Student	Answer
3	T is 365 days old than B
4	T is 1 year ahead of B
5	T= exactly one year older than B
6	T + B = Tachi + Bill
7	B = T + 1Y B= Bill's age, T = Tachil's age, Y= Years

teachers promote transition from *process* to *object* thinking in the early grades may aid United States teachers' presentation of basic concept related material.

Limitations and Future Studies

One of the limitations of this study was the lack of qualitative interview data which are useful for providing insight about the misconceptions students have. In addition, future studies need to focus on instructional interventions for determining how to change students' misconceptions, while facilitating their ability to complete the transition from *process* to *object thinking*. The transition from *process* to *object* is necessary for constructing sound understanding, yet little is understood as to why some students find it easier to make such transitions while it is particularly challenging for other students.

Another limitation of this study is the lack of data on how and what students learned and how they were taught about these fundamental concepts. Data identifying how the curricula were used and what strategies were instructed were not analyzed. Future studies may be conducted with consideration for how student learning of these concepts is influenced by the way they are introduced, developed, and applied into real world contexts.

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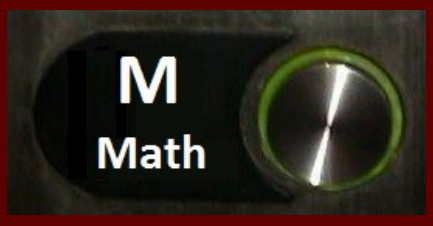

Appendix A: Rubrics for classifying students' errors

Items	code	Types of errors	Comments	Typical Answers
1		Five times as many as	Students view "5 times" as a variable	X 5, five times as many
		Donuts, Jinko's donuts	Students view "donuts" as a variable	Donuts
		Jinko sells five times as	Students view the term "Jinko sells " something as a variable	Jinko sells five times as
		Price, 25 cents or constant numbers	Students write "price" a known number "25 cents" as variable	25 cents, Price
		Others / I do not know	Students do not understand this problem	I do not know what "variable" means
		No response	Students have no response	
2		Refer to specific values	Students using specific numbers	B=13, T=14
		Variables as labels	Letters are used to represent objects	T is 1 year ahead of B
		Simplifying algebra express such as T+1 as T1	Add T+1 as T1	T+1=T1
		Using "=" as association	Misunderstanding "=" as is	T-B=answer
		Using special letters	Students did not use provided letters B and T	X=X, you don't have any data to compare
		T/B=1 or T over B	Not to use addition / subtraction but use division/multiplication	T/B=1
		Reversed equations	The equation showed that Tachi is one year younger than Bill, which is opposite to the problem.	T+1=B Or T=B-1
		no response	Leave it as empty	
	10	Others *		

(Continued from page 26)

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Spotlight on Best Practices

Advisory Programs

Breaking Ranks in the Middle calls for middle level schools to "implement a comprehensive advisory or other program that ensures that each student has frequent and meaningful opportunities to meet with an adult to plan and assess the student's academic, personal, and social development" and *This We Believe* speaks of the need for an "adult advocate for every student."

Advisory is not

- Having students meet with an advisor to discuss report card results.
- Assigning students to work on assignments during advisory time.

Advisory

- promotes opportunities for social development;
- assists student[s] with academic problems;
- facilitates positive involvement between teachers and administrators and students;
- provides an adult advocate for each student in the school;
- promotes positive school climate
- Is fun!

Documented Results

- increased student achievement,
- promoted student-teacher relationships,
- addressed general self-esteem and confidence beliefs,
- linked parents with the school,
- mediated between academic and social concerns

Source:

Stawick, J. (2011). The effects of an advisory program on middle-level student learning. *College of Education Theses and Dissertation*. Paper 43. http://via.library.depaul.edu/soe_etd/43

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Increasing Parent-Teacher Communication to Improve School Attendance for a Student with a Learning Disability: A Case Study

Bethany M. McConnell

Abstract

Daily school attendance is critical for students to earn a high school diploma. Regular school attendance and graduation are well-established predictors of student success. Students in special education are at greater risk for school non-attendance for various reasons. Therefore, it is especially important to assure that students with identified disabilities are monitored throughout their school careers to assure regular attendance and avoid high rates of dropout and negative post high school outcomes for students with disabilities. The present case study measures school attendance of a student at the middle level, with an identified learning disability, based on increased communication between his teacher and parent. The results suggest ways to improve attendance and communication between teachers and families of students with disabilities at the middle level.

Introduction

Regular attendance is necessary for students to succeed in American schools. Unfortunately, on most days, 10% of public school students are absent from school and for students in urban areas, absenteeism is as high as 30% (Corville-Smith, Ryan, Adams, & Dalicandro, 1998). Patterns of longstanding non-attendance or absenteeism usually leads to school dropout (Hibbett & Fogelman 1990; Hibbett, Fogelman, & Manor, 1990; Kogan, Luo, Murry, & Brody 2005; Tramontina et al., 2001). Students with identified disabilities also are at high risk for low rates of attendance (Mattison, 2004; Redmond & Hosp, 2008) and higher dropout rates (Zigmond & Thorton, 1985). Both absent students and students who drop out have been linked to many self-destructive behaviors ranging from vandalism to criminal violence (Chou, Ho, Chen, & Chen, 2006; Denny, Clark, & Watson 2003; Guttmacher, Weitzman, Kapadi, & Weinberg, 2002; Hallfors, Cho, Brodish, Flewelling, & Khatapoush, 2006; Henry & Huizinga, 2007).

Trends of school non-attendance start as early as middle school and can be linked to school dropout. Statistical analyses of over 1,000 students showed a strong correlation between several behavior patterns (e.g., low rates of attendance, high behavioral referrals, low credit completion) in sixth grade and succeeding dropouts (Balfanz, Herzog, & MacIver, 2007; Roderick, 1994). An identified concern of parents with children transitioning into middle school is the decrease in communication between parents and teachers. Over half of the parents of chronic non-attendees surveyed reported they were unaware of their children's absences (Kearney & Bates, 2005; Klerman, Weitzman, Alpert, Lamb, Kayne, Roth-Gerominini, & Rose et al., 1987).

According to the National Educational Longitudinal Study (NELS) of special education students, 44% of students with identified disabilities dropped out of high school rather than receiving a high school diploma or any certification of school completion (Rossi, Herting, Wolman, & Quinn, 1997). This percentage did not include students who left school because they were too old to receive education services. Students with cognitive and/or behavior disabilities may have difficulties working with their peers, thus have an outlet of avoiding peers by not going to school. These students also have more difficulty bonding with their teachers and find school less rewarding (Barth, 1984). Therefore, an attendance pattern of students with identified disabilities needs to be addressed so that appropriate actions can be taken.

The cause of students' non-attendance is multifaceted. Kearney (2008) suggested there are different categories of absenteeism, and thus, students are absent for many reasons. To help educators study absenteeism, Kearney operationally defined a number of categories of non-attendees based on a foundation

of research. One reason for school absenteeism is school phobia, or when students avoid school because of a fear of a specific stimulus (e.g., class bully, school bells; Tyrell, 2005). A second reason for school refusal is a form of anxiety that includes general emotional distress or worry while in school (Suveg, Aschenbrand, & Kendall, 2005). Another reason for separation anxiety or undue stress associated with removal from primary caregivers (Hanna, Fischer, & Fluent, 2006). The final reason for absenteeism is school refusal behavior or when a student avoids school for a part of, or for an entire day, whether anxiety-related or not (Kearney & Silverman, 1996).

Among the descriptions of why students do not attend school as listed above, schools frame attendance around excused or unexcused absences. All schools have a defined outline of their attendance policies that vary from district to district. As an example of parameters of absences, a public high school in Washington (Hartnett, 2008) provides a guideline similar to most secondary schools nationwide. Excused absences are defined as expected or unexpected absences relating to personal or family health related occurrences (e.g., sickness, death in the family, hospitalization, etc.). Parents need to obtain a school's permission for planned absences (e.g., doctor's appointment, family trip) for a school to recognize the absence as excused. Unexcused absences include any issues related to getting late to school due to transportation difficulties, family duties (e.g., babysitting), or job requirements. Additionally, in this example anytime a parent does not provide a note to the school providing an acceptable identification of an excused absence as identified by the school within three days the absence will be addressed as an unexcused absence.

When students do not report to school several problems arise, specifically hours of non-attendance accumulate and students miss out on academic instruction, but families may also receive a fine for not enforcing their child's school attendance (Reid, 2000). Although penalties have been implemented in the past, federal mandates also require collection of average daily attendance by all schools in order to measure Adequate Yearly Progress. Additionally, all school districts have implemented school truancy plans to address attendance (No Child Left Behind Act, 2002). Schools vary in their plans for informing parents about student attendance from daily automated phone calls to parents, to systematic routines of teachers contacting the parents (Conley & Enomoto, 2009).

Schools vary in their plans for informing parents about student attendance from daily automated phone calls parents, to systematic routines of teachers contacting the parents (Conley & Enomoto, 2009).

Problems may persist with some students because parents of chronic non-attendees report they are unaware of their child's attendance patterns (Kearney & Bates, 2005; Klerman et al., 1987). More specifically, parents of middle and high school students interviewed from the NELS survey attributed their lack of knowledge of student behavior, progress, and achievement to the dramatic decrease in communication with their student's school teachers and faculty as the students got older (Ryan et al., 1994). Additionally, teachers reported that they did not know the schools' expectations regarding attendance and/or they choose not to make parent contact because of their frustration with inconsistent patterns of how truancy is handled (Conley & Endomoto, 2009).

Within most frameworks studies have tried to disaggregate results among gender, minority, and socioeconomic status. Special education students are a sub-group that has received little attention related to interventions that center on improving attendance. Recently schools have been required to calculate disaggregate attendance rates of students with Individualized Education Plans (IEPs). The attendance rate expectation in the state of Pennsylvania including excused and unexcused absences is 90% attendance and an 80% graduation rate (PA Dept. of Education Attendance Report, 2010). Consistently, in Pennsylvania students with IEPs are below attendance rates of their peers, and in many schools across the nation, students with IEPs are not meeting the passing rate of attendance and graduation as their same-aged peers (PA Dept. of Education Attendance Report). Just as students with IEPs need explicit teaching of skills, they also need supportive accommodations to promote daily attendance. Because parents are viewed as a positive influence on school attendance (Corville-Smith et al., 1998) it is important to see if teacher communication is a strategy of contact for getting students with identified disabilities to maintain a rate of consistent school attendance. Therefore, the following case study asked if increased communication between parents and teachers regarding a student's school attendance would also increase the attendance of a student with an IEP?

(Continued on page 33)

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(Continued from page 31)

Method

Participant and Setting

The study took place in a semi-rural town in Pennsylvania. The district was comprised of approximately 1,975 students. Data collection took place in the middle school that housed 7th and 8th grade students. Special education teachers had mandatory highly qualified status, as defined by the state. The names given in the description are pseudonyms to protect confidentiality.

The student participant was a 7th grade male named Peter. He was diagnosed as having a learning disability while in the elementary school. Though he has had difficulty with schoolwork he had maintained a low B average in his classes. His mother, Amelia reported to his special education teacher that elementary school was very stressful for him, but attendance was never an issue. However, his attendance rate decreased when he transitioned into middle school.

The parent participant was supportive of working with the teacher. Amelia gave her cell phone number, and listed several times she would be available to talk with the teacher. The teacher participant was a third year special education teacher within the district. The teacher team-taught English, History, and Basic Science in 7th grade. She earned highly qualified status in all subject areas by taking the state's subject area assessments. While responsible for 28 students' IEPs, she met with these students each quarter to monitor their progress.

Materials

The materials included by the experimenter were the communication log and three separate scripts for the teacher to use when calling the parent (see Appendix A). The detailed scripts were for notification of student absence and positive report of student's high rate of attendance. The communication log was used to record any responses from the mother.

Dependent Variable

Because the intervention started on a Wednesday, the measurement period was calculated into five-day intervals. Peter's attendance rate was measured by percentage of time present over the total five-day school week. For example, if Peter came to school late one day in a five-day period, he was present for 4.5 days. This translates into an attendance rate of 90%. If Peter was not present, regardless of excused or unexcused absence, he was considered absent.

Independent Variable

The teacher made informative parent phone calls when Peter was absent. These calls occurred each time Peter was marked absent in the computerized attendance system. The teacher simply called the parent and notified Peter's mother that Peter was reported absent. Positive parent phone calls also occurred each time Peter had been present for a period of 10 consecutive days. For these phone calls the teacher praised the mother for her efforts in getting Peter to school each day. The teacher would use the appropriate script depending on the attendance rate of the student. Then the teacher would document the mother's responses on the provided communication log.

Procedure

The principal of a semi-rural middle school in Pennsylvania was asked to create percentages of attendance rates of all seventh grade students with IEPs in the school. Students in seventh grade were selected for intervention based on the high correlations of outcomes established in their sixth grade year (Roderick, 1994). Out of the list of 30 students in Special Education eight students met criteria of an attendance rate of 85% or lower. One mother gave permission to participate in the research. Her son, Peter, had an 82% rate of attendance during the four weeks of baseline. The experimenter met with the school nurse to make sure that Peter's low rate of attendance was not due to a disability.

Next, the experimenter informed the special education teacher of the study and collected informed consent for her participation. The teacher provided the experimenter with the student's attendance records. The experimenter then held a training session for the teacher. The experimenter went over the scripts with the teacher and outlined each type of script the teacher would use to communicate with the parent. The teacher was also provided with a log to write notes to summarize the parent conversation.

When the teacher and experimenter met they identified when parent phone calls would be made. The parent would be called each time the student was absent from class. In the mother's consent form she provided appropriate times and phone numbers to call. When Peter was present for 10 days the teacher would give a positive phone call (i.e., the teachers would call to praise the mother for her efforts in getting her son to school).

Each morning the teacher checked the attendance system to see if Peter was in school. If Peter was not in school, then she called Peter's mother to report his absence. The teacher would record Peter's mother's response. Each time Peter was absent the teacher also notified the experimenter so she could record the data. When 10 days of full attendance was reported, the teacher called Peter's mother for a positive phone call.

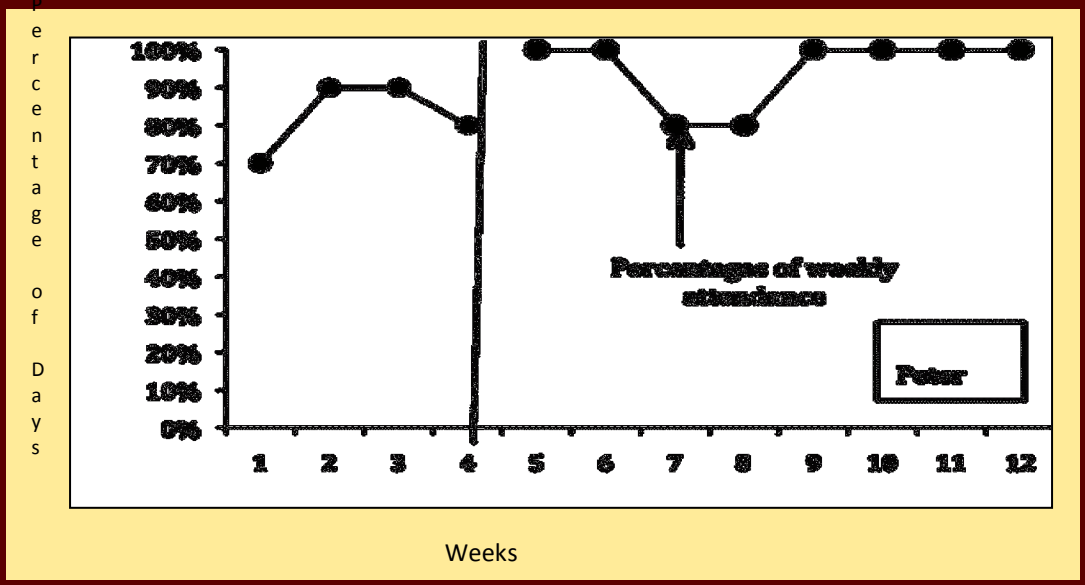

Figure 1. The percentage of days present each week at school.

Data Collection

Baseline data, which included the attendance rate of Peter, was collected for a four-week period prior to the intervention. During the intervention, the teacher retrieved an attendance report each day from the schools computer automated system. Every three days the teacher e-mailed the attendance data to the experimenter. By observing the data the research team contacted the teacher each time the student was present for 10 days to remind her to call the mother to make positive contact.

Inter-observer Agreement

The experimenter checked the computer-automated attendance system every two weeks to verify the reported attendance records. The experimenter and the teacher had 100% agreement on attendance rates. The computer-automated report also was used to observe when and why Peter was absent, and the report also disclosed if an excuse was provided from the parent (see Appendix B).

Results

With visual inspection, Peter had a stable baseline with a mean rate of attendance at 82% (see Figure 1). At the beginning of the intervention Peter had a positive trend of attendance. The data showed a slight decrease in attendance for two weeks, however, it did not go below his lowest rate of attendance during baseline. During Peter's last four weeks of intervention he had a positive pattern of attendance, and showed no decrease in his attendance rate.

Figure 1 also displays baseline and intervention attendance rates. In the four weeks of baseline the student had a median rate of 82% attendance. In his first week he was present for 70% of the week equating 3.5 days of school. In the second and third weeks of baseline Peter was present 90% of the time for each week. He came to school late once each week. In the fourth week of baseline, the student was present for 80% of the week.

At the start of the intervention the teacher made contact with the parent. The mother was very cooperative and did not have any questions. In the first five days of the intervention the student had a rate of 100% attendance. In the second week of the intervention Peter had another week of 100% attendance. The teacher was able to call Peter's mother and praise her efforts for making sure her child was present for 10 days in a row.

In the third week of intervention the student was absent for one day and he had an 80% attendance rate. The teacher called the

Table 1. Office Report Reasons for Absence

Date	Time absent	Reason for absence	Excuse provided
3/15	A	I	N
3/16	A	I	N
3/22	H	S	N
3/26	H	I	N
4/06	H	I	N
4/22	A	V	Y
4/28	A	I	Y

Note. L= Late to school, H= Absent for half day, A= Absent all day, S= Slept in, I=Illness, V=Vacation, Y= Yes, N= No

parent to report the absence and the mother stated she was aware of the absence and Peter would return to school on the next day. On the fourth week of intervention the student again had 80% attendance rate because he was absent for one day. The parent reported she had a doctor's excuse and her son would be back to school on the next day. See Table 1 for reported reasons for student's absences. For the next 10 days Peter was present and the teacher was able to call his mother to acknowledge her son was in school for 10 days in a row.

The student was also present during the fifth and sixth weeks of intervention. Again the teacher was able to call home and report the student's 10 days of perfect attendance. For the last two weeks of the intervention Peter was present, totaling 20 days of perfect attendance. The teacher called the mother to praise her for her efforts in getting her son to school each day.

At the end of the study the teacher was given a survey to complete regarding her input on the intervention. She reported that she felt comfortable contacting Peter's mother. She also explained that she hoped to continue increased communication with parents of her students with patterns of low attendance. One difficulty related to what the teacher explained was having enough time to talk when Peter's mother was available. Lastly, she also suggested adding electronic mail communication with parents who have access to the Internet.

Discussion

The present case study examined the effect of increased teacher and parent communication for a student with low rates of attendance and an identified learning disability. The student's mother was called each time the student was absent. Each time the teacher called home the mother was aware of her child's absence. She usually had a doctor's slip to send to the school when Peter returned. As shown in Figure 2 Peter's attendance gradually increased after implementation of the intervention, and he maintained perfect attendance for the last month of the study. During baseline, the student was coming to school late and rarely had doctor's excuses (Table 1). The mother shared in one of the first phone calls that her son was frustrated with elementary school (Figure 1).

When the intervention was implemented the majority of Peter's absences were reported as illnesses. His mother appeared to begin following schools policy for not reporting absences by taking her son to the doctor to get excuses once the intervention began. A change in student behavior from baseline to intervention was Peter did not have multiple days of absence. Peter also started getting to school on time. Simply making Peter's mother aware of his absences and discussing the importance of regular school attendance (Ryan et al., 1994) appears connected to improvement in his attendance rate.

Similarly as described in the literature, the principal shaped the attendance policy for the school (Conley & Endomoto, 2009). Attendance was closely monitored in the middle school. All parents within the middle school were required to receive an electronic phone call when students were absent from school. The principal also discussed how he went to the extent of calling parents of students with high rates of non-attendance. However, when students and their parents would go to court for high rates of truancy the principal reported that the judge would follow the administrator's discretion on charging fines to the family. The principal stated he gave different punishments for each student based on how well he knew the families and whether or he felt the fines would make a difference. This is another example of administrators not holding to consistent guidelines; therefore, students and teachers may not take the attendance protocols seriously (Conley & Endomoto, 2009). So in spite of the policy, it lends the idea that Peter maintained high rates of attendance when his teacher increased contact with Peter's mother.

The case study expands research of parent contact and just as the Licht et al. (1991) studies were of no cost to the school. Often, interventions promoting positive student outcomes require additional financial and human resources. Several research teams have paid students with low attendance rates to come to school (Bloom, Fellerath, Long, & Wood, 1993; Bloom, Kopp, Long, & Polit, 1991; Reid & Bailey-Dempsey, 1995). Another community-based intervention over a seven year period made no significant increase in school attendance, yet cost the school $680 per student each year (McPartland & Nettles, 1991). In the current study, little cost was needed to improve Peter's school attendance. When administrators and teachers consider implementing effective practices to in the classroom, added expenses should always be considered. By increasing parent and teacher communication in the middle school initial patterns of non-attendance may prevent young teens from avoiding school, and potentially dropping out of school. The time spent on parent and teacher contact strongly outweighs students not finishing school.

Including positive phone calls when students are present allows for teachers and parents to build a positive rapport. The increased level of communication between teachers and parents allowed Peter's mother to share some school and home history along with frus-

(Continued on page 37)

About PA-POMLE

Pennsylvania Professors of Middle Level Education

Formed in 2010, PA-POMLE is a group of professors from institutions of higher education across Pennsylvania who have organized to:

- Provide a professional network to enhance the exchange of information and ideas, as well as to encourage the discussion of topics related to preparing middle level educators.
- Contribute to the development of an expanded middle level research base, and provide additional means for sharing and disseminating current research and best practices among those across Pennsylvania and beyond interested in middle level education.
- Serve actively as advocates for the middle level education movement, especially in terms of promoting middle level concepts among various publics commonly dealt with in the preparation of middle level educators.
- Share in the advocacy for the middle level movement by supporting the stated purposes and goals of the Pennsylvania Association for Middle Level Education (PAMLE).

Membership in PA-POMLE is institutional, meaning that any Pennsylvania institution of higher education with a PDE approved Middle Level Certification program is invited to join. All professors from member institutions shall be considered official members of the group.

For more membership information, contact Dr. Whitney Wesley, treasurer at WWESLEY@edinboro.edu

Meet our President-: Ron Perry, Ph.D.

Ron Perry retired from the North Allegheny School District (29 years) where he was a middle school teacher, math & science resource teacher, and a manager of educational technology. Ron served 10 years with the Western Region Pennsylvania Middle School Association and also with the PMSA Executive Council. Ron serves at Robert Morris University as an Assistant Professor in the Elementary Education Department and as the Middle Level Certification Coordinator.

Contact Ron with inquiries about PA-POMLE at perryr@rmu.edu

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trations that he had previously with school. Further, this regular schedule of conversation allowed Peter's mother to share additional information that could be beneficial to the teacher when creating Peter's IEP (Dabkowski, 2004; Lytle & Bordin, 2001). By making Peter's attendance a priority, his mother also made sure that she got a doctor's excuses for any of his absences. This is something the mother did not do before implementation of the intervention.

With other studies of non-attendance, researchers and outside personnel have regularly been mediators between parents and teachers (Gregory, Allebon, & Gregory 1984; Hayden, 2009; Sinclair, Christenson, & Thurlow, 2005) regarding the students' school attendance. Although having outside investigators contact homes does decrease responsibilities of teachers, there is a lack of bonding between teachers and parents. Parents reported they had difficultly sharing information with people having little to do with their child's academic achievement (Hayden, 2009). Therefore the use of involvement between teachers and students in special education, as implemented in this case study, may be well suited because of the bonding for students and their teachers in secondary schools (Nagle, Gresham, & Johnson, 1979).

Future Research

Students with identified disabilities are targeted for low rates of school attendance (Mattison, 2004; Redmond & Hosp, 2008). However, among the research comparing the individual sub-groups of students with different identified disabilities there are conflicting reports stating that certain categories of disabilities have higher rates of non-attendance (Converse & Lignugaris-Kraft, 2009; Mattison, 2004; Redmond & Hosp, 2008). Identifying patterns of non-attendance within specific disability categories could potentially help to identify reasons for non-attendance and help to determine if the low attendance rate in special education can be linked to etiology of the disability. With the promising results of this study it would be beneficial to measure the outcomes in a larger study with students with learning disabilities.

Conclusion

It is obvious when students miss school, they miss instruction. For students with IEPs, attendance is especially crucial, because most students in special education need additional instruction to benefit from the curriculum. By increasing phone calls from the teacher to the parent, Peter's attendance patterns suggest that he started coming to school on time and was absent less. The teacher also reported that Peter's mother started following administrator's attendance policies by providing excuse notices when Peter was absent. This intervention was relatively cost free. It did however, demand more time from the teacher. But the teacher and parent had more opportunities to communicate about Peter and his educational history. With Peter coming to school regularly and his teacher corresponding with his mother, many would agree the effort of increased parent-teacher conversations does outweigh the cost of future student dropouts.

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Appendix A

Teacher contacting parent Trial

Teacher: Hello, My name is _____ I am your son/daughter's teacher at _____ Middle School*. As you have agreed we will be working together to increase our communication when _____ is absent. I have also agreed to work with Bethany McConnell from _____ University* to measure your child's attendance rate as we increase our communication. Because this is a research study, I will be collecting a brief log to write down each of our conversations.

I wanted to confirm that this phone number and time would be appropriate for me to call when we need to discuss _____'s attendance patterns. I also wanted to give you a number to reach me if you have any questions (school's # or cell phone if preferred) _____. At this point do you have any questions?

Parent response: [documented]

Teacher: Response to any parent comments. [document] At this point in the semester, _____'s attendance rate is _____. We do understand that there are many circumstances for absenteeism, but as a teacher I am trying to limit the amount of absences for _____, because low rates of school attendance have been link to many negative outcomes such as low academic achievement and school dropout. We are working now in the Middle School to help increase _____'s school attendance patterns and hopefully we will see this pattern continue for his/ her school career. Do you have anything you would like to add?

Parent response: [documented]

Teacher: Response to any parent comments. [document] Now I would like to go over the process of when I will be calling. I will call you each time that _____ is absent. We will discuss the measures for absences (such as excused absences, etc.). If _____ should be in school that day but did not report, we will go through our school policy for student location. This research design also includes that I call you every 10 days of perfect attendance. Do you have any questions about this calling process?

Parent response: [documented]

Teacher: Response to any parent comments. [document] I am looking to working with you and increasing our communication for the benefit of _____ academic success. Thank you for your time, good bye

Parent response: [documented]

* Names have been omitted to preserve confidentiality.

Student Absence

Teacher: I wanted to inform you that _____ is currently absent from school.

Parent response: [documented]

(If parent is aware of absence and is excused)

Teacher: I understand that absences can happen, we just encourage that _____ comes back to school tomorrow.

Parent response: [documented]

Teacher: Response to any parent comments. [document] Please be aware of our excused absence policy and be sure to complete a note to excuse _____'s absence. Thank you for your continued support. Good bye

(If parent is unaware of absence)

Teacher: At this time as part of the school's policy I have to notify the Principal that _____ is currently absent. Please notify the school when you contact _____ . We will be sure to contact you as soon as we find out any information. Thank you, good bye

Parent response: [documented]

At this point teacher will notify the principal of the reported absence.

Student has a record of positive attendance

Teacher: Hello, I wanted to contact you to let you know that _____ has been present for _____ days in a row. I want to thank you for your commitment in getting _____ to school on time everyday.

Parent response: [documented]

Teacher: Response to any parent comments. [document] I appreciate your help. Have a nice day.

(Continued from page 37)

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Appendix B. Teacher/Parent Communication Log

Teacher Name_____Ms. Simmons_____

Parent Name _____Amelia_____

Student Name ____Peter_____

Please fill out the date, reason for phone call (absences, high rate of attendance) and a summary of parent comments

Date	Reason for call	Summary of parent comments
4-7	Parent trial	Glad Peter's involvement can help
4-21	10 days of attendance	Peter has been enjoying school- huge difference from elementary school where frustrations with school were making Peter not want to go to school
4-22	Student absent	Take your child to work day- Excuse provided to office
4-28	Student absent	Went to doctors, was not feeling well. Doctor gave okay to return to school tomorrow
5- 10	10 days of attendance	
5-24	10 days of attendance	

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About the Author

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Bethany's research interests include working with preservice teachers building partnerships with families of students with disabilities. Bethany works with preservice teachers creating an understanding for teaching students with special needs.

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All submissions must be prepared using word processing software and saved in Microsoft Word (.doc or .docx) or rich text format (RTF). Manuscripts must comply with the guidelines in the Publication Manual of the American Psychological Association, current edition. Double space all text; including quotations and references, use 1 inch margins for top and bottom, and use 1.25 inch right and left margins. All text should be Times New Roman 11-point font. Complete references should be placed at the end of the manuscript, using the "hanging indent" function. Additional article publication formatting details are listed on the PA-POMLE and PAMLE web sites.

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Abstract – In a separate file describe the major elements of the manuscript in 100-150 words. Do not include your name or any other identifying information in the abstract.

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- Manuscripts should be no more than 15 pages of narrative (excluding references, tables, and appendices), using the latest APA style, and double-spaced on one side of 8-1/2 by 11-inch paper with justified margins.
- Pages should be numbered consecutively including the bibliography, but the author's name should not appear on the manuscript itself.
- Charts or illustrative material will be accepted if space permits. Such materials must be camera-ready. Photographs can be used with proper release forms and high quality resolution.

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PAC-TE Opens Search for a New Executive Director

At its September meeting the PAC-TE Board of Directors received and accepted the notice that Linda Cook will resign from her position as PAC-TE Executive Director at the end of her contract, November 1, 2015.

President Winterton formed a Search Committee comprised of: Past President Dr. Jay Hertzog, President-elect Dr. Kevin Zook, and Director Dr. Mary Dupuis.

PAC-TE members are asked to share this information with potential candidates, and/or apply.

Those interested in applying are asked to submit a cover letter, CV, and three letters of reference to Dr. Jay Hertzog at doctorjay80@gmail.com.

Any questions regarding the position should be directed to Dr. Hertzog. Review of applications will begin immediately and continue until the position is filled.

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8:30-9:50 am
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Central Harrisburg, PA

October 22-24, 2014
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43rd Teacher Education Assembly
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Central Harrisburg, PA

October 24, 2014
9:00-9:50 am
PAC-TE Middle Level Focus Group
Central Ballroom Parlour D, Best Western Premier
Central Harrisburg, PA

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