

Bridging the Gap

The Impact of Graduate Degree Programs
Connecting Mind, Brain, and Education Research
to Teaching and Learning



Prepared for



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EXECUTIVE SUMMARY

This study was conducted to document how well the brain-based teaching graduate degree programs provide teachers with important knowledge, skills, and practices so that they may effectively reach all students and improve student achievement in classrooms today.

Study Overview

This study was conducted to document how well the M.S. and Ed.S. degrees in Brain-Based Teaching offered through Nova Southeastern University provide teachers with important knowledge, skills, and practices so that they may effectively reach all students and improve student achievement in classrooms today. Using an instrument that assesses teachers' perceptions of their graduate program both overall and in comparison to other university programs and professional development in which they have participated, results provide a means of estimating how influential the programs are in helping teachers better reach all students so that every child has the opportunity to learn.

Key Findings

1. Program graduates are teachers who take responsibility for improving teaching effectiveness in their classrooms.
 - More than 92% state that they are now more effective teachers.
 - About 97% report that they have added more teaching strategies to their toolbox.
 - More than 90% note that they use what they learned on a regular basis.
2. Program graduates state that they are better able to reach and teach more students more of the time.
 - I have learned strategies that help me keep more students' attention more of the time (93%).

Graduates report that they are better able to reach and teach more students more of the time.

Graduates agree that the program gave them opportunities to learn with other professionals and to develop as teacher leaders.

- I learned new tools for working with students who have trouble learning with other methods (91%).
 - I am better able to differentiate instruction (90%).
3. Program graduates report improved understanding and application of knowledge about how students learn and necessary skills for success in the 21st century.
- I have a better understanding about how my students learn (96%).
 - I am better able to make lessons meaningful (92%).
 - I learned the thinking skills my students need to achieve academic and life successes (95%).
4. Program graduates report that they are more metacognitive about their teaching practice.
- I am better able to explain why I am doing what I am doing (96%).
 - The assignments I completed helped me internalize what I was learning (92%).
 - I am better able to keep myself in a positive, optimistic, motivated state for teaching (92%).
5. Program graduates report that the program gave them opportunities to learn with other professionals and to develop as teacher leaders.
- I acquired knowledge and skills that I can share with my colleagues (97%).
 - I had the opportunity to dialogue the use of strategies with other professionals (92%).

INTRODUCTION

These graduate degree programs are designed to equip teachers with knowledge about how research in the domains of student learning, cognition, neuroscience, and teacher leadership can be translated into best practices in classrooms and schools.

Approximately 3,000 educators have graduated from brain-based teaching programs offered through the Abraham S. Fischler School of Education at Nova Southeastern University, which is accredited by the National Council for Accreditation of Teacher Education (NCATE) as well as regionally through the Southern Association of Colleges and Schools (SACS). Three programs are offered: the Master of Science degree with a major in Brain-Based Teaching and concentrations in Learning and Teaching or Reading and Literacy as well as the Educational Specialist degree with a major in Brain-Based Teaching and a concentration in Teacher Leadership.

The programs focus on equipping teacher leaders with knowledge about how breakthroughs in the domains of student learning, cognition, brain, and teacher leadership can be translated into best practices in the classroom and beyond. A June 2012 article in *Education Week* named the programs as some of the only U.S.-based programs that offer teachers certification in educational neuroscience, along with those offered at Harvard and the University of Texas at Arlington (Sparks, 2012).

Background

Research across the trans-disciplinary fields of mind, brain, and education is starting to inform educational practice, but few degree programs have used this knowledge to create an integrated conceptual framework and course of study. These brain-based graduate programs with a focus on teaching, learning, and teacher leadership have a deep foundation in specific projects that span several decades. For example, at the state level in 1999-2002, Donna Wilson and Marcus Conyers worked with teacher leaders across Florida on the Department of Education's dropout prevention initiative. The purpose of the

Scholarships for Teachers in Action Research (STAR) project was for teacher leaders across the state to participate in the following: (1) a weeklong education, mind, and brain workshop, (2) four two-day follow-up workshops, and (3) site based job-embedded coaching sessions at their schools. Within the same time span, this work was the focus of an Annenberg Challenge grant for in-service teachers in two of the largest school districts in the United States.

Other Related Studies on the Brain-Based Teaching Programs

Two other studies (Germuth, 2011, 2012) point to the impact of these graduate programs on the graduates' professional expertise. In one of the studies a case study approach (Stake, 1995; Yin, 1993) informed by Michael Quinn Patton's (1990) work on qualitative sampling and Sarah Lawrence Lightfoot's work on portraiture methodology (1997) was used. The study included in-depth interviews with seven current or former students and one parent coordinator. An analysis of interviews demonstrated that current and past students were using the information, skills, and practices they learned in their graduate programs to reach all learners across all school levels to improve student achievement, that they were using many of these same strategies to better reach and work with parents, and that they had become voices for change as teacher leaders in their schools and communities. Preliminary results of this study were presented at the 2011 International Association of Cognitive Education and Psychology (IACEP) conference, and final results were presented at The American Association of Colleges for Teacher Education (AACTE) conference in February 2012.

The other study included results from 90 graduates who responded to a survey about their behaviors and roles as teacher leaders. Findings demonstrated that program graduates are teacher leaders who take responsibility for improving teaching and learning in their schools in formal and informal ways and approach their work as teacher leaders in a way that is consistent with national and state teacher leadership standards. Furthermore, completion of the graduate degree program prepared teachers to successfully assume teacher leadership roles, with approximately 91% of respondents indicating that they strongly credited their graduate education with their development as teacher leaders.

An analysis of interviews demonstrated that current and past students were using the information, skills, and practices they learned in their graduate programs to reach all learners across all school levels to improve student achievement.

SURVEY AND METHODOLOGY

The Brain-Based Teaching Graduate Survey is based on a review of the programs it covers and is designed to assess the degree to which graduates of the Master of Science and Educational Specialist programs are better prepared after study to teach across a wide age range and content span.

Survey

The Brain-Based Teaching Graduate Survey is based on a review of the programs it covers and is designed to assess the degree to which graduates of the Master of Science and Educational Specialist programs are better prepared after study to teach across a wide age range and content span. Items in the graduate survey are grouped into four sections. The sections focus on graduates' perceptions of: (1) the experiences they had participating in the graduate programs; (2) the impact their participation had on their teaching practice; (3) the strength of the programs compared to other university programs they have experienced; and (4) the strength of the programs compared to other professional development opportunities they have experienced. In addition, multiple demographic questions are included.

Given the development of the survey, it can clearly be said to have high content validity, which refers to the extent to which a measure represents all facets of a given social construct—in this case, teachers' perceptions of their learning experiences in graduate studies with an education, mind, and brain focus and the impact on their classroom practice.

To complete the survey, teachers responded to questions that assessed whether and how much they perceived themselves as having engaged in critical research in, study of, and applications involving education, the mind, and the brain, and how they perceived themselves as better prepared to help all students achieve. To date, 294 graduates have responded to the graduate survey.

Methodology

To assess the reliability of the survey, or degree to which the survey measures what it is meant to measure consistently over

Teachers were provided a link to the web-based version of the survey within three months of their graduation and asked to complete the anonymous survey.

time, item-analyses, including Cronbach's alphas, were calculated by section. Item-analyses indicated that items in each section were well aligned and that no items needed to be dropped from the survey. Cronbach's alphas indicated that the sections have high internal reliability and are as follows: Graduates' Perceived Experiences (0.893), Impact of Participation on Teaching (0.954), Strength of Graduate Programs Compared to Other University Programs (0.957), and Strength of Graduate Programs Compared to Other Professional Development Programs (0.965). When evaluating the internal consistency of a scale, the rule of thumb to follow is: 0.9 is Excellent, 0.8 is Good, 0.7 is Acceptable, 0.6 is Questionable, 0.5 is Poor, and 0.5 is Unacceptable. Thus survey sections were viewed as having excellent internal consistency.

Participants

Teachers were provided a link to the web-based version of the survey within three months of their graduation and asked to complete the anonymous survey. Follow-up emails were used to increase the response rate. To date, a total of 294 graduates of the brain-based teaching program have completed the graduate survey, for a response rate of 61%.

Of these respondents, 170 (58%) were graduates of the Ed.S. program, 100 (34%) were graduates of the M.S. program with a concentration in Learning and Teaching, and 20 (7%) earned the master's degree with a concentration in Reading and Literacy (4 graduates did not answer the question).

Approximately half (n=148; 50%) indicated that they are currently teaching at the elementary level (pre-K through fifth grade), 64 (22%) teach at the middle school level (grades 6-8) and 42 (14%) teach at the high school level (grades 9-12). An additional 40 graduates are either fulfilling a variety of other educational roles including adult educator, principal, curriculum specialist, and counselor (11% of respondents) or are not currently working (3% of respondents). Respondents represent multiple states, including Alabama, Arizona, California, Colorado, Connecticut, Florida, Georgia, Illinois, Maine, Maryland, Massachusetts, Michigan, Nevada, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Utah, Virginia, Washington, Wyoming, and the District of Columbia. All but 14 respondents said that they were either Likely (n=57; 19%) or Very Likely (n=223; 76%) to recommend the program to their colleagues.

RESULTS

Collectively, these items assess the degree to which program participation improves teaching and learning.

For the first part of the survey, respondents were asked to rate their level of agreement on a scale of 1 (strongly disagree) to 5 (strongly agree) to multiple statements about the educational program in which they engaged to assess whether it met its objectives (e.g., provided opportunities for students to dialogue with other professionals, provided examples of research-based strategies being put into practice). In the second part of the survey, respondents were asked to again rate their agreement, using the same scale as noted above, to multiple statements about the impact of their graduate studies on their teaching practice. Collectively, these items assess the degree to which program participation improves teaching and learning. When broken down by sub-areas, these items assess the following five dimensions of teaching:

I. Improved Teaching Practice

- I am a more effective teacher. (92%)
- I had access to important research on teaching and learning. (95%)
- Course materials and information included information I could use. (93%)
- I had access to examples of research-based strategies being put into practice. (91%)
- I think and reflect more on my teaching practice. (92%)
- I am using what I learned on a regular basis. (91%)
- I have added more teaching strategies to my toolbox. (97%)

II. Improved Ability to Reach and Teach More Students More Often

- More of my students in my class are learning more of the time. (86%)
- I learned new tools for working with students who have trouble learning with other methods. (91%)
- I am able to reach more of my students more of the time. (91%)
- I am better able to differentiate instruction. (90%)
- I have learned strategies that help me keep more students' attention more of the time. (93%)

III. Improved Understanding and Application of Knowledge about How Students Learn

- I have a better understanding about how my students learn. (96%)
- I am better able to make lessons meaningful. (92%)
- I am better able to employ strategies for making important knowledge memorable. (95%)
- I learned thinking strategies my students need to achieve academic and life success. (95%)

IV. Becoming More Metacognitive About Teaching

- I am better able to explain why I am doing what I am doing. (96%)
- The assignments I completed helped me internalize what I was learning. (92%)
- I am able to keep myself in a positive, optimistic, motivated state for teaching. (92%)
- I am more excited about teaching. (91%)
- I am more likely to stay in the teaching profession. (85%)

V. Learning with Colleagues and Working as a Teacher Leader

- I acquired knowledge and skills that I can share with my colleagues. (97%)

- I had the opportunity to dialogue ideas with other professionals. (93%)
- I had the opportunity to dialogue the use of strategies with other professionals. (92%)

Findings based on survey responses are presented below, by sub-dimension. Each sub-dimension includes a selection of teacher comments; the full list of comments provided by graduates can be found in the Appendix.

Improved Teaching Practice

The following survey items assess whether teachers believe that their professional practice has improved since participating in the brain-based teaching programs, including whether they use the resources, skills, and strategies that they learned and whether they think and reflect more on their teaching practice. Graduates believe very strongly that the programs in which they matriculated greatly improved their teaching practice. As is shown below, mean ratings to the following statements assessing teachers' improved teaching practice ranged from 4.40 to 4.76, with the percent of graduates agreeing or strongly agreeing ranging from 90.8% to 97.1%.

Comments provided by respondents support what the data show—that the graduate programs provided opportunities and experiences that improved participants' teaching:

- *Thinking for Results was the most useful part of the program I believe. I am incorporating the Cognitive Assets into my daily instruction and coaching my students in developing them.*
- *I really felt that all the information was cogent and immediately applicable. The beauty and the strongest part of this master's was the requirement to apply the learning immediately. I also based most of my program about delivering the cognitive assets and using these concepts at the center of my program and was able to use and connect all of the other tools to them. I learned so much from the AR study and was pleased to know how much the last class added to my classroom management repertoire.*
- *Allowing students to have more choices in their learning is huge. Providing a variety of teaching techniques that are verbal, visual, and experiential is necessary to reach every learner, and intentionally teaching cognition to students to help them be successful in learning is important.*

- *The 60 Strategies text will be a helpful asset when designing my lessons. I will also make sure that I am in a healthy, optimistic state for my students. I now know that I need to focus on changing the lesson to meet the needs of the learner rather than trying to change the learner.*
- *My students are learning how to activate a positive attitude to put them in the mood for learning. My students also benefit from movement activities such as brainobics to help them learn.*
- *I am able to strategically plan my lessons around the way the brain learns best. My class is lively, interactive, positive, and metacognitive. This benefits students!*
- *I am far more flexible and differentiate for individual students rather than for groups of students.*
- *I believe that I am more positive and optimistic than I've been in the past. I am making individual connections with my students. I have begun teaching mini lessons ... and support through small group.*

TABLE 1: IMPROVED TEACHING PRACTICE

	n	Min.	Max.	Mean	Sd	%4 or 5
a. I am a more effective teacher.	272	1	5	4.52	.945	92.3
b. I had access to important research on teaching and learning.	278	1	5	4.70	.789	94.6
c. Course materials and information included information I could use.	280	1	5	4.60	.870	92.8
d. I had access to examples of research-based strategies being put into practice.	288	1	5	4.53	.871	91.0
e. I think and reflect more on my teaching practice.	273	1	5	4.57	.957	91.6
f. I am using what I learned on a regular basis.	272	1	5	4.40	.935	90.8
g. I have added more teaching strategies to my toolbox.	272	1	5	4.76	.616	97.1

Improved Ability to Reach and Teach More Students More Often

The brain-based teaching programs focus on teaching educators ways to better engage, motivate, and teach diverse learners of all types. Graduates leave armed with new understanding for how to reach all students through proven tools and strategies. Graduates believe

that their graduate program improved their ability to reach and teach more students more often, regardless of background or learning preference. Mean agreement ratings to items that relate to graduates' abilities to reach diverse learners were rated quite high, ranging from 4.21 (More of my students in my class are learning more of the time) to 4.61 (I learned new tools for working with students who have trouble learning with other methods). The percent of graduates who rated their agreement to these items a 4 or 5 ranged from 86.4% to 93.0%.

TABLE 2: IMPROVED ABILITY TO REACH AND TEACH MORE STUDENTS MORE OFTEN

	n	Min.	Max.	Mean	Sd	%4 or 5
a. More of my students in my class are learning more of the time.	271	1	5	4.21	1.172	86.4
b. I learned new tools for working with students who have trouble learning with other methods.	248	1	5	4.61	.924	91.3
c. I am able to reach more of my students more of the time.	273	1	5	4.42	1.023	90.8
d. I am better able to differentiate instruction.	272	1	5	4.47	.937	90.4
e. I have learned strategies that help me keep more students' attention more of the time.	273	1	5	4.53	.927	93.0

These findings are reinforced by comments such as the following:

- *I chose this program because of the focus on brain-based teaching. With the differentiated learning needs in every classroom, I believe it is critical to know and understand how the brain accesses and processes information in order to best meet those needs.*
 - *The idea of practical optimism, because I work with many courageous learners who have learned pessimism—it is truly the key to helping them believe intelligence is not fixed, and their brains are changing all the time.*
-
- *I think more about individual student differences and how I can teach so that each one learns effectively (differentiation strategies).*
 - *Their scores on state tests have drastically improved.*
 - *My students are more optimistic, less stressed and more cooperative. Because of this, they are better able to pay attention and engage with the lesson and the activities. As a result of higher engagement, they are learning and retaining more.*
 - *They learn about themselves as learners—as whole entities. In many cases, they "teach" themselves how to be better students.*
 - *My students have more excitement toward learning because I now know how to create learning activities that appeal to each of them.*
 - *I have been better able to understand my students as a whole. I now know why they have difficulties learning and how to accommodate for those difficulties.*
 - *My day is much more thought out. I plan activities that will benefit all students. I now think about my own thinking and also help students think about their own thinking. I've learned to ask my students the right questions to get them thinking more in depth. I've learned that each student is unique as a fingerprint. Each student learns differently.*
 - *It has confirmed my belief that every person can learn, you just have to find out how they learn best and adapt to meet their learning needs.*

The brain-based teaching programs promote learning about mind, brain, and education research, including information about how the brain functions and ways to apply such findings to better reach diverse learners.

Improved Understanding and Application of Knowledge about How Students Learn

The brain-based teaching programs promote learning about mind, brain, and education research, including information about how the brain functions and ways to apply such findings to better reach diverse learners. Using this information, teachers become more aware of how students learn, including students who learn in nontraditional ways.

Graduates' ratings were particularly high for the suite of items related to their understanding and application of knowledge about how students learn, or metacognition. Mean ratings of agreement ranged from 4.53 (I am better able to make lessons more meaningful) to 4.71 (I have a better understanding about how students learn). The percent of graduates who rated their agreement a 4 or 5 to these statements reflect their affinity to these items and ranged from 92.0% to 96.3%.

Comments provided by respondents reflect that graduates believe that they gained greater understanding regarding how students learn and ways to use this understanding to increase students' achievement:

- *The entire Brain S.M.A.R.T. method really outlined how to get students to really learn how to learn. My goal is to teach students HOW to learn and think, not just memorizing content.*
- *My students now have a teacher who has the strategies and tools to help them learn to think metacognitively, and to teach them how to become successful in school, and in their personal lives.*
- *I feel that my students are able to now own their learning. I feel*

like I have been able to teach my students the importance of driving their own thinking. I feel my students are beginning to enjoy learning more now that I have gained more knowledge on best teaching practices from my graduate studies.

• *The metacognitive strategies are wonderful. I have never been taught the concept of "thinking about your thinking," but such information helped students learn and grow leaps and bounds.*

TABLE 3: IMPROVED UNDERSTANDING AND APPLICATION OF KNOWLEDGE ABOUT HOW STUDENTS LEARN

	n	Min.	Max.	Mean	Sd	%4 or 5
a. I have a better understanding about how my students learn.	272	1	5	4.71	.707	96.3
b. I am better able to make lessons meaningful.	273	1	5	4.53	.899	92.0
c. I am better able to employ strategies for making important knowledge memorable.	272	1	5	4.58	.825	95.2
d. I learned the thinking skills my students need to achieve academic and life success.	245	1	5	4.68	.762	95.1

- *I feel that I am better qualified to develop learning experiences that are geared to boost their learning potential. Because the program focuses intensely on educating teachers about how students learn, I know that I am better able to create opportunities for my students to participate in activities that produce optimal learning.*
- *I approach life now believing that everyone is doing the best they can with the cognitive assets they have. I am more supportive, tolerant, compassionate, and understanding of life's circumstances. I also listen better to others and want to give them the hope and optimism to pursue their dreams and feel success.*

Becoming More Metacognitive About Teaching

The brain-based teaching programs stress providing knowledge to teachers about learning, so that they have an understanding about how to be more metacognitive about their teaching. Graduates' agreement to statements about metacognition indicate that they are becoming more aware of what they are doing in the classroom. They also spend time learning about the benefits of a positive state of mind; many teachers apply these strategies to their own teaching practice. These findings are reflected in the ratings below and in the following comments:

- *The thing that was most helpful was the realization that I was not necessarily a poor classroom manager, but simply in need of better materials and instructional strategies to keep my students engaged in their learning.*
- *Learning about neurocognitive plasticity and the power of positive states of mind has made me a more optimistic teacher. I realize that EVERY student can become a more effective thinker. My students benefit from me EXPLICITLY modeling and promoting effective brain-based strategies.*
- *I am more confident in my abilities and feel I have a better understanding (and more tools) to meet the learning needs of my students. I am more creative in my lesson design, and it is better aligned with my instructional goals.*
- *It has helped me to understand the importance of getting the students to think about their own thinking. Before my graduate studies I occasionally told the students what I was thinking about and felt foolish while doing it. Now I know there are many strategies to help students succeed in school and beyond.*

Students need to become and stay optimistic about learning in order to continue to strive for the highest level possible. It is important to encourage students to want to learn and how to help each other succeed as well.

TABLE 4: BECOMING MORE METACOGNITIVE ABOUT TEACHING

	n	Min.	Max.	Mean	Sd	%4 or 5
a. I am better able to explain why I am doing what I am doing.	275	1	5	4.65	.720	95.7
b. The assignments I completed helped me internalize what I was learning.	275	1	5	4.55	.892	92.0
c. I am able to keep myself in a positive, optimistic, motivated state for teaching.	271	1	5	4.50	.890	91.5
d. I am more excited about teaching.	275	1	5	4.51	.926	91.3
e. I am more likely to stay in the teaching profession.	280	1	5	4.38	1.084	85.3

• I've never experienced a program that was not only about the students and their learning, but also about me and my own social, cognitive, and emotional development—my own brain's learning systems. To become better at what I do, I have to be good at understanding and being me first. I firmly believe this, and no other program has ever addressed this.

• Completing the program has made me a much more confident teacher! It

has given me an abundance of effective tools and strategies that enable me to reach all of my students, no matter what their challenges may be.

Learning with Colleagues and Working as a Teacher Leader

The brain-based programs provide opportunities for participants to learn with colleagues and begin working as teacher leaders in their schools and communities. For example, teachers have opportunities to dialogue about ideas and strategies with colleagues and other professionals and share what they have learned within their classes, schools, and communities. As is shown below, mean ratings of agreement to items related to these themes ranged from 4.57 to 4.75, with over 92% of respondents agreeing or strongly agreeing to these items. These findings are also reflected in the following comments:

- As a result of this program I am able to share this knowledge with parents in the business environment. By sharing what brain research is telling us about how children learn best and providing strategies for parents to use at home I am beginning to build a network of brain teaching/learning advocates. If change is to happen it will be driven by parents who are empowered with the facts about brain based learning and expect the system to change.*

TABLE 5: LEARNING WITH COLLEAGUES AND WORKING AS A TEACHER LEADER

	n	Min.	Max.	Mean	Sd	%4 or 5
a. I acquired knowledge and skills that I can share with my colleagues.	245	1	5	4.75	.608	96.7
b. I had the opportunity to dialogue ideas with other professionals.	278	1	5	4.59	.817	92.8
c. I had the opportunity to dialogue the use of strategies with other professionals.	277	1	5	4.57	.838	92.1

- *I have never been more passionate about learning. This program by far exceeded any prior educational experience I have had. Every course and every piece of information was applicable to learning and teaching. It is a program that you can not only believe in, but one that you can use to motivate others to be the best they can be.*

- *I work with teachers more often now, and often teach workshops focused on instruction.*

- *I am better able to coach teachers to be reflective in their practice and have a wealth of strategies to share with them to aid their students with retention, transfer and application. Hence, improving student achievement.*

- *I am more confident as a lead teacher and department chair.*

- *I feel more confident as a teacher. Other teachers are coming to me for guidance. I have taken an even greater role as a leader at my school.*

- *My peers at work are very interested in what I have to share about the education of students. I have also been given a job with more responsibility.*

Comparison of Brain-Based Teaching Programs to Other University Programs and Professional Development

Graduates were asked to compare the brain-based teaching program in which they matriculated to other university and professional development programs on a scale of 1 = much stronger in the other program to 5 = much stronger in the brain-based teaching program. As is shown below, between 86.7% and 90.7% of graduates rated the brain-based teaching program a 4 or a 5 in comparison to other university programs; percentage of ratings that were 4 or 5 ranged from 88.1% to 92.1% when graduates made comparisons to other professional development programs.

Figure 1.
Rating of Brain-Based
Teaching Program to
Other University Programs

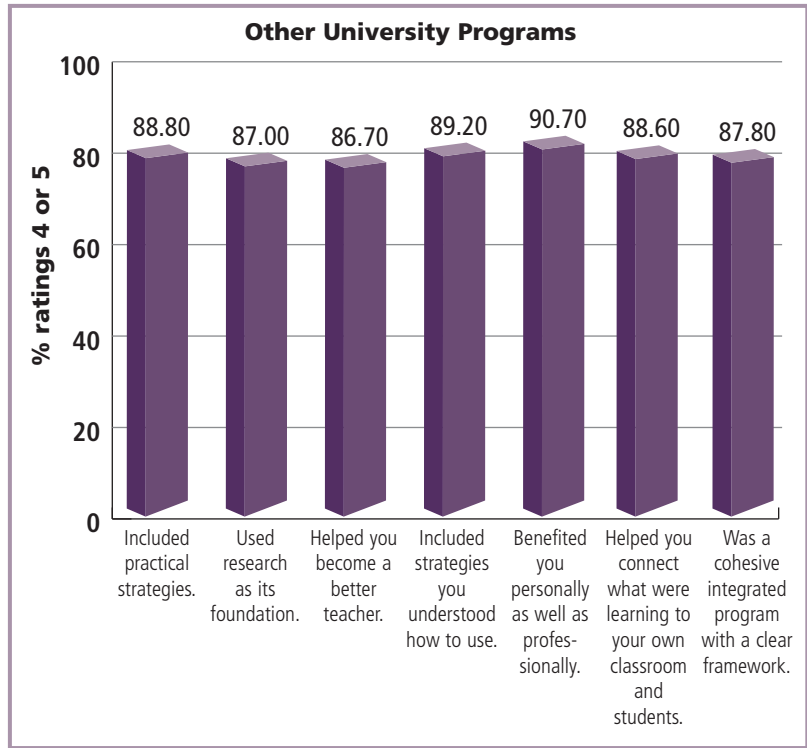
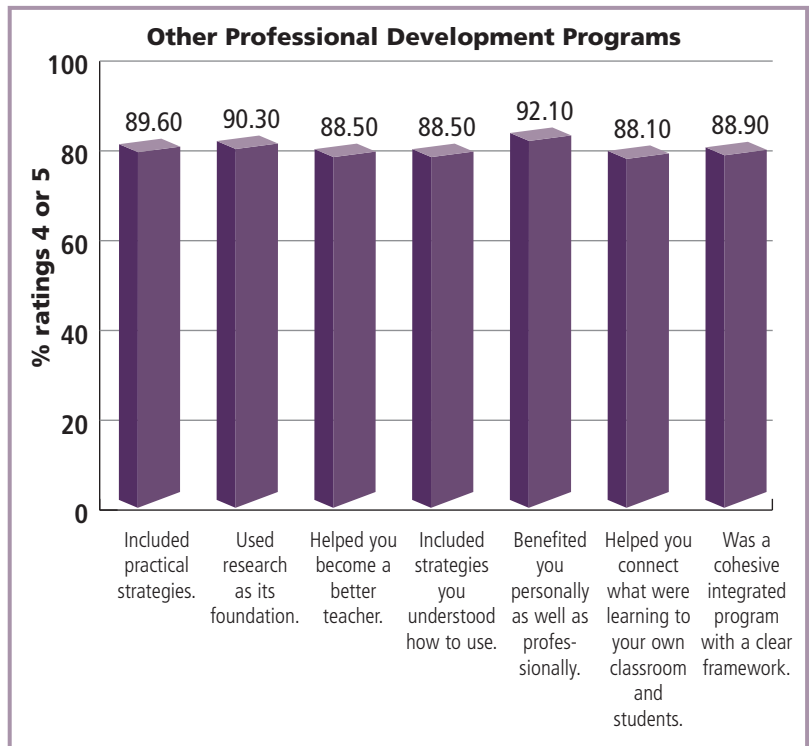


Figure 2.
Rating of Brain-Based
Teaching Program to
Other Professional
Development Programs



FINDINGS AND DISCUSSION

The Brain-Based Teaching Graduate Survey ratings strongly support that the program is positively received by participants.

These findings indicate that: (1) the graduate programs positively impact student learning gains; (2) graduates realize better the potential for all students to learn; (3) graduates explicitly teach cognitive and metacognitive strategies to their students to increase their achievement; (4) knowledge about how they learn, an aspect of metacognition, is a critical driver of helping students achieve; and (5) strategies that they learned to teach students are applicable to all learners, including special needs children and diverse learners, and across a broad array of subjects.

The Brain-Based Teaching Graduate Survey ratings strongly support that the program is positively received by participants. For example, agreement ratings to the statements, "I am more excited about teaching [because of the program]" and "I am more likely to stay in the teaching profession [because of the program]" were 4.51 and 4.38, respectively. Graduates were also overwhelmingly positive about the degree to which they had meaningful experiences that have better enabled them to reach all learners. Findings from the graduate survey showed that respondents rated highly their agreement to statements such as "I learned new tools for working with students who have trouble learning with other methods" (mean=4.61). In addition, teachers report:

- having added more teaching strategies to my toolbox (mean=4.76);
- having a better understanding about how my students learn (mean=4.71); and
- learning the thinking skills my students need to achieve academic and life success (mean=4.68).

Additionally as part of the graduate survey, graduates reported that these programs, compared to other graduate and professional development programs, "helped me become a better

In the survey, teachers indicated that the brain-based teaching programs had prepared them to become teacher leaders in their classrooms, schools, and communities and that many of them had taken on formal and informal teacher leadership and instructional leadership roles.

teacher” and “benefitted me personally as well as professionally,” with mean ratings of agreement to these statements above 4.40.

These findings are supported by findings from the qualitative study mentioned earlier, in which interviewees reported (1) being more positive about teaching and in general in their lives because of the strategies they learned that focused on the power of a positive outlook, and (2) changing their own practice in the classroom based on their graduate studies. All seven teachers interviewed shared that they now differentiate their instruction more effectively, using teaching strategies that provide opportunities for students to learn concepts in a variety of ways; three provided specific descriptions of the variety of strategies they use to teach certain topics or concepts. Similarly, each teacher spoke of new pedagogical strategies that she uses in the classroom, with two describing how they have reduced teacher-led activities in favor of more cooperative and interactive learning opportunities. One makes her lessons more experience-based and uses teaching strategies to get kids excited about the material. Another shared how she focuses more on thinking and learning strategies now, and described helping students understand how to use the strategies they learn in her class in their other classes.

Findings from the Teacher Leadership Survey also support these findings. In that survey, teachers indicated that the brain-based teaching programs had prepared them to become teacher leaders in their classrooms, schools, and communities and that many of them had taken on formal and informal teacher leadership and instructional leadership roles. Within these roles, graduates reported sharing with students, teachers, principals, and families such things as cognitive and metacognitive strategies to increase student achievement, knowledge about how students learn and its connection to helping students achieve, and strategies that can reach all students, including special needs children and diverse learners, across a broad array of subjects.

Limitations of the Study

The greatest limitation of this study is the lack of comparative data available from graduates of other programs with which these results can be compared. However, these data do support findings from the other two studies that showed that these graduates leave their program of study better prepared to teach students in schools today and to continue their journey of professional learning.

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APPENDIX: SURVEY COMMENTS

The textbooks written by Marcus Conyers and Donna Wilson were the most helpful to me in my classroom. I use strategies from these books every day with my students.

I. Improved Teaching Practice

- *I have always believed that all children can be successful learners but are not given the opportunity because they are forced to endure a system that sets the majority of teachers and students up for failure. I felt the program could finally help me understand (after 43 years) how to be a truly effective educator and to use this knowledge to help change a failing system.*
- *The BrainSMART program offered new and innovative ideas for the classroom that were research based.*
- *The textbooks written by Marcus Conyers and Donna Wilson were the most helpful to me in my classroom. I use strategies from these books every day with my students.*
- *Each paper that I was required to write that involved developing a plan of action for my school was truly beneficial. I have used several of the strategies that deal with maintaining student attention and focus.*
- *60 Strategies book was very practical for using immediately in the classroom with little to no preparation. They have helped me to increase a positive state for my students and increase achievement.*
- *I think that the assignments were well thought out and really helped me to incorporate the strategies and become a better teacher. They were challenging, but that's why I liked them.*
- *Thinking for Results was the most useful part of the program I believe. I am incorporating the Cognitive Assets into my daily instruction and coaching my students in developing them.*
- *The 60 Strategies book from the first course was and still is very helpful in applying what I have learned in my classroom.*
- *I also feel like the artifacts are a way to apply what I have learned in the course to real life in the class.*
- *The action research project was very enlightening and empowering as I was able to identify a problem, apply effective strategies, and then see positive results.*

I really felt that all the information was cogent and immediately applicable. The beauty and the strongest part of this master's was the requirement to apply the learning immediately.

- *There were so many instructional strategies. Being able to incorporate them through my teaching experiences proved to be pivotal.... My students were very successful this past year and will continue to be throughout my teaching career because of the plethora of information learned through my studies. I am glad that the program was recommended to me.*
- *I found the artifacts and case studies to help me learn about putting these strategies into practice. I have never taught civilian side but I was able to learn so much from these assignments. The online chats were also helpful because I was able to learn from other professionals and from their experiences. At first I was a bit nervous as to why was I enrolled in this program, but I soon realized that BrainSMART can be used in all social institutions of learning.*
- *The knowledge of having other tools than the traditional tools that are used every day. These tools and strategies have worked in my classroom with students. Knowing that the brain can be stimulated in many different and basic ways such as good nutrition can enhance students' success.*
- *I really felt that all the information was cogent and immediately applicable. The beauty and the strongest part of this master's was the requirement to apply the learning immediately. I also based most of my program ... delivering the cognitive assets and using these concepts at the center of my program and was able to use and connect all of the other tools to them. I learned so much from the AR study and was pleased to know how much the last class added to my classroom management repertoire.*
- *[What helped me most] To work on individualizing lessons and approaches to learning. To help students understand the importance of goal setting and how to drive their own brains. To NOT take for granted that students instinctly have all the skills they need to be successful so as teachers we need to teach those skills that are most important for learning. One other concept that has stuck with me is the 80/20 rule which means to me to teach the 20% of what's most important that 80% of students will retain. Lastly, I love the concept - Practice makes permanent. My students hear it all the time. Though there are many other strategies and concepts that I will or do use, the above things stand out as reasons to apply learned strategies.*
- *Allowing students to have more choices in their learning is huge. Providing a variety of teaching techniques that are verbal, visual, and experiential is necessary to reach every learner, and*

I believe that I am more positive and optimistic than I've been in the past. I am making individual connections with my students. I have begun teaching mini lessons and support through small group.

intentionally teaching cognition to students to help them be successful in learning is important.

- *Helping student to transfer knowledge from the classroom to real life. 2. Using the Power of Rehearsal to help students retain knowledge to improve their grades and so on. 3. Creating a positive state of mind by using "I feel good" and other strategies. All of the above strategies are BrainSMART strategies that are vital to helping students become positive and more productive students in the classroom and in life.*
- *The 60 Strategies book will be a helpful asset when designing my lessons. I will also make sure that I am in a healthy, optimistic state for my students. I now know that I need to focus on changing the lesson to meet the needs of the learner rather than trying to change the learner.*
- *Students benefit from the positive atmosphere of higher expectations and achievable goals.*
- *My students are learning how to activate a positive attitude to put them in the mood for learning. My students also benefit from movement activities such as brainobics to help them learn.*
- *I am able to strategically plan my lessons around the way the brain learns best. My class is lively, interactive, positive, and metacognitive. This benefits students.*
- *I am far more flexible and differentiate for individual students rather than for groups of students.*
- *The fact that I am putting more effort into designing instruction and reflecting on best practice/clear goals benefits my students. Also, I make more effort to teach to their strengths.*
- *I believe that I am more positive and optimistic than I've been in the past. I am making individual connections with my students. I have begun teaching mini lessons and support through small group.*
- *I don't know how I taught before without the knowledge I have gained. I feel my undergraduate was lacking in the "how-to" of reaching all learners.*
- *I can help students with reading difficulties using the strategies learned through the program.*
- *I now can understand my students' mode of learning which I had not understood before.*

I can help students with reading difficulties using the strategies learned through the program.

- *I came away from this program finally, after 43 years, understanding why children as young as 8 and 9 felt they "were dumb and stupid" and why a high percentage of high school students are not equipped with the thinking and learning strategies they need to be successful, productive citizens. I would have been a much more effective teacher had I had this knowledge and training years ago. I may not currently be in a classroom environment but this information helps me work more effectively with my grandchildren, with the training I provide employees who volunteer in schools, as well as provides me with research based knowledge about the brain and learning to share during discussions with family, friends and co-workers.*
- *Provided more practical and ready-to use strategies.*

II. Improved Ability to Reach and Teach More Students More Often

- *Fascinating courses and perfect fit for my special education students to learn how their brains work best and how to best accommodate their needs.*
- *I heard other colleagues talking about how the program changed their classrooms and how their students looked at school. I wanted to provide my students with the same success.*
- *It offered a new or better approach to teaching and learning. I was looking for more methods.*
- *The program provided a different perspective. It addressed to the needs of the population I serve. They are often not presented with viable options.*
- *I chose this program because of the focus on brain-based teaching. With the differentiated learning needs in every classroom, I believe it is critical to know and understand how the brain accesses and processes information in order to best meet those needs.*
- *As a teacher to students with emotional disabilities, I found the psychological connection of BrainSMART's program to be the most relevant to the needs of my learners.*
- *60 Strategies provided numerous options for teaching students, regardless of previous knowledge or experiences students may have brought to school.*

My students are more optimistic, less stressed and more cooperative. Because of this, they are better able to pay attention and engage with the lesson and the activities. As a result of higher engagement, they are learning and retaining more.

- *Considering I work with high school dropouts, I have found these three concepts to be of most importance with every new student I receive: Power of Optimism, Time, and Finishing Power.*
- *In one of the videos, Marcus Conyers explained, when the teacher displays a lot of movement, it may help students focus. After trying this myself, I was amazed at the results! In classes where the majority of the students are kinesthetic learners, I was able to engage the whole class and retain their attention!*
- *The idea of practical optimism, because I work with many courageous learners who have learned pessimism—it is truly the key to helping them believe intelligence is not fixed, and their brains are changing all the time.*
- *The concept of optimism is much more important to me now that I know how vital it is as an influencing agent. The importance of meaning and novelty have a greater influence on what I do because I have a better understanding of how it engages students.*
- *They are more engaged in the lessons and are learning more in a shorter period of time.*
- *They have a more knowledgeable teacher who understands how to best meet the needs of the diverse learner.*
- *I think more about individual student differences and how I can teach so that each one learns effectively (differentiation strategies).*
- *Their scores on state tests have drastically improved.*
- *My students are more optimistic, less stressed and more cooperative. Because of this, they are better able to pay attention and engage with the lesson and the activities. As a result of higher engagement, they are learning and retaining more.*
- *All students have the opportunity to learn and understand important information, to make practical applications as they connect to learning standards.*
- *They learn about themselves as learners—as whole entities. In many cases, they "teach" themselves how to be better students.*
- *As a whole, I reach more students because I am aware of the workings of the brain.*
- *Individually, I engage students at a level that I do not feel I did before the course. I may have caught their attention acting intuitively then, but now I am more intentional.*

I have been better able to understand my students as a whole. I now know why they struggle when learning and how to accommodate for those difficulties.

- *My students know they can drive their brains to success. They also feel the optimism in themselves, the classroom, and in me. I will never again question ability - ever!*
- *Students really delight in the power of being in control of "Driving their Brains!" Knowing that they can learn strategies to help them become successful learners, students are eager to try new strategies to discover what works best for their unique brains to learn.*
- *My experience with the programs has taught me that students have the ability to become better students when given the tools and opportunity to do so. A good teacher will try everything possible to help a student to be the best that they can be. All students are different and some need implicit teaching to become successful. However, I believe that all students can learn.*
- *I feel more prepared to teach the child, not just the subject.*
- *My students have more excitement toward learning because I now know how to create learning activities that appeal to each of them.*
- *I have been better able to understand my students as a whole. I now know why they struggle when learning and how to accommodate for those difficulties.*
- *At my recent evaluation with my principal, he told me that the parents of my students had reported positive things to him regarding this year's class of students.*
- *Personally I have taken a much different approach to my own health and well-being. I also look at each one of my students as individuals that have specific needs and now I have strategies to meet their needs!*
- *My day is much more thought out. I plan activities that will benefit all students. I now think about my own thinking and also help students think about their own thinking. I've learned to ask my students the right questions to get them thinking more in depth. I've learned that each student is unique as a fingerprint. Each student learns differently.*
- *It has confirmed my belief that every person can learn, you just have to find out how they learn best and adapt to meet their learning needs.*
- *How amazing the brain is and how little we know about it as educators. It has really made me understand how learning works and why certain things can cause someone not to learn.*

III. Improved Understanding and Application of Knowledge About How Students Learn

- *I was interested in a program that gave viable suggestions and solutions for use with today's students. BrainSMART was that program.*
- *The metacognitive strategies are wonderful. I have never been taught the concept of "thinking about your thinking," but such information helped students learn and grow leaps and bounds.*
- *I am interested in teaching my students in a way that maximizes learning for them. I think this program does that.*
- *It seems students have changed since I was in high school; their learning preferences, the strategies which teachers utilize, and their attention span. I was seeking a graduate program that would assist me with understanding my students and to aid them with becoming academically successful as well as productive students.*
- *I am interested in learning more about the human brain and how it functions so that I can apply that knowledge to help students learn more effectively.*
- *The entire Brain S.M.A.R.T. method really outlined how to get students to really learn how to learn. My goal is to teach students HOW to learn and think, not just memorizing content.*
- *That the body and brain makes up one complete system. This concept is one I always believed to be true, but I now know why it is true, and have the research to back it up. It is crucial in determining why students may have difficulties in learning, and understanding what strategies will help them. Nutrition, sleep, and demeanor are all so important to helping students open themselves to learning. I am focusing highly on these areas concurrently with teaching my discipline.*
- *The malleability of the mind. Just knowing how the brain works has helped me. I have taught much of it to my kids and I think it is making a difference. The ways to reach boys and students with disabilities has also helped. My students and myself also love the memory strategies.*
- *The three phases of genius because our district is focusing on developing skills for 21st century learners. It will be necessary for teachers to understand how to present information so that students can input, process and express what is taught.*

Just knowing how the brain works has helped me. I have taught much of it to my kids and I think it is making a difference.

I feel that my students are able to now own their learning. I feel like I have been able to teach my students the importance of driving their own thinking.

- *My students now have a teacher who has the strategies and tools to help them learn to think metacognitively, and to teach them how to become successful in school, and in their personal lives.*
- *Improve their thinking and ability to retain, transfer and apply their learning. Lifelong learners.*
- *I feel that I am better qualified to develop learning experiences that are geared to boost their learning potential. Because the program focuses intensely on educating teachers about how students learn, I know that I am better able to create opportunities for my students to participate in activities that produce optimal learning.*
- *I feel that my students are able to now own their learning. I feel like I have been able to teach my students the importance of driving their own thinking. I feel my students are beginning to enjoy learning more now that I have gained more knowledge on best teaching practices from BrainSMART.*
- *Thank You BrainSMART experts!*
- *They benefit because I understand how the brain works now. I realize the types of lessons and strategies I need to use to reach all students.*
- *I approach life now believing that everyone is doing the best they can with the cognitive assets they have. I am more supportive, tolerant, compassionate, and understanding of life's circumstances. I also listen better to others and want to give them the hope and optimism to pursue their dreams and feel success.*

IV. Becoming More Metacognitive About Teaching

- *I felt that learning more about the brain and how it affects learning would give an edge in the classroom. Learning how and why students learn the way they do was very interesting to me. In the end I also learned something about myself. I am so happy I did it!*
- *Prior to the Ed.S. program, I completed the BrainSMART master's program, and I was pleased with the professional growth I made as a result. I learned a great deal of useful information and practical brain-based strategies which have helped me to help my students be effective learners. The strategies are easy to implement, and they have become a part of my daily teaching.*
- *The thing that was most helpful was the realization that I was not necessarily a poor classroom manager, but simply in need of better*

materials and instructional strategies to keep my students engaged in their learning.

- *The Cognitive Assets. Knowing what assets students need to develop is key in teaching, and helping students achieve at the highest level possible. This knowledge has also been helpful to me in my personal life, in dealing with others, and in becoming a better person myself.*
- *Positivity has helped me become more optimistic in my current position. I believe knowing more about the structure and function of the brain has helped me to be a better facilitator of instruction for my students and I have used many of the various strategies with my students.*
- *The cognitive assets are helpful for me in two ways. They help me understand my students and they help me teach my students. The concept of positivity has made a huge impact on my teaching. Taking control of my own life and helping students see they can take control of their learning.*
- *I feel cognitive strategies are most helpful because I am in the military. I have to be prepared mentally and physically to teach and serve my country. Learning about cognitive strategies and the importance of metacognition has shaped my thinking and learning abilities. I am now a more prepared soldier, instructor, and person.*
- *The 60 Strategies book outlined by the domains for SMART transformed my teaching performance and boosted my enthusiasm for teaching.*
- *I'm more optimistic & motivated to teach the necessary skills for increased student achievement; I'm building meaningful relationships by connecting to different learning styles & interest profiles.*
- *Because I am a more positive person and am working on being more energetic, the students are reaping the benefits of a teacher that is more tuned into them and helping them learn.*
- *I have an openness to change and a more positive outlook on my profession.*
- *My students have the benefit of my knowledge of the brain-based teaching program of powerful strategies to give them power to succeed in the classroom, at home and everywhere. This was the right choice for me and my students.*

Because I am a more positive person and am working on being more energetic, the students are reaping the benefits of a teacher that is more tuned into them and helping them learn.

Work is more exciting to me now, and each day teaching becomes more enticing to me, as I have so many more tools and knowledge to utilize in the performance of my job—tools and knowledge that are proving to be true and highly successful in implementing change within myself as a teacher and within my students!

- *Learning about neurocognitive plasticity and the power of positive states of mind has made me a more optimistic teacher. I realize that EVERY student can become a more effective thinker. My students benefit from me EXPLICITLY modeling and promoting effective brain-based strategies.*
- *Work is more exciting to me now, and each day teaching becomes more enticing to me, as I have so many more tools and knowledge to utilize in the performance of my job—tools and knowledge that are proving to be true and highly successful in implementing change within myself as a teacher and within my students!*
- *I am more confident in my abilities and feel I have a better understanding (and more tools) to meet the learning needs of my students. I am more creative in my lesson design, and it is better aligned with my instructional goals.*
- *My students benefit from having a top-notch instructor, positive, intellectual, and knowledgeable. I feel better about myself and my abilities and this happiness and ease with myself comes through my teaching and affects my colleagues in a productive way. I also have a mind-catalog of professional books that might help our staff with their own professional journeys.*
- *The program was different because it helped me change my ideas about how students learn, student motivation, student ability, and my ability to impact all of these areas.*
- *It has helped me to not only understand and relate to my students but also my colleagues at school. It has allowed me to see where I need to alter my thinking and actions.*
- *It has helped me become more optimistic in the area of teaching. I felt like when I first started out teaching, I wanted all of my children to succeed like everyone else. However, I have come to realize that not all children learn the same way. We are all different. And I must be more optimistic in regards to trying to save everyone. I must continue to help all of my students to internalize those successes.*
- *It has helped me to understand the importance of getting the students to think about their own thinking. Before BrainSMART I occasionally told the students what I was thinking about and felt foolish while doing it. Now I know there are many strategies to*

I am personally more organized and a better thinker. I now work smarter, not harder. This is huge for me! I can feel myself stop, think, and formulate a plan before beginning most things. I am more of an effective person and I love that.

help students succeed in school and beyond. Students need to become and stay optimistic about learning in order to continue to strive for the highest level possible. It is important to encourage students to want to learn and how to help each other succeed as well.

- *The program has encouraged me to be more reflective in my thinking and approaches to student learning.*
- *This program got me more excited about teaching. It made me more aware of things that I have done right and things that I should discontinue. I feel that I will be a better prepared educator.*
- *I've never experienced a program that was not only about the students and their learning, but also about me and my own social, cognitive, and emotional development—my own brain's learning systems. To become better at what I do, I have to be good at understanding and being me first. I firmly believe this, and no other program has ever addressed this.*
- *The BrainSMART program helped me to understand myself better and why I did certain things. I learned about my health and emotions and how they can seriously affect my body and brain. With this new knowledge, I am taking care of myself and being more conscious of my health. I also believe I am better able to understand and appreciate my family members who all have different learning styles and strengths.*
- *Everyday my mind is in a self-evaluative mode. I no longer feel inadequate when it comes to having other options to support students. I can always change course midstream to reach the results sought after.*
- *I am personally more organized and a better thinker. I now work smarter, not harder. This is huge for me! I can feel myself stop, think, and formulate a plan before beginning most things. I am more of an effective person and I love that.*
- *Completing the program has made me a much more confident teacher! It has given me an abundance of effective tools and strategies that enable me to reach all of my students, no matter what their challenges may be.*

V. Learning with Colleagues and Working as a Teacher Leader

- *I'm able to give colleagues more tools to make them positive learners and share those with my colleagues as well. As principal of a small alternative program, I am able to transfer my*

I love to share ideas with other teachers that I can use in my classroom the next day.

knowledge to our staff and assist them in implementing these strategies. I am more aware of the differences students come to school with, and I am better equipped to meet these differences and to help my colleagues to do so also.

- *[I've learned better] How to encourage teachers to be leaders in their classrooms and how it helps to motivate other teachers. When teachers become leaders in their classroom their students are able to be successful and excited about their learning.*
- *As a result of this program I am able to share this knowledge with parents in the business environment. By sharing what brain research is telling us about how children learn best and providing strategies for parents to use at home I am beginning to build a network of brain teaching/learning advocates. If change is to happen it will be driven by parents who are empowered with the facts about brain based learning and expect the system to change.*
- *As I pass on what I've learned to the teachers, they will be able to improve their instructional practices and increase student achievement.*
- *I have never been more passionate about learning. This program by far exceeded any prior educational experience I have had. Every course and every piece of information was applicable to learning and teaching. It is a program that you can not only believe in, but one that you can use to motivate others to be the best they can be.*
- *I love to share ideas with other teachers that I can use in my classroom the next day.*
- *I am using the information to share with my PLC (professional learning community) at my school.*
- *I work with teachers more often now, and often teach workshops focused on instruction.*
- *I am better able to coach teachers to be reflective in their practice and have a wealth of strategies to share with them to aid their students with retention, transfer and application. Hence, improving student achievement.*
- *I am more confident as a lead teacher and department chair.*
- *I feel more confident as a teacher. Other teachers are coming to me for guidance. I have taken an even greater role as a leader at my school.*
- *I am more of a leader at my school now.*

I am a better teacher and teacher leader now. I have learned so many practical strategies to incorporate into my classroom. The program has renewed my passion for teaching!

- *My peers at work are very interested in what I have to share about the education of students. I have also been given a job with more responsibility.*
- *The courses on instructional leadership helped me to reflect on my current practices when coaching other teachers and developed my leadership skills.*
- *I am a better teacher and teacher leader now. I have learned so many practical strategies to incorporate into my classroom. The program has renewed my passion for teaching!*
- *I grew from a teacher to a coach because I only had 3 years of teaching experience and this program provided me with tools to continue to grow.*

Bridging the Gap

The Impact of Graduate Degree Programs
Connecting Mind, Brain, and Education Research
to Teaching and Learning

