Research Paper

Aspects of teacher education that affect student success: A study of Arizona public high schools

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Contextualization

In the United States of America, an individual state's education system has far reaching impacts on its entire population when high school graduates enter the state's workforce. The implications of a failing school system are enormous. School districts desire to implement reform that increases the graduation rate while simultaneously reducing the dropout rate. The No Child Left Behind Act (NCLB) has established 2014 as the year when 100 per cent of all US high school students will graduate. Failure to achieve this mandate will result in school districts facing severe consequences, including replacing all administrators and district takeover by the private sector. Some states are successfully increasing the number of students who graduate and are college bound; yet those successful results are coinciding with an increase in the student dropout rate (Cooper, Ponder, Merritt and Matthews, 2005).

The fundamental question regarding what aspects of teacher education impact student success can assist policy makers and those who hire teachers with information regarding how to better promote student success. This will enable hiring committees to search for teachers with the qualities and qualifications that meet the criteria supported by empirical data.

Abstract: *This study was designed to investigate what aspects of teacher education (if any) affect student success. Questionnaires were mailed to a random sample of high- and low-performing urban and rural public high schools across Arizona. Quantitative variables that were researched include the level of degree a teacher attains, the route a teacher chooses to achieve certification, teachers' attendance at core-subject related workshops, teacher mentoring, and teacher collaboration using data based information to drive decision-making. Regression analysis was used to analyse the data. The results of this research support teacher mentoring and attendance at core-subject related workshops as vehicles to promote student success. This research provides information for policy makers, administrators, and teachers who are invested in promoting student success.*

Introduction

The National Center for Policy Analysis (2001) conducted a study examining how American students compare to their international counterparts in 42 other countries. Nine-year-old fourth-grade American students demonstrated high scores in science and mathematics. But when a re-test was administered to those same students as 13-year-old eighth graders, scores declined below the international average in mathematics and were only at the average level in science. Finally, when re-tested as 17-year-old twelfth grade students, the gap in both subjects had grown even larger.

A 2005 international study was conducted by the National Center for Education Statistics, a division within the US Department of Education's Institute of Education Sciences, regarding the condition of education. Their brief was an assessment that analysed data gathered in 2003 in mathematics literacy and problem-solving abilities. It compared the performance of 15-year-old US students with their international counterparts. Twenty-nine Organization for Economic Cooperation and Development (OECD) industrialised countries and eleven non-

OECD countries participated. The OECD consists of European countries who joined together to restructure Europe after World War II as well as countries outside of Europe including Canada, Japan, Korea, Mexico, New Zealand, Australia, and the United States (Ellis-Christensen, 2003). American 15-year-olds scored below the OECD international average in combined mathematics literacy, specific mathematics skills, and problem solving, being outperformed by 20 OECD and three non-OECD countries. American students did outperform peers in five OECD countries and seven non-OECD countries. In problem-solving, American students outperformed peers in three OECD countries and six non-OECD countries, yet were outperformed themselves by peers in 22 OECD and three non-OECD countries.

According to Morgan Quitno's annual reference book, *Education State Rankings 2005 - 2006,* Arizona fell from 44th place in the 2002-2003 school year to 50th place in the 2005-2006 school year in the Smart Schools Ranking. Furthermore, it remains in 50th place. Morgan Quitno procures its data from the US Department of Education's National Center for Education Statistics database. In 2006, 618 of Arizona's 1,861 schools (or 33 per cent) did not make Adequate Yearly Progress (AYP) (Arizona Department of Education, 2006). As a means of holding schools accountable for student success, AYP is a yearly measure of student achievement. States have been mandated to develop target goals for AYP and incrementally raise the bar so 100 per cent of the students in Title I schools are proficient on the state assessment in reading, writing, and mathematics by the 2013-14 school year. Title I, a federally funded education program, is part of the Improving America's Schools Act of 1994. It provides support to schools whose population is composed of high levels of poverty and at-risk students who would otherwise have difficulty meeting state performance standards. Title I provides resources to support students who need assistance in attaining reading, writing and / or mathematics skills as determined by individual schools. Proficiency means the student takes their state assessment at grade level (No Child Left Behind Act, 2001); tenth grade students test at the tenth grade level even if they receive special education services and academically function at the fourth grade level. Arizona utilises the Arizona Instrument to Measure Standards (AIMS) test to measure AYP. AYP states that 95 per cent of the student body will pass the state standardised test (AIMS). Furthermore, 95 per cent of each socio / ethnic subgroup must test, including special education students and English language learners. If one socio / ethnic subgroup does not meet the required 95 per cent attendance rate, the entire school fails regardless of test results. Additionally, school graduation rates are factored into AYP (No Child Left Behind Act, 2001).

Background

Despite gains in the Arizona Instrument to Measure Standards Test (AIMS), 33 per cent of Arizona's schools did not make Adequate Yearly Progress (AYP) as defined by the No Child Left Behind (NCLB) Act (Arizona Department of Education, 2006). NCLB is a United States Act that was passed in 2001 and amended in 2004. It requires all public school teachers to be highly qualified, which means having a bachelor's degree, full state licensure, and proof of subject knowledge in their content area. Proof of subject knowledge is provided in one of the five following ways: having a degree in the subject taught, having college credits equivalent to a major in the subject, passing a state-developed test, having an advanced certification from the state, or possessing a graduate degree.

The lack of student progress is deemed to be partially related to different components of teacher education. For this study, teacher education is divided into two components: formal and informal. The formal components are the route one takes for teacher certification (traditional or an alternative route) and the level of degree attained (undergraduate or graduate). A traditional route occurs when one attends a university and attains a bachelor's degree, obtains 24 college credit hours in the subject matter to be taught, and has taken methodology courses. An alternative route occurs when one circumvents the aforementioned requirements. An example would be the Teach for America (TFA) program that sends

graduates from the nation's most prestigious colleges to work in disadvantaged school districts after only a few weeks of training (Trei, 2005). Informal components include the training a teacher receives while employed including mentoring, attending workshops or seminars, and collaboration.

NCLB was amended in 2004 to provide flexibility in critical areas such as mathematics and science. It allows states to create a combination of evidence to establish a teacher as being highly qualified, such as teaching experience, professional development, and knowledge in the subject that has been acquired over time. Furthermore, flexibility is extended to rural teachers, science teachers, multi-subject teachers, and special education teachers. In rural districts, teachers who are highly qualified in at least one subject have three years to become highly qualified in the additional subjects taught. In states where demand is high, science teachers are allowed to receive certification under a general science umbrella as opposed to specific science content such as earth science, biology, and chemistry. Likewise, multi-subject teachers can demonstrate subject competence through a streamlined process in each core academic area. Finally, special education teachers only need to be highly qualified in the core academic subjects in which direct instruction is provided. If the special educator provides consultation regarding adapting curricula, implementing behavioural supports, interventions, or accommodations and modifications, subject-matter competency need not be demonstrated (NCLB, 2004).

Formal Teacher Training

Darling-Hammond (1999) states that fully certified teachers with a background in subject matter and methodology are generally higher rated and produce more successful students than teachers who lack the background in subject matter and methodology. This is evidenced by high-standards states requiring prospective high school teachers to major in a core subject and to student teach for at least a semester. High-standards states are states that insist new teachers meet licensure requirements, ensure funding for on-going training and teacher mentoring, and have a high level of excellence established for teacher education institutions. In contrast, low-standards states license teachers with only six weeks of student teaching and without requiring even a minor in the core subject. Furthermore, high-standards states require teachers to be equipped with a plethora of teaching strategies, be familiar with regular and special education requirements, understand curriculum development and assessment, have some knowledge of how to use technology in the classroom, and have classes in child development. Low-standards states do not have similar requirements. High-standards states repeatedly lead the nation in academic scores in mathematics and reading. They rarely, if ever, hire out-of-subject area or uncertified teachers. Findings by Darling-Hammond (1999) reveal "the strongest and most consistent predictor of a state's average student achievement level is the proportion of well-qualified teachers in the state" (p 4). Well-qualified means a fully certified teacher with a certificate or major in the core subject being taught.

Darling-Hammond (2000) states that teachers entering the education environment without being fully prepared do not possess planning skills and the ability to implement instruction, when compared to those who are fully prepared. These same teachers are more likely to blame students for the lack of success. Darling-Hammond recommends improving teachers' preparation through improvement programs and improving clinical training. Goldhaber and Brewer (1996) support Darling-Hammond's perspective, reporting on a longitudinal study conducted in 1988 in which approximately 24,000 13-year-old eighth graders were surveyed. Then in 1990, a follow-up survey was conducted involving approximately 18,000 of the original 24,000. The survey explored the effects teacher education had on student success. It was found that there *was* a correlation between teachers certified with a bachelors' or masters' degree in mathematics or science and student success in those subjects. However, having a degree in mathematics or science had no effect on student success in English or History. This suggests that student success is affected by teachers' degrees when they are subject-specific.

Trei (2005) reviewed research by Darling-Hammond regarding the Teach for America (TFA) program. Conducted over six years by the Stanford School of Education researchers, the findings concluded that students consistently performed better when taught by certified teachers who have received methodological training rather than those who lacked or had minimal formal preparation. Rice (2003), on the other hand, feels that the impact of alternative-route certification as compared to standard certification is unclear, although she states that advanced degrees have a positive impact at the high school level when the degrees earned are in the subject matter being taught. A Harvard Graduate School of Education research project also contrasts with Darling-Hammond's findings. Researchers state that teachers receiving alternative forms of certification are as effective in the classroom as those receiving traditional training if the following criteria are met: possession of a bachelor's degree, "rigorous" exams in the subject area to be taught are passed, and professional teaching knowledge is demonstrated. Additionally, first year teachers are required to receive support through a mentoring program (American Board for Certification of Teacher Excellence, 2006).

Connor and Killmer (2001) provide an analysis that was developed at Southern Illinois University in an attempt to determine if contextually prepared student teachers have greater student teacher success than their traditionally trained counterparts. Information was gathered via two different surveys, a student teaching survey and a supervisor / cooperating teacher survey. The student teaching survey contained 113 questions that were rated using a Likert scale as well as open-ended questions. The supervisor or cooperating teacher survey contained 42 Likert scale questions and open-ended questions. The goal of both surveys was to determine the effect of the contextual teacher preparation program on the student teachers in the following constructs: prediction of success; confidence; professional background; preparation; personal attributes; instructional skills; classroom management; application of knowledge; holistic understanding; student interactions; university faculty interactions; and professional opportunities. For all 12 constructs the student teachers were viewed favourably when compared to their traditional student teacher counterparts.

Informal Teacher Training: Teacher Mentoring

Mentoring is a tool in which new teachers are paired with more experienced teachers or a team of experienced teachers to provide support, answer questions, problem solve, observe classes, and talk confidentially. Requiring both administrative and peer support, the purpose is to maximise classroom effectiveness. Gradet (2006) states that mentoring is a means of providing invaluable support from within the teaching community. The mentoring approach provides both teachers (the mentor and the mentee) with the opportunity to talk confidentially and problem solve. Mentoring may take many forms, including an induction, separate or informal program.

Mentoring involves both opportunity and risk. A possible risk includes a new teacher acquiring the mentor's bad habits or ineffective approaches if not paired with a skilled teacher. Considerations for creating a mentoring program include not pairing new teachers with superiors, pairing mentors and mentees of similar interests and outlooks on teaching, and pairing teachers who work in the same subject area or who have similar class loads. Guidelines include providing quality support and training for mentors that include goals, purposes, philosophies, and methods of observing / feedback; providing incentives such as pay and release time; providing administrative support; and building regular meeting times for mentors and mentees into the school schedule (Brewster and Railsback, 2001).

Lee *et al* (2006) collaborated to create a practical guide of 20 recommendations (10 for the mentor and 10 for the mentee) that enable a mentoring relationship to be successful under ten headings: Get ready for your mentor-mentee relationship; Share your personal philosophy with each other; Cultivate effective and ongoing communication; Plan, organise,

and manage; Build an expanding network of support; Share professional knowledge with each other; Engage in collaborative problem solving; Strengthen interpersonal communication skills; Provide caring and constructive feedback; and Strive for balance in your relationship. The benefits of implementing these strategies are that an experienced educator provides a venue for the new teacher to grow and successfully develop, thus increasing the new teacher's self-confidence and reducing attrition.

Attending Core Subject Related Workshops

Attending core subject-related workshops and seminars that address context-specific issues is one avenue through which teachers attain student success. Kelleher (2003) states that professional development should occur in context, connecting the information the teacher learns to student learning. In this model, professional development should be data-driven, should translate teachers' learning into classroom instruction, be tied to district goals, and provide an assessment mechanism to measure the effectiveness of the activities that were used during the training. Most importantly, the professional development should be relevant to the teacher's daily work. One way to tie professional development to district goals is via SMART goals. SMART goals are Specific, Measurable, Attainable, Results-oriented, and Time-bound. Development for teachers entails six stages that should be supported and guided by an administrator, mentor, or peer coach:

- Stage 1 – Data is used to set specific, measurable goals for student learning. This SMART goal drives which professional development opportunities a teacher engages.
- Stage 2 – Not imperative for every professional development opportunity; this stage permits the teacher to prepare for the activity.
- Stage 3 – Teachers are rewarded with incentives for pursuing self-improvement activities that transforms to student learning.
- Stage 4 – Teachers utilise reflection and then share meaningful information that will assist colleagues with improving student learning.
- Stage 5 – The teacher focuses on appropriate changes that can be implemented in the classroom that tie the new knowledge into classroom activities.
- Stage 6 – Teachers implement both quantitative and qualitative assessments to analyse if the original goals were achieved.

Lipson, Mosenthal, Mekkelsen and Russ (2004) agree with Kelleher (2003), in that issues that are context-specific need to be addressed in order to create a good fit between the school, instructional program, and community. They studied successful schools and found that the literature program chosen was not what mattered; rather, the manner in which all of the players came together (educators, students and community) determined success. In other words, those educators who experienced the greatest success were those who have invested in their profession as shown through commitment, knowledge, and expertise who provided balanced instruction, could articulate knowledgeably regarding their practice, and took advantage of professional development opportunities.

Staff Collaboration

Research reveals that staff collaboration is considered to be one of the most important considerations regarding on-going teacher education (DuFour, 2004; Rober, 2003; Idol, Paolucci-Whitcomb and Nevi, 1994). Empirical data points to collaboration that includes training from within, utilising data to drive decision-making, calling upon a variety of appropriate techniques, and the importance of administrative support (Gradet, 2006; Cooper, Ponder, Merritt and Matthews, 2005; Lashway, 2003; Leithwood and Riehl, 2003).

The current literature emphasises the great importance of internal support teachers receive while engaged in their profession through professional learning communities and collaboration. According to Gradet (2006), staff member collaboration is imperative to school success. He states that professional development is better received when it comes from the teachers (internally) rather than when an outsider imposes it upon the staff.

DuFour (2004) agrees that collaboration is essential. Describing three 'big ideas', he states there is a shift from teaching to learning, creating a culture of collaboration and focusing on results. With a focus on collaboration, DuFour states,

> The powerful collaboration that characterises professional learning communities is a systematic process in which teachers work together to analyse and improve their classroom practice. Teachers work in teams, engaging in an ongoing cycle of questions that promote deep team learning…in turn, leads to higher levels of student achievement (p 8).

Analysis takes the form of common formative assessments to determine if a student has mastered essential outcomes. Collectively, the professional learning community (PLC) determines the standard a student must meet to be considered proficient. PLCs are groups of teachers who cooperatively create goals to meet students' needs and enhance student performance. DuFour (2004) emphasises the necessity of teachers being provided with the appropriate meeting time to effectively collaborate.

Cooper, Ponder, Merrit and Matthews (2005) engaged in a comprehensive case study including documents, site visits, and interviews for eleven diverse North Carolina high schools that have consistently performed well on state assessments. Data-driven collaboration was highlighted as one of the patterns that consistently emerged as a technique implemented by successful schools. The belief is that staff members of the same core subject who meet regularly are better able to develop instruction, monitor students' progress, and coordinate efforts to support students when their decisions are supported by evidence.

Agreeing with Cooper *et al* (2005), Roeber (2003) emphasised the importance of collaboration and the importance of ongoing programs that keep teachers up-to-date in their subject areas. In addition to group learning that occurs in seminars and workshops, Roeber states that a priority should be placed on paying attention to individual teachers and their professional development needs, connecting student achievement and assessment by analysing results to drive decisions regarding how instruction should be altered. Focus time should be frequently scheduled (two to three times each month) for teachers to create a plan and / or discuss if an already developed plan is or is not working. Idol, Paolucci-Whitcomb and Nevi (1994) offer a collaboration technique known as collaborative consultation, a problem-solving model that involves regular and special education teachers who equally share the responsibility for a chosen intervention. Collaborative consultation enables people with diverse expertise to generate creative solutions to mutually defined problems. Solutions are thus richer than if the individual team members alone created them. The desired outcome of collaborative consultation is to provide comprehensive and effective programs for all students, enabling them to achieve maximum constructive results.

Leithwood and Riehl (2003) state effective educational leaders assist faculty members in collaboratively determining a vision and developing goals. One way support is provided is through time and resources. During collaboration, faculty members make joint decisions regarding issues and concerns. The result is discovering options that meet the needs of challenging students that make a difference. A supportive leadership role is crucial for this to occur.

Arizona Department of Education High School Summary Results

The spring 2006 AIMS test results demonstrate a need for concern (Table 1). The percentage of students who met or exceeded the state's requirements was: reading 70 per cent; writing 63 per cent, and mathematics 60 per cent. However, 25 per cent of the students *fell far below* the state's requirements in mathematics, potentially preventing them from receiving their high school diploma (Arizona Department of Education High School Summary Results, 2006).

Table 1. AIMS Spring 2006 High School Summary Results

Subject	N	Mean SS	FFB	A	M	E
Reading	76,763	702	5	25	62	8
Writing	86,223	685	6	32	57	6
Mathematics	86,767	697	25	15	48	12

Performance Levels: **FFB**, Falls Far Below the Standard; **A**, Approaches the Standard; **M**, Meets the Standard; **E**, Exceeds the Standard. The number equals the percentage of students in each performance level.

Based on the latest data released by the Arizona Department of Education (ADE), AIMS test scores for 2004 and 2005 reveal the school improvement status for all Arizona schools (Table 2). Most noteworthy is that fewer schools were required to be in improvement status in 2005 than in 2004; however, 90 schools received a warning in 2005 as compared to none in 2004.

Table 2. Number of Title I Schools Identified for Improvement in 2004 and 2005.

Improvement Status	2004	2005
Year 1[1]	73	56
Year 2[2]	56	44
Corrective Action[3]	48	27
Restructuring Implemented[4]	0	4
Restructuring Planned[5]	12	20
Out of School Improvement[6]	109	0
Warning	0	90
Total Identified	189	241
Total Not Identified	1562	902

[1] A Title I school under the year one improvement status is a school that has not met AYP for two consecutive years. Within 90 days of identification, the school must notify parents / legal guardians, develop and implement a School Improvement Plan (SIP), allocate 10 per cent of its Title I funds for professional development, and permit parents / legal guardians the option of transferring their student to another school.

[2] A Title I school under the year two improvement status is a school that has not made AYP for three consecutive years. Upon identification, the school must continue with the same strategies as year one.

[3] A Title I school that has not made AYP for four consecutive years must maintain the above strategies as well as implement at least one of six corrective actions listed in the NCLB corrective action options.

[4] A Title I school that has not made AYP for five consecutive years must continue to implement the above strategies as well as prepare a restructuring plan with appropriate arrangements to implement one of three restructuring activities.

[5] A Title I school that has not made AYP for six consecutive years must implement the above strategies and the restructuring plan.

[6] Identifies Title I schools who have met AYP and are removed from the improvement plan.

Arizona's 4-year and 5-year graduation rates for the years 2001, 2002, 2003, and 2004 are illustrated in Table 3. Based on the number of students graduating in four- and five-years, it is clear that, while schools have improved, more than 20 per cent of the students are still not successful in meeting the Arizona state standards.

Table 3. Trends in Arizona four- and five-year percentage graduation rates

Years to graduation	2001	2002	2003	2004
4-year	70.8	72.7	74.0	76.8
5-year	72.9	76.4	77.9	79.8

According to Tobergte and Curtis (2002), US practices and procedures over the last 50 years have virtually been unchanged in spite of the millions of US dollars that have been allocated for a plethora of innovative approaches intended to improve student achievement. In Arizona, the poor testing results on the 2006 AIMS test could be due, in part, to important aspects of teacher education that are being largely neglected. For example, finding time for professional collaboration is a major challenge. Saddled with multiple responsibilities, teachers often struggle just to keep up with attendance, behaviour issues, phone calls home, grading papers, creating lesson plans, defining objectives, and other responsibilities that make this list endless. These responsibilities, coupled with limited resources, tend to thrust teachers into a silo perspective in which individuals, grade levels, or content areas compete with each other or operate in isolation (Kaufman, Oakley-Browne and Leigh, 2003).

In an effort to determine what aspects of teacher education affect a school's success as measured by student scores achieved on the AIMS test, the following was hypothesised: schools staffed with teachers possessing advanced degrees, that send teachers frequently to core subject-related workshops / seminars, that regularly provide scheduled time for data-driven collaboration, and that provide teacher-mentoring programs have a greater student success rate than schools that do not.

An important limitation of this study was that it cannot account for many extraneous variables that may affect students' success. Examples of extraneous variables include the amount of time a student studies, how much sleep the student gets, if the parents are literate and able to help with homework, and diet.

Method

This study was conducted using the AIMS test results published on the ADE website. Thirty low-performing public high schools and thirty high-performing public high schools were randomly selected from the ADE list to participate. A short questionnaire was designed and administered to teachers employed in the selected schools. The questionnaire was designed to attempt to determine if there was a relationship between each aspect of teacher education mentioned above and student success as measured by aggregate AIMS scores.

Procedures

The chosen schools, listed in descending order, were divided into two groups: the upper- and lower-half. Utilising Research Randomizer, an Internet random number sampler program, sixty schools were selected from the list, thirty low-performing and thirty high-performing. Participants that received the questionnaire included English and mathematics teachers from across the state from both urban and rural populations and incorporated various age groups, genders, degree levels, and years of experience.

Approval to use human participants for this research project was obtained through the IRB process at Northcentral University. Principals of the randomly selected schools received an information sheet/consent form to secure permission to distribute the accompanying questionnaires to the English and mathematics teachers. The teachers of the randomly selected schools received an *Information Sheet for Participation in a Research Project* attached to the questionnaires. Prior to mail out, the questionnaire underwent evaluation by a formative committee. The information sheet invited classroom teachers to participate in a research study. Furthermore, it explained the purpose, participation requirements, potential risks / discomfort, potential benefits, ensured anonymity / confidentiality, and the right to withdraw. Those that chose to participate completed them.

The next step was to collect the completed questionnaires from the principals. A self-addressed stamped envelope was included for the return of the questionnaires. The completed questionnaires' data were analysed using SPSS to determine if there was a relationship between any aspect of teacher education mentioned earlier and student success, as measured by aggregate AIMS scores.

The following questions were included:

1. Did you attain your education certificate through a traditional program or an alternative certificated program?
2. Name the level of degree(s) you have attained.
3. Approximately how many core-subject related workshops / seminars do you attend each school year?
4. Have you ever participated in a structured teacher-mentoring program as a mentor or mentee in your current school?
5. Approximately how many hours each school year do you formally or informally collaborate with your colleagues using data-based information to drive decision making?

Results

Ninety-two English and mathematics teachers from 15 schools (seven low-performing and eight high-performing) across the state, including urban and rural areas, completed the questionnaire. The response rate to each question was over 95 per cent. There was a 9 per cent difference between high- and low-performing schools regarding degrees earned (bachelors vs masters) and an 18 per cent difference between high- and low-performing schools regarding the path taken to certification (traditional vs. alternative). In addition, 73 per cent of the teachers in the high-performing schools reported being a mentor or mentee while only 28 per cent of the teachers in the low-performing schools made this statement. However, 87 per cent of the teachers in both the high- and low-performing schools stated they attend workshops and seminars one to nine hours per year. Just 2 per cent of the teachers in the high-performing schools and 4 per cent of the teachers in the low-performing schools reported attending workshops and seminars 10 or more hours during the school year. Interestingly, 38 per cent of the teachers from the low-performing schools compared to only 6 per cent of the teachers from the high-performing schools reported *that they did not collaborate* with their peers using data to drive decision-making during the year. Just 15 per cent of the teachers from low-performing and 46 per cent of the teachers in the high-performing schools collaborated for up to 20 hours annually. However, 49 per cent of the teachers in the low-performing schools and 51 per cent of the teachers in the high-performing schools (almost equal) collaborated for more than 41 hours annually.

Table 4 gives the multiple regression analysis findings and suggests that participating in mentoring is the most valuable strategy that can be implemented to promote student success, with being a mentor or mentee with another faculty member increases student

AIMS scores by 27 points ($p < .001$). Note that 73 per cent of the teachers in high performing schools reported being a mentor or mentee while only 28 per cent of the teachers in the low-performing schools made this statement.

Table 4. Effect of Teacher Education on Student Success (AIMS Test Scores)

Variable	*B*	Standard error *b*	Beta	*t*	Significance of *t*
Degree	5.44	6.84	.08	.80	.429
Workshops	11.33	5.07	.22	2.24	.028
Mentoring	27.30	7.09	.38	3.85	.000
Collaboration	1.07	.92	.12	1.17	.246

The second most valuable strategy that can be implemented to promote student success ($p < 0.05$) is participating in core-subject related workshops. For every unit of increase in attendance at workshops / seminars (one unit equals three hours), student success rates as measured by the AIMS test would increase by 11 points. Note that 74 per cent of the teachers in high performing schools reported attending workshops while only 26 per cent of the teachers in the low-performing schools made this statement. The above findings were further supported when the results of the top three schools that returned their questionnaires were examined to determine common characteristics among their approach to create student success. In those schools, 53 per cent of first-year teachers engaged in mentoring programs, and 86 per cent of the teachers attended core-subject related workshops for up to ten hours annually.

The degree a teacher holds and how certification was attained yielded no significant effect in this study. Although several studies (Darling-Hammond, 1999 and 2000; Goldhaber and Brewer, 1996; Trei, 2005; Rice, 2003; Connor and Killmer, 2001), convey mixed results, it had been expected that holding an advanced degree attained via traditional training in methodology would yield a strong positive relationship to student success over holding an undergraduate degree attained via alternative certification routes. Similarly, there was no significant effect of collaborating with peers using data to drive decision-making. This was also surprising, as much literature strongly supports collaboration (Gradet, 2006; DuFour, 2004; Cooper *et al,* 2005; Roeber, 2003; Idol *et al,* 1994; Lashway, 2003; Leithwood and Riehl, 2003) as an important strategy that promotes student success. It is possible that such an affect was difficult to capture via this study, which occurred at a micro level.

Conclusion

This study examined if any aspects of teacher education could promote learning and contribute to student success in the state of Arizona. Though research delineates that attaining a degree in education, collaborating, mentoring, and attending core-subject related workshops are positive behaviours of effective teachers (Darling-Hammond, 1999; Goldhaber and Brewer, 1996; Gradet, 2006; Kelleher, 2003; DuFour, 2004; Rober, 2003; Cooper, Merrit, Matthew and Ponder, 2005; Lashway, 2003), this researcher wanted to determine which aspects had the greatest impact in Arizona public high schools.

The findings of this research suggests that mentoring and participating in core-subject related workshops are the two best strategies that could be implemented to promote student success in Arizona public high schools. These findings, however, are certainly not straightforward, for aspects of teacher education are intertwined. For example, a teacher possessing a bachelor's degree with a strong desire to enhance his or her teaching ability could attend core subject-related workshops. Or, a school could implement a data-driven collaboration schedule coupled with teacher mentoring, supporting a first year teacher with a skilled tenured teacher. The result would be the enhancement of teachers' skills and

demonstrating competence via a combination of professional development and teaching experience. The optimum result is an increase in the student success rate.

Teachers may be armed with a plethora of knowledge and skills and be willing to do everything within their power to impart that knowledge to their students. Yet, in the end students, with the support of their parents, are ultimately responsible for their education. Unfortunately, the current atmosphere in the United States places the greater onus on the teachers.

The results obtained provide possibilities for concerned policymakers, administrators, and teachers. The continuing challenge is for professional learning communities to regularly re-evaluate the process being implemented to achieve high-levels of student learning through high performing collaborative teams. The teams need to clarify what students will learn, how assessments will occur, and which interventions are necessary for remediation to occur. Systemic thinkers in learning organizations are "not content to merely describe the future they seek; they also articulate and promote attitudes, behaviours, and commitments that must exist to create that future" (National Education Service, 2005, p 229).

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