ISSN 2165-7874

A CASE STUDY: TEACHERS' CONFIDENCE IN THEIR OWN AND THEIR STUDENTS' ABILITIES IN DEAF / HARD OF HEARING HIGH SCHOOL MATHEMATICS CLASSROOMS

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Abstract

Current educational reform in mathematics education reflects attempts to incorporate the Common Core State Standards (CCSS). The CCSS decrees both content standards and mathematical practices (process standards) that students should master if they are to be sufficiently prepared for college or a career. This paper investigates the confidence reported by 16 deaf /hard of hearing high school teachers in their ability to teach all of the mathematical standards and practices, as well as their confidence in their students' ability to learn the same. Results suggest that differences in these teachers' confidence, as well as their confidence in their students' ability, is directly related to differences between teachers with a college-level math qualification and teachers with no tertiary math qualification. Self-identified needs are distilled into suggested topics for, and levels of, professional development that will provide support to fulfill these essentials.

Keywords: Mathematics Education, High School Mathematics, Teacher Confidence, Common Core State Standards, Deaf Education

Introduction

Many countries, including the United States, are in the midst of educational reform. In the U.S. the newest reform effort in mathematics education is the introduction of the Common Core State Standards (CCSS). Forty-two states, the District of Columbia, four territories, and the Department of Defense Education Activity (DoDEA) have adopted the Common Core State Standards (Achieve Inc., 2013). The CCSS are a set of academic standards that include mathematical content and processes that collectively define the skills and knowledge all students in K through 12 – including students who are deaf and hard of hearing (DHH) – need to succeed in college, career, and life (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The standards for high schools, in particular, identify the mathematical content and processes students should learn in order to be prepared for college and career. The five content standards are: number and quantity; algebra; functions; modelling; geometry and statistics; and probability. The eight process standards are: make sense of problems and persevere in solving them; reason abstractly and quantitatively; construct viable arguments and critique the reasoning of others; model with mathematics; use appropriate tools strategically; attend to precision; look for and make use of structure; and look for and express regularity in repeated reasoning (p. 6-8). Easterbrooks, Stephenson and Mertens (2006) point out that federal mandates require professionals in the field of deaf education to pay increased attention to content standards.

In bringing about the desired reform, Du Plooy (1998) points to the central role teachers play by indicating that students' experience of the curriculum presented to them is affected by the perceptual filters of their teachers. Jegede, Taplin and Chan (2000) suggest that if our educational system is to experience satisfactory and effective reform, then it is essential that teachers, reform's most valuable resource, be comprehensively developed.

Factors Influencing Teacher Behavior

The impact of teachers' behaviors on students' learning of mathematics cannot be overstated, with Johnson (2004) believing that teachers are the most important component of the educational environment in deaf / hard of hearing (DHH) classrooms. Marschark, Lang and Albertini (2002) suggest that aspects of classroom dynamics attributable to teachers' behaviors might explain considerable variability in deaf students' achievement across all levels. Luckner (2006) advocates that special attention be given to the role of the teacher in educating DHH students, as well as the methods by which his or her skills may be bolstered.

Fennema and Franke (1992) remark that the depth and breadth of a teacher's knowledge is one of the most important factors that determine what is taught in the classroom and how. Teachers must have an in-depth knowledge of the specific mathematics that they teach (Ball, 2000) in addition to the mathematics to which their students will be exposed to in the future. Several researchers (e.g., Muijs & Reynolds, 2002; Ball, Lubienski & Mewborn, 2001; Swafford, Jones, Thornton, Stump & Miller, 1999) claim a correlation exists between a teacher's knowledge and his or her instructional processes. Essentially, a lack of adequate content knowledge is a barrier that inhibits effective instruction (Eisenhart, Borko, Underhill, Brown, Jones & Agard, 1993), with improved teacher knowledge leading to improved student learning (Muijs & Reynolds, 2002; Webb, Boltt, Austin, Cloete, England, Feza, Ilsley, Kurup, Peires and Wessels, 1998). Goldhaber and Brewer (2000) found that certified teachers of secondary mathematics have a statistically significant positive influence on their students' mathematics achievement scores compared with the achievement of students whose teachers either hold private school certification or who are not certified in mathematics at all. Lang and Pagliaro (2007) warn that not requiring content-related qualifications of teachers responsible for instructing DHH students in mathematics may jeopardize student learning.

Koehler and Grouws (1992) indicate that teachers' behavior is influenced by their beliefs and attitudes towards mathematics as a subject to be learned and the teaching of mathematics. Garberoglio, Gobble and Cawthon (2012) postulate that there is a need to investigate these beliefs and attitudes, as these are essential components affecting students' learning and achievement, and that teachers' beliefs and attitudes are largely unexamined constructs in deaf education research. Teachers' attitudes towards mathematics is influenced by their enjoyment (Quinn, 1998) and interest in mathematics, their confidence in their own mathematical abilities, their confidence in their ability to teach, and the value they place on knowing and using mathematics (Ernest, 1989). Not surprisingly, a teacher's own confidence in their teaching is formed through experiences and the presence or lack of positive reinforcement, and depends heavily on the type of reinforcement and evaluations by significant others (Schunk, 1996). Otacioglu (2008) deems that self-confidence is a necessity for successful teaching, with a positive relationship existing among success, self-confidence, and motivation. Teachers with a belief in their own effectiveness are less critical of students (Ashton & Webb, 1986), believe they can influence student learning even with more challenging students (Guskey & Passaro, 1994), and are more persistent in working with low achieving students (Gibson & Dembo, 1984). Hart (2004) points out that helping teachers gain confidence in their own mathematical ability can improve student success in science, technology, engineering, and mathematics.

Clark, DePiper, Frank, Nishio, Campbell, Smith, Griffin, Rust, Conant, and Choi (2014) suggest evidence that a teacher's perceived choices about how to instruct his or her students are influenced by perceptions of their students' innate talent and ability, and that it is plausible that these same beliefs influence how those choices are manifested in the classroom. Penso (2002) notes in her study that prospective teachers (n=40) believed that most learning difficulties are the result of the learner's characteristics. Teachers' beliefs about learners could be as varied as believing that some learners are

ISSN 2165-7874

born "good students," while others are destined to be low achievers because of their limited ability. Furthermore, teachers may believe that some learners have a natural talent for mathematics while other do not; consequently, "working hard" will only bear fruit for "smart" learners. A serious concern is if teachers accept that learners must possess innate knowledge or skill, or that a certain "type" of mind is required to understand mathematics, then teachers may relinquish their responsibility to use pedagogically sound methods to teach challenging mathematics (Foss & Kleinsasser, 1996). Garberoglio, Gobble and Cawthon (2012) have suggested a link between a teacher's own expectation that he or she can "make a difference," regardless of a student's current achievement, with having higher expectations for students' achievement.

Research Questions

This study seeks to answer the following questions:

1. What level of confidence is reported by DHH high school teachers in their ability to successfully teach CCSS content and process standards?
2. What level of confidence is reported by DHH high school teachers in their students' ability to successfully master the appropriate CCSS content standards?
3. What level of professional development do DHH high school math teachers receive in the content they teach?
4. What do DHH high school math teachers report as needed professional development in the content they teach?

Methodology

The principals in 83 DHH high schools across the U.S. were contacted by email requesting permission and cooperation by forwarding a short survey to their high school math teachers. In total 16 teachers from 14 different states voluntarily completed the survey. This paper reports the completed surveys only.

The first 24 of the 33-question survey followed the same pattern: Teachers were asked if they taught a particular CCSS content domain; what their confidence level in teaching that domain was; how many hours of professional development they received per year in that particular domain; and how confident they were in their students' ability to be successful in that particular domain in the future. For each CCSS content domain, a description was provided listing explanatory and inclusive topics:

- *Number and Quantity*: exponents, rational/irrational numbers, complex numbers, complex plane, polynomial functions, vectors, and matrices.
- *Algebra*: expressions, equivalent expressions, operations on polynomials, zeroes and factors of polynomials, polynomial identities, rewriting rational functions, writing equations describing numbers/relations, solving equations and systems of equations, graphing equations, and reasoning with equations.
- *Functions*: concept of functions, function notation, interpreting functions in terms of a context, analyzing functions with multiple representations, constructing/comparing linear and exponential models, trigonometric functions, unit circle, and modeling/proving/applying trigonometric functions.
- *Modeling*: Using models to link mathematical concepts to everyday life/work/decision-making, and using tools (graphing utilities, spreadsheets, computer systems, etc.) to model.
- *Geometry*: transformations, congruence, proving theorems, similarity, trigonometric ratios, right triangles, applying trigonometry to triangles, circles, arc length, sectors, area, conic section equations, volume, relationships between two- and three-dimensional objects, and applying geometric concepts while modeling.

- *Statistics & Probability*: Summarize/represent/interpret data on measurement and quantitative variables, interpret linear models, processes of statistical experiments, infer/conclude from sample surveys/experiments/observational studies, independence/conditional probability, compute probability of compound events, and evaluate outcomes with probability.

For questions concerning confidence levels, teachers were asked to use a five-point Likert scale, choosing from the following: (1) not confident at all, (2) somewhat confident, (3) uncertain, (4) confident, and (5) very confident. Once teachers completed these questions for all of the content domains they taught, the next four questions inquired about teaching confidence in mathematical practices (process standards). Teachers were asked to rate their confidence level, using the same five-point Likert scale as discussed above, in the following categories (with provided descriptions):

- *Problem Solve with Precision*: Aligned with the CCSS Mathematical Practices Objectives (#1) Make sense of problems and persevere in solving them; (#6) Attend to precision.
- *Reason and Explain*: Aligned with the CCSS Mathematical Practices Objectives (#2) Reason abstractly and quantitatively; (#3) Construct viable arguments and critique the reasoning of others.
- *Model and Use Tools*: Aligned with the CCSS Mathematical Practices Objectives (#4) Model with mathematics; (#5) Use appropriate tools strategically.
- *See Structure and Generalize*: Aligned with the CCSS Mathematical Practices Objectives (#7) Look for and make use of structure; (#8) Look for and express regularity in repeated reasoning.

Using the same five-point Likert scale, the next question asked about the teacher's confidence in his or her knowledge of what he or she is supposed to teach (knowledge of mathematical CCSS – combining all content and process standards.)

The last five items asked teachers to identify those content domains for which they had received professional development and for how long; for which domains they would like to receive more professional development; their years of experience teaching in a DHH high school; their highest math qualification; and the state in which they teach. For the question concerning hours of professional development relating to the six Content Standards, teachers were asked to choose their answer from: 0 hours (indicating no PD), 1-3 hours (very little PD), 4-6 hours (sufficient PD). For the question concerning years of experience, teachers were asked to choose their answer from the following choices: 0 years, 1-2 years, 3-4 years, 5-6 years, 7-8 years, 9-10 years, and 11+ years. For the question concerning their highest mathematical qualification, teachers were asked to choose from the following answer choices: high school mathematics, mathematics minor (undergraduate), mathematics major (undergraduate), and graduate school mathematics. No personal identifying data was collected.

Results and Discussion

Seven teachers reported a high school diploma as their highest mathematics qualification, with five reporting more than 11 years of teaching experience, one reporting less than four years, and another less than two years. Two teachers had a college minor in math; four were math majors at college, and three held a graduate level mathematics qualification. Four of the nine teachers with college-level qualifications reported more than 11 years of teaching experience, one reported between seven and eight years, two reported between three and four years, and two reported less than two years of teaching experience. The result for this population of teachers is that nearly 44 percent – all tasked with teaching math to high school students – had no math qualification higher than the level they currently teach.

Descriptive statistics (e.g., mean and standard deviation) were employed to evaluate the data. Although means and standard deviation are reported, the data sets are small and not necessarily

ISSN 2165-7874

normally distributed. Table 1 reports the entire population's (n=16) teaching confidence in both the CCSS content and process standards with mean (*x*) and standard deviation (σ) values shown. Because teachers were asked to evaluate only the content domains that they were currently teaching, there is variation in the participant numbers (n-values).

Table 1

Teaching Confidence in CCSS Content and Process Standards

Content Standards	*n*	*x*	*σ*	*Process Standards*	*n*	*x*	*σ*
Number & Quantity	14	3.71	1.20	Problem solve with precision	16	3.53	1.12
Algebra	16	4.25	1.00	Reason & explain	16	3.00	1.12
Functions	10	3.70	1.06	Model & use tools	16	3.65	0.93
Modeling	10	3.80	1.03	See structure & generalize	16	3.18	1.13
Geometry	12	4.00	1.04				
Statistics & Probability	9	3.44	1.13	All knowledge: Content & Process	16	3.65	1.17

Table 2 provide details regarding the teachers' confidence in their students' ability to successfully master the CCSS content standards with mean (*x*) and standard deviation (σ) values shown. Only teachers who were currently teaching a specific domain were asked to evaluate their confidence in their students' ability, leading to variation in the participant numbers (n-values).

Note that in all CCSS content standards, the mean value of the teachers' confidence in their own teaching is higher than their belief (expressed as a mean) in their students' ability to successfully master the same content standard. These teachers reported to be most confident in teaching algebra and least confident in teaching statistics and probability. They seem most confident in their students' ability to master geometry and algebra, and least confident in their ability to do the same with functions and statistics and probability.

Table 2

Teachers' confidence in student ability in CCSS Content Standards

Content Standards	*n*	*x*	*σ*
Number & Quantity	14	2.86	1.17
Algebra	16	3.13	1.15
Functions	10	2.50	0.85
Modeling	10	2.40	1.07
Geometry	12	3.17	1.19
Statistics & Probability	9	2.46	0.88

For analysis and comparative purposes, all teachers with a college minor, college major, or graduate school qualification in math were grouped and compared to teachers with only a high school math qualification. When the data is analyzed using teacher qualification as a variable, some noticeable differences between teachers with a math qualification and those without becomes evident. Figure 1 illustrates the difference in teaching confidence (expressed as a mean) in the CCSS content standards between these two groups, with seven teachers holding only a high school math qualification and nine teachers having some form of tertiary math qualification.

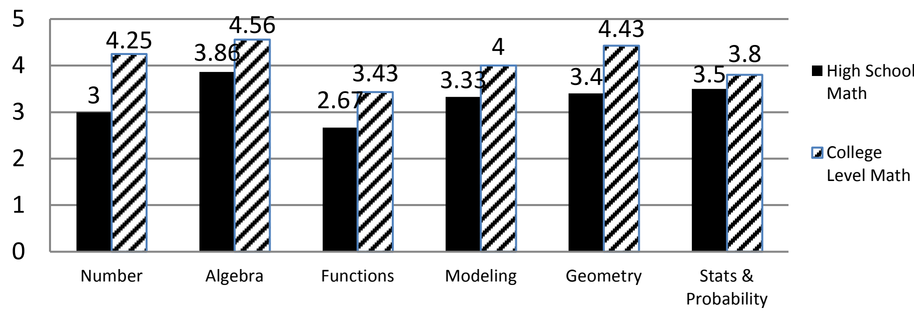

Figure 1: Teaching Confidence: Content Standards

Using the Likert scale, a score close to two or below is testament to a lack of confidence, a score of three indicates a teacher is unsure of his or her teaching confidence, and a score near four and above indicates confidence. Across all of the CCSS content standards, Figure 1 illustrates a lack of teaching confidence, or at least uncertainty about teaching confidence, by teachers holding only a high school math qualification. In contrast, and again across all CCSS content standards, teachers with at least some college-level math qualification seem to be more confident in their own teaching abilities.

Figure 2 shows the difference in teaching confidence (expressed as a mean) between these same two groups of teachers with respect to the CCSS process standards and their overall teaching confidence (considering both content and process standards).

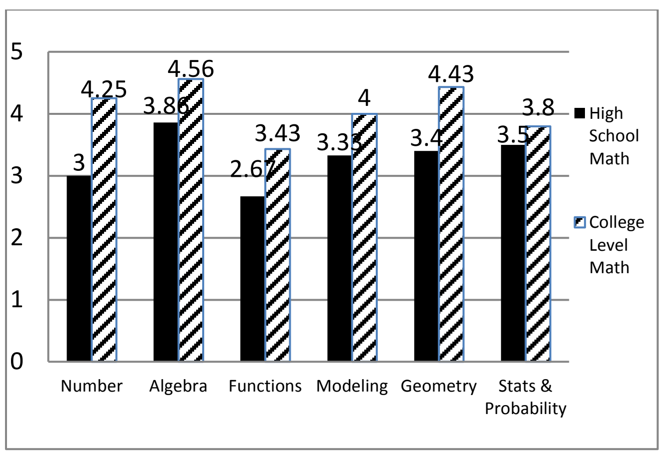

Figure 2: Teaching Confidence: Process Standards

With neither group of teachers reaching a score of four, it can reasonably be assumed that both groups do not feel confident in, or are at least unsure of, their own ability to teach such critical skills as reasoning or generalization successfully. However, it does appear that overall, teachers with some college-level math qualification feel more confident than their colleagues with no tertiary math training. Figure 2 furthermore suggest that teachers from both groups feel unsure of their teaching ability when both content and process standards are considered. Figure 3 indicates the difference in confidence (expressed as a mean) between these two groups of teachers with respect to their students' ability to master the five CCSS content standards.

ISSN 2165-7874

There is a noticeable difference between teachers' confidence in their own ability to teach (Figure 1) and their perception of students' ability to learn the content presented to them (Figure 3). Where teachers with only a high school math background may have been unsure of their own abilities (e.g. modeling (3.33), functions (2.67), statistics and probability (3.5)), they indicate a clear lack of confidence in their students' ability to successfully master these same topics (modeling (2.33), functions (2.33), statistics and probability (2.5)). Similarly, teachers with some college-level math training also indicate uncertainty or lack of confidence in their students' ability to master most of the CCSS content standards.

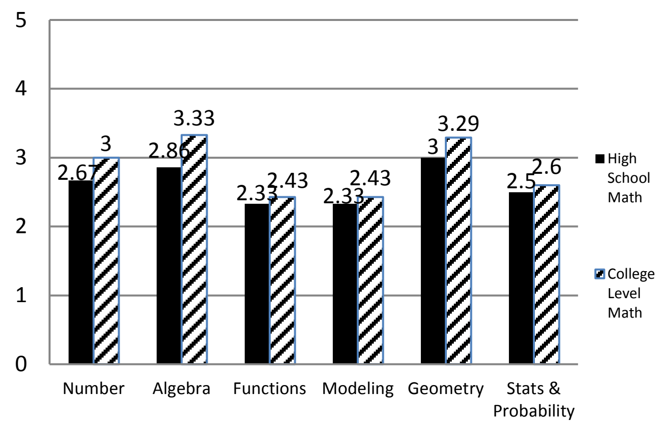

Figure 3: Confidence in Student Ability

To explore the difference between their students' ability and their own, the Kolmogorov-Smirnov test (K-S test) (Daniel, 1990) was employed. The K–S test is a nonparametric test of the equality of continuous, one-dimensional probability distributions that can be used to compare two samples *or one sample against* a reference probability distribution. The null distribution of this statistic is calculated under the null hypothesis that the samples are drawn from the same distribution (in the two-sample case), or that the sample is drawn from the reference distribution (in the one-sample case). The test does not compare any particular parameter (e.g., mean or median) and, therefore, it does not report any confidence interval. It is sensitive to differences in both location and shape of the empirical cumulative distribution functions of the two samples.

For teachers with a high school math background, this test does indicate that there is a significant difference in the distribution of responses (on the Likert scale) between their confidence in their teaching and beliefs about their students' ability to master both functions $(0.05 < \propto < 0.10)$ and modeling $(0.05 < \propto < 0.10)$. Similarly, results from the K-S test indicate that for the teachers with college-level math backgrounds, the distribution of their responses (on the Likert scale) inquiring about their beliefs about their own teaching confidence and their students' ability to master both functions $(\propto < 0.01)$ and modeling $(0.05 < \propto < 0.10)$ is also significant.

From this statistical analysis it is clear that there is a significant difference in distribution of responses for: a) Modeling (both groups of teachers) b) Functions (both groups of teachers, with teachers with some college-level mathematics responses indicating a strong significance). The reason(s) why functions and modeling suggest significance is unclear; future research may shed light on the reason(s) for the lack of confidence specific to these two concepts among teachers in both groups.

Table 3 and Figure 4 include self-reported hours of professional development the teachers in both groups have received during the past year with regards to the five CCSS content standards. Table 3 reports professional development (PD) for all teachers teaching each of the CCSS content domains, while Figure 4 contains data represented by mathematical qualification.

Table 3
Teacher-reported hours of PD in CCSS Content Standards

Content Standards	*n*	*x*	*σ*
Number & Quantity	14	0.86	1.29
Algebra	16	1.06	1.73
Functions	10	1.10	1.85
Modeling	10	1.10	1.85
Geometry	12	0.83	1.19
Statistics & Probability	9	0.89	0.93

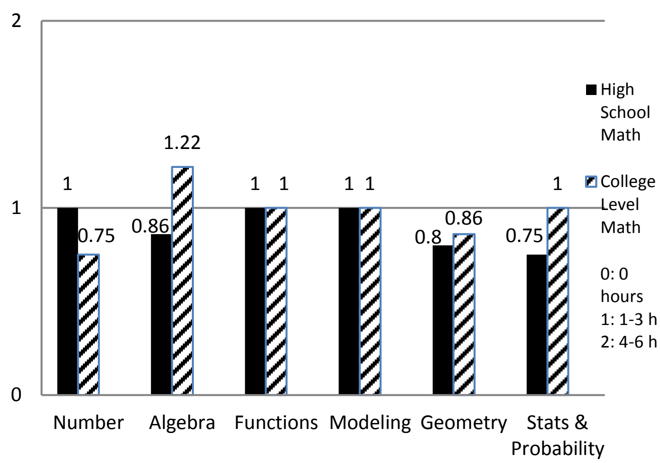

Figure 4: Hours of Professional Development

Both groups of teachers indicate that, in the past year, they have received between one and three hours of professional development for each of the content standards. If one considers that about three hours of professional development was received for each content standard, a teacher could potentially have received between six and 18 hours of professional development in math in the last year. This finding is consistent with the findings of Wei, Darling-Hammond, Andree, Richardson & Orphanos (2009) who report that 57 percent of teachers received less than 16 hours of professional development in the content of the subject(s) they taught during the previous 12 months.

The author agrees with Ball (2000) that teachers must have an in-depth knowledge of the specific mathematics that they teach, and also agree that they must have knowledge of the mathematics to which their students will be exposed in the future. To explore teachers' self-identified professional development needs, all teachers in the study were asked to indicate areas of professional development in which they would want to receive more training, regardless of the content they were currently teaching.

Figure 5 illustrates areas of professional development most desired by DHH high school teachers. Functions, modeling, and statistics and probability are reported as the CCSS content standards in which these teachers want the most professional development, with less than 50 percent feeling a need for more professional development in algebra.

We were also curious to know whether these teachers would be more likely to want professional development in the CCSS content domains that *they are currently teaching*. Figure 6 reports the results of teachers currently teaching each of the content standards and their self-identified need for more professional development in that standard (See Table 1 for n-values for each of the CCSS content domains).

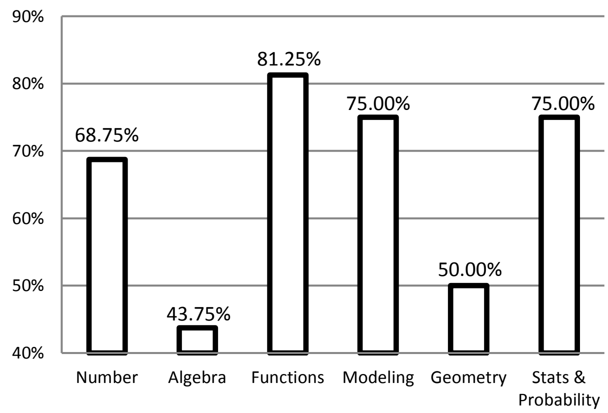

Figure 5: Self-Identified Content Areas of Need in PD

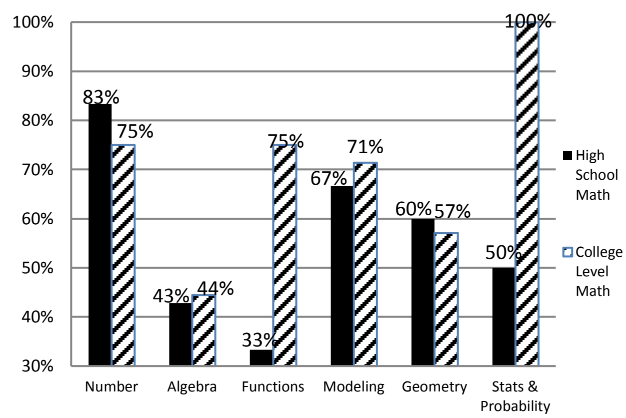

Figure 6: Teachers wanting more PD in content area currently teaching

Figure 6 indicates a clear difference between teachers with a high school math qualification and those with a college-level math qualification. The vast majority of teachers with college-level math qualifications want more professional development in statistics and probability, functions, number, and modeling, while teachers with a high school math qualification want more professional development in number, modeling, and geometry. When considering teaching confidence as reported in Figure 1 and the want for more professional development (Figure 6), some interesting trends emerge. Teachers with a high school math qualification report a lack of teaching confidence in functions (lowest score of all teaching confidence scores) and yet, only 33 percent of them indicated that they wanted to receive more professional development in teaching functions. This finding might suggest that these teachers may hold a belief that additional professional development is unnecessary, possibly due to their belief that their students are not capable of successfully mastering this content standard (see Figure 3).

Conclusions

Farah-Sirkis (1999) notes that both experienced and novice teachers view subject matter knowledge as a priority for in-service training programs, and mentions that 80 percent of teachers viewed subject matter knowledge as the number one qualification for a good mathematics teacher. Pagliaro and Ansell (2002) acknowledge that, in general, deaf education teachers receive strong preparation in the psychology of learning and the unique needs of their students, but lack sufficient knowledge of math content and pedagogy, which may lead to classroom decisions that limit students' experience. In their study, Easterbrooks, Stephenson and Mertens (2006) found that the majority of the DHH master teachers felt that possessing specific training, experience, and certification in content-area knowledge to be beneficial to teaching and learning. Johnson (2004) is of the opinion that the shortage of teachers for DHH students is one of both quantity and diversity, and points to the uncertainty of how many teachers of DHH students are teaching without the appropriate certification of licensure. Kelly, Lang and Pagliaro (2003) found that only 61 percent of teachers in residential/center school programs held a mathematics education certification. In this current study, nearly 44 percent of teachers had no math qualification higher than the level they are expected to teach, with another 12 percent holding only a minor in mathematics. It seems that in more than a decade, little has changed that would result in a greater percentage of appropriately certified math teachers teaching in DHH high schools.

The relative shortage of deaf education teacher preparation programs appears to compel some states to place unqualified individuals as teachers of DHH students (Johnson, 2004). For school and school systems wanting to improve the quality of teaching, professional development is a key strategy (Wei, Darling-Hammond, & Adamson, 2010). A similar sentiment is shared by Ball, Thames and Phelps (2008) who suggested that the mathematical knowledge necessary to effective teaching is not exclusively developed through university mathematics courses. Professional development can also provide the opportunity to equip teachers with the essential knowledge and skills to be effective teachers.

It is of critical importance that tertiary institutions tailor in-service programs to meet the needs of teachers in schools for the deaf and hard of hearing who are preparing classes they are not trained to teach while facing students who, according to Shaver, Marschark, Newman and Marder (2013), have complex needs and multiple disabilities.

For its part, in revealing that the professional development of DHH high school teachers is, on average, currently less than 18 hours a year, this article has attempted to give these teachers a voice insofar as those CCSS content domains in which they need and want more professional development. Teachers, regardless of the CCSS domain in which they are currently teaching or their mathematical background, have identified functions, modeling, and probability and statistics as topics for which there is a high need for professional development, while algebra was identified as the CCSS domain in need of the least attention for professional development.

When considering formal mathematical training as a variable, some interesting differences with respect to teaching confidence, confidence in student ability, and professional development emerged between teachers with no formal tertiary math education and those that did receive such training. DHH high school teachers with only a high school math qualification, reported a lower degree of teaching confidence in most of the CCSS content and process standards, and not confident in teaching the functions, reasoning, and generalizations. This group of teachers also reported not feeling confident in their students' ability to learn successfully any of the CCSS content standard domains, with especially low confidence levels in functions and modeling. This study may suggest a possible relationship and connection between these teachers' low level of teaching confidence and their even lower level of confidence in their students' ability to successfully master a content domain.

Teachers with some college-level math qualification (minor, major, or graduate studies) report themselves to be more confident in their own teaching abilities in both CCSS content and process standards. These teachers report feeling confident in teaching number, algebra, modeling, geometry, and probability and statistics; however, these teachers share a lack of confidence in DHH high school students' ability to be successful in most of the CCSS content domains especially functions and modeling. It is not clear why these two CCSS content domains were rated so low by both groups of teachers. Teachers with some college-level math qualification do report feeling confident in their ability to teach problem solving or model and tool use – two critical process standards. Garberoglio, Gobble and Cawthon (2012) point to the impact of teachers' perceived efficacy as a strong influence on teacher behavior in the classroom, "especially in teachers' level of effort, perseverance though difficult situations, and the goals they set" (p.368).

The professional needs of these two groups also seem different. Teachers with a college-level math qualification expressed a need for more professional development in probability and statistics, functions, number and modeling; while teachers with only a high school level math qualification reported little need for more professional development in functions. This group of teachers did, however, express the need for more professional development in number, modeling, and geometry.

If educational reform is to be successful, universities, colleges, and other professional development providers may need to evaluate the suitability of the math courses targeted at mathematics teachers (Kanes & Nisbet, 1996). The National Research Council (NRC) (2001), however, cautions that simply taking more of the standard college or university mathematics courses does not appear to improve a teacher's ability to teach effectively. The specialized knowledge of mathematics that teachers need is different from the mathematical content contained in most college or university mathematics courses, which are primarily designed for professional use of mathematics in fields such as mathematics, science, and technology (NRC, 2001). Not only should these courses ideally encompass elements to improve knowledge (subject content, pedagogy [Quinn, 1998] and curriculum knowledge), but also make teachers aware of their own beliefs and attitudes and the effect they have on their disposition towards mathematics, learner characteristics, and the teaching and learning of mathematics.

Maher, Bailey, Etheridge and Warby (2013) point to professional development as a means by which to influence teachers' confidence in their ability to teach math, and strongly advocate for mentoring between teachers and college faculty. They believe that faculty mentors have the ability to assist in the development of knowledge and understanding of teaching with a focus on conceptual understanding. Such mentoring can offer teachers an intentional learning experience that could challenge and resolve discrepancies between "old and new ways of knowing" (p.272), provide support, direction, feedback, "positive reinforcement," "guidance and moral support," "patience and understanding," and even "a shoulder to cry on" (Huffman & Leak, 1986, p.24). Mentoring may also provide a critical friend, according to Fensham (2004), against whom a teacher can bounce ideas and get a thoughtful response. Content faculty can bridge possible gaps in knowledge, with the end result being teachers who encounter challenges and overcome them with the help of a content faculty mentor, a greater pool of resources, and an enhanced ability to solve future problems (Maher, Bailey, Etheridge & Warby, 2013).

As educators of teachers, we have a responsibility to our students to assist their teachers to become the best teachers they can be so that, in turn, our students can become the best they can be.

Limitations of the study

The strength of the interpretations of these findings is limited due to the limited number of DHH high schools contacted, the number of principals willing to give permission or cooperate, and the consequently small DHH high school math teacher sample that was obtained. An important limitation is that the teachers in this study may not be fully representative of the national population of teachers working with deaf students. Results are based solely on teacher responses, trusting that teachers answered honestly and accurately.

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