

Working Paper Series

Appalachian Collaborative Center for Learning, Assessment, and Instruction in Mathematics
Working Paper No. 37

The Perception of Math and Math Education in the Rural Midwest

David M. Lucas (Ohio University Southern, Ironton)
Jamie Fugitt (University of Tennessee, Knoxville)

May 2007

ACCLAIM's mission is the cultivation of *indigenous leadership capacity* for the improvement of school mathematics in rural places. The project aims to (1) understand the rural context as it pertains to learning and teaching mathematics; (2) articulate in scholarly works, including empirical research, the meaning and utility of that learning and teaching among, for, and by rural people; and (3) improve the professional development of mathematics teachers and leaders in and for rural communities.



Copyright © 2007 by the Appalachian Collaborative Center for Learning, Assessment, and Instruction in Mathematics (ACCLAIM). All rights reserved. The Working Paper Series is published at Ohio University, Athens, Ohio by the ACCLAIM Research Initiative.



ACCLAIM Research Initiative
Address: 314F McCracken Hall
Ohio University
Athens, OH 45701-2979

Office: 740-593-9869
Fax: 740-593-0477

E-mail: howleyc@ohio.edu; johanseo@ohio.edu
Web: <http://www.acclaim-math.org/researchPublications.aspx>

All rights reserved.

Funded by the National Science Foundation as a Center for Learning and Teaching, ACCLAIM is a partnership of the University of Tennessee (Knoxville, TN), University of Kentucky (Lexington, KY), West Virginia University (Morgantown, WV), University of Louisville (Louisville, KY), and Ohio University (Athens, OH).



This material is based upon the work supported by the National Science Foundation Under Grant No. 0119679. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



The Perceptions of Math
and Math Education
In the Midwest

By

David M. Lucas, Ph.D.
Ohio University Southern
Ironton, Ohio
lucasd@ohio.edu

Jamie Fugitt
University of Tennessee
Knoxville, Tennessee
fugitt@cofo.edu

May 13, 2007

Introduction

Situated in the heart of Illinois farm country, Midwest City* provided the backdrop and the baseline for a qualitative research project considering the grand tour question, “What are the perceptions of the people of the Midwest concerning math and math education?” The target population consisted of the people located and living in the community and school district of Midwest City, Illinois. Using the qualitative research method known as *folkography*, Dr. David Lucas led a research team of undergraduate students from Ohio University to Midwest City, Illinois to perform the necessary field research. Joined by University of Tennessee, Knoxville doctoral student Jamie Fugitt, the research team set up a base of operations, mapped out the research region into target zones, and divided the team members into field-work teams. The research team, after organizing the research field project, began the work.

In the introduction of a paper concerning math and math education, one math educator observed, “The need to popularize mathematics and to change the public perception of our subject seems axiomatic as there is no doubt that many people regard mathematics unfavorably and this has an impact on our work in mathematics education.” (Begg, 2004).

Johnny W. Lott, former president of the National Council of Teachers of Mathematics wrote, “To consider the improvement of the perceptions of

mathematics and mathematics education in today's world demands that mathematicians and mathematics educators know what is important in mathematics education. Mathematics educators must determine what is important to the field in order to convey the importance to the public at large in order to influence public perception." (Lott, 2004).

Some contend that "the public perception of mathematics as a subject of utility and economic significance has placed restrictions upon its development as an art. The qualities of mathematics that may represent its beauty are commonly hidden from the experiences of students. Rather the clarity of right and wrong answers overshadows the multiple interpretations of patterns, the potential for discourse, and the creation of learning environments that promote problem posing, conjecturing, and investigating mathematical problems." (McLoughlin, 1999).

The International Institute of *Folkknography* and Ohio University Southern, on behalf of the organization known as ACCLAIM, sought to discover the perceptions of math and math education held by the people in the Midwest. Data demonstrate that math educators hold the conviction that math ranks as highly important in the curriculum for an accomplished education. Yet, what do the people of the Midwest think? What thoughts, opinions, and perceptions do they hold? This investigation project sought to identify, clarify, and record these perceptions.

Literature Review

Although the subject of perceptions of math and math education has not been widely investigated, some research does exist. For instance, in the spring of 2004, researchers surveyed the general population of persons in order to ascertain the importance they placed on math for career and education opportunities. The research project, entitled *Public to Policy Makers: More Math, Please*, involved a bicoastal public opinion poll that challenged some popular myths and stereotypes surrounding math. More than 75% of the 1000 adults surveyed in Massachusetts and Washington – two New Economy states – indicated a firm belief that all students should take at least geometry and algebra; of these, about a third think all high school students should study trigonometry and calculus. Recognizing a link between math skills and New Economy jobs, seven out of 10 believed that better math education would provide a critical competitive advantage to their state's economic future. (Fraser, Fleishauer, & O'Conner, 2004).

Additionally, according to the poll, the pop-culture notion of widespread *math phobia* – an American public that is largely intimidated by mathematics – may hold less truth than is generally believed. Only 14% of the 1000 adults surveyed by the study acknowledged having a fear of math, and an overwhelming 85% agreed that, because today's economy is more

complex and technology-oriented, gaining math skills remains important. (Fraser, Fleishauer, & O'Conner, 2004).

Mass Insight Education, a nonprofit group focused on improving student achievement, commissioned the survey of 1000 residents in Massachusetts and Washington—states with remarkably similar demographics and approaches to school reform—to learn how public attitudes might be affected by efforts to increase students' math capabilities. Top business leaders in Massachusetts and Washington indicated that math skills were critically important for jobs in the new economy, but they felt that educators were a long way from providing high school graduates with the math skills they need to succeed. What is surprising is that residents in both states wholeheartedly agree with them. What's more, they have some ideas on how math educators can develop that skill base, and they reject the peculiarly American notion that they — or their schoolchildren — can't do the math. (Fraser, Fleishauer, & O'Conner, 2004).

The results of the study demonstrated that not only did the public feel relatively comfortable with math, but that 83% across both states report that they use math at work or at home often. Moreover, the general public seemed to indicate that math did not seem more difficult to learn than other subjects, although more women reportedly remembered having more difficulty with math in school than men. (Fraser, Fleishauer, & O'Conner, 2004).

Parents and others who attempted to help children with their math homework, found it more difficult to help with math than with other subjects by a two to one margin. Most think the math curriculum is more complex today. This data seemed to indicate that certain changes in the math education process had occurred between the generations. Other findings include:

- Nearly unanimously (31 out of 32), executive respondents believe U.S. students' math skills don't compare well with those of students around the world. These opinions echo the results of previously published national surveys, which indicate that two-thirds of American employers and professors rate workers' and students' math skills as poor to fair.
- That dim assessment of today's high school graduates' math skills is shared by the public. Only one in five people believes American students do as well at math as other countries' students do.
- Most of those polled, in these two states where standards-based reform has been underway for over a decade, believe that although students are not as skilled as they could be in math, they are in better shape than they were before standard testing—and high school exit exams in math are part of the right strategy to continue improving math achievement.

“The message of the survey is clear,” said William H. Guenther, president of Mass Insight Education. “The public is ready for leadership in math. Fear of math has been overblown. Residents in these two *New Economy* states couldn't be clearer on the critical importance of math skills to their economic future – or the inadequate state of current math education in the United States, compared to that in other countries.” (Fraser, Fleishauer, & O'Conner, 2004).

In Ontario, researchers surveyed teachers and also the general public concerning their perceptions of math and math education. For the purposes of this investigation, the perceptions of the public deserve scrutiny. The Ontario College of Teachers commissioned COMPAS to undertake a representative

sample survey of more than 1000 teachers and more than 500 members of the general public. Conducted by professional interviewers using computer-assisted, telephone interviewing technology, the surveys were completed in July, 2004. Although the respondents were Canadian, the cultural similarities might render some insights as to the perceptions of math and math education in North America, if not specifically the United States. (COMPAS, 2004).

The findings concerning the perceptions of the general public in Ontario concerning the importance of math and math education included:

- Students were perceived to be better prepared. The students tested most recently achieved significantly higher scores in general math skills than those tested only five years ago. The students of the present have better math skills when compared to students in the past.
- Residents in Ontario perceived a distinction between personal skills and professional skills. Respondents were asked to rate on 5-point scales the importance of the various skills and attributes that contribute to a student's future success. Factor analysis of the importance ratings demonstrated that Ontarians classify the skills as contributors to personal success or professional success. The *personal skills* factor was comprised of skills and appreciation for the arts, athleticism, civic mindedness, and generosity of spirit. Meanwhile, *professional skills* reflected literacy, work ethic, math, and social/interpersonal skills. *Professional skills* were perceived to be more important than *personal skills* to a student's future success.

In another study performed in Australia, over 1300 students from grades 7-11 were surveyed to discover their perceptions concerning the importance of math and math education. The research demonstrated that

the students' perceptions about math and math education became more negative throughout secondary school. Specifically:

- Girls perceived mathematics as more difficult than boys throughout most of secondary school.
- Students' perception of the importance of math declined, especially during their senior years.
- Boys were more interested in math than girls throughout grades 7 to 11 and both boys' and girls' interest in math declined through junior and middle grades, plateauing in senior years.
- Students' perceptions of their talent in math declined through secondary school, with boys maintaining consistently higher perceptions of their own abilities than girls throughout grades 7 to 11.
- Boys' expectations of their own success in math remained relatively stable over time, while girls' expectations of their abilities declined through the middle years, then 'recovered' in senior years, although not quite to the same level as in 7th grade.
- All students perceived mathematics as requiring slightly less effort during grade 7, with a slight increase in effort required from the end of grade 7 through to grade 10 and a slight reduction in effort between grades 10 and 11 (Watt, H. M. G., 2004).

This data resulted from a study in Australia, but once again can demonstrate interesting insights into perceptions of youth concerning the overall importance of math and math education in their future. Also, such studies can provide comparison information for stateside projects.

The Target

Midwest City*, located in central Illinois at the south end of a large lake, is about 50 miles from a metropolitan area of 100,000 people and about 115 miles east of St. Louis, Missouri. As the county seat of the county,

Midwest City is the home of the county's only hospital. The 52 bed hospital employs more than 230 people, has 10 active medical staff physicians, and 27

*Pseudo name

consulting physicians. With an actual city population of just over 5, 000 people, Midwest stands as the largest city in the county which, according to the latest census, supports a population of just over 23,000 people (2000 census).

The city's government consists of a mayor and four city council members, all of whom are elected to four-year terms. The city council meets twice monthly and makes decisions related to planning and zoning issues, liquor licenses, and city spending.

According to the city website, "Corn, wheat, and soybeans make agriculture this area's economic priority." Yet, as often happens, the data reported on the 2000 U.S. Census indicate that only 1.6% of the employed civilian population over age 16 in the county is employed in "farming, fishing, and forestry occupations." Approximately 26.1% of the county population is employed in "production, transportation, and material moving occupations"; another 24.4% is employed in "management, professional, and related occupations"; and an additional 21.4% make their living in "sales and office occupations" (State and County QuickFacts, 2006). A large paper mill operation located in the community manufactures paper products and employs nearly 1200 people. Other manufacturing enterprises consist of a plastic bag manufacturer, employing 147 people and a farm machinery

operation which employs over 100 people. Additional small manufacturers, each employing between 10 to 100 people, produce items such as hair care products, turbochargers, and machine tools. Although farming operations remain important in the minds of the citizens, clearly the community continues to change to meet the current needs and market demands.

The nearby lake serves as a major recreational center in the city and the surrounding area. This 11,100-acre lake provides recreational activities for people including camping, boating, hiking, fishing, and hunting. According to an article appearing in the *Journal & Gazette Times-Courier** in March of 2005, more than 3.5 million people visited the lake during the previous year, providing an economic impact of nearly \$75 million in the region. A recently constructed aquatic park promises to provide additional recreational opportunities for residents and visitors and additional revenue prospects for the city.

Twenty churches are listed on the city website including the following denominations: Assembly of God, Baptist, Catholic, Christian, Church of Christ, Church of God, Church of the Nazarene, Jehovah's Witness, Lutheran, Methodists, and Presbyterian. The site also lists several civic organizations including local chapters of AARP, American Business Women's Association, American Legion, American Red Cross, Kiwanis, Lions, United Way, Moose Lodge, Rotary Club, and Shrine Club.

A local business college, enrolling approximately 40 students at the time of this study, is located in the city. The college offers diploma programs in six areas of business study. Other colleges and universities in the area include a junior college (approximately 30 miles away), a small university (35 miles away), and a major Midwestern university (about 40 miles away).

The Midwest City School District, comprised of four schools, serves children living in the city. There is a kindergarten center comprised of 91 students; Main Street Elementary serving 325 PK, 1st, 2nd, and 3rd grade students; an intermediate school enrolling 476 students in grades 4th – 8th; and Midwest City High School which enrolls about 400 students in grades 9th – 12th. The percentage of students in the high school meeting or exceeding state standards in mathematics during the 2004-2005 school year comprised less than the percentage statewide with the school failing to meet the minimum standards required for adequate yearly progress (AYP) as defined by the state. For all other schools in the district, the percentage of students meeting or exceeding state standards in mathematics was greater than those percentages statewide with each school making AYP.

The county is home to five school districts each serving students from preschool to twelfth grade. The districts, with student populations, are as follows:

- District one consists of 1014 students;
- District two enrolls 490 students;

- District three has 1270 students (Midwest City District);
- District four supports 465 students; and
- District five educates 440 students.

Midwest City district is classified as a *small town district* while all other county districts are designated as *rural*. The county student population is about 97% white and 100% of the county teachers are white. About 9.1% of Shelby county population was living below the poverty level in 1999 compared to 10.7% statewide. The average annual teachers' salary in the county is about \$14,000 below the average teachers' salary statewide. All but one of the five districts has about 30% of the teachers with graduate degrees compared with 49% statewide. One district reports 58.5% of the teachers having graduate degrees.

During the 2004-2005 school year all the county school *districts* reported making AYP. In order to receive this designation several criteria must be satisfied including the following: at least 95% of all eligible students tested in reading and mathematics; at least 47.5% of these students meeting or exceeding state standards for reading and mathematics; at least 89% attendance rate for elementary school districts; and at least 66% graduation rate for high school districts. In all five county districts 100% of all eligible students were tested in reading and math. The percentage of students meeting or exceeding state standards for mathematics ranged from 58.6% to

73.3%. Average attendance rates for the five districts ranged from 94.2% to 95.9% while the graduation rate ranged from 92% to 100%.

All elementary and middle schools in the county reported meeting standards for AYP for 2004-2005 with children performing well on the state mathematics tests. The percentage of students meeting or exceeding mathematics standards was significantly above the state percentages for most county elementary and middle schools. The five county high schools did not fare so well. The percentage of students meeting or exceeding the state standards on the PSAE Mathematics exam was less than the state average for every high school in the county. The state reported 52.8% of the students meeting or exceeding the standards in mathematics while the percentages for the county high schools ranged from 40.0% to 51.4%. Three of the five schools were reported as not making AYP and one of the schools was listed as receiving “academic early warning status.” This designation indicates that the school did not make AYP for two consecutive years and is eligible for state sanctions. As a result “Illinois requires a revised school improvement plan and will assign an external support team to work with educators and assist with School and District analysis. Extended day and year programs are optional. In addition, federal law requires that Title I schools must offer School Choice, which allows parents to move their students to more successful schools” (Interactive Illinois Report Card).

While school board records are currently not available for county school districts, an article in the *Midwest City News** provided a summary report of the December 2005 meeting of the Shelbyville School Board. As part of the Integrated School Improvement Plan, the high school principal reported, “We are focusing on a lot of things. Part of the plan is focusing on a continued improvement on achievement testing with a focus on math.” The elementary school principal reported that the school had improved a lot in math the previous year and that continued improvements in math is one of the four goals on which the school is working.

At the time of this study, mathematics education seemed to be attracting a great deal of attention in the county. It became clear in the preparation phase of the investigation that it would be both interesting and informative for *folknographers* to listen closely to the residents of this area to determine their perceptions of mathematics and mathematics education in this rural Mid-western community. Midwest City offered a multiple number of the qualitative characteristics which made it the ideal target location for the study. The research team selected it as representative of Midwest America. Midwest City fit the required criteria, offering the researchers insights into the perceptions and attitudes of rural farmland communities, their struggle with changing realities, their adherence to agrarian traditions, their attitudes toward traditional public education, while they seek to maintain and grow the peaceful living conditions the region has become

famous for supporting. Surely the *voices* of this region should be considered as typical when academicians seek to know the perceptions of math and math education in the Midwest.

*Pseudo name

The Design

This study follows the pattern of a similar study previously done by Ohio University Southern and the International Institute on behalf of ACCLAIM in Appalachia in March, 2004. The study sought to uncover the perceptions of math and math education in Appalachia. The results were published and math educators around the country continue to study and consider the findings (Lucas, 2004). The implications have been far reaching.

The research team, consisting of 14 undergraduate students, one doctoral student, and Dr. David Lucas entered the field prepared for the research. The team set up the computer writing lab, scoped out the community of Midwest City, divided the city into six sectors for easier access, and prepared all of the materials for the work.

The team planned to engage a preliminary survey to gather benchmarking statistical data (see Appendix) and to open respondents up to the possibilities of a *folkographic* interview. All team members had been carefully trained in the procedure of *folkography* prior to the journey. After completing a survey, respondents would be politely asked to participate in an interview for additional qualitative data. All respondents were advised of their right to decline, that participation was voluntary, and that the

participant could terminate the interview at any time. Team *folknography* was subdivided into seven field teams and the entire community was canvassed during the intensive research field work.

As the team members collected field surveys, they also sought field interviews. In keeping with the principles of *folknography*, the interviews prompted narratives which give voice to the perceptions of the person interviewed (Lucas, 2005).

The Findings

Folknographers entered the field in May of 2006 and performed a focused and intensive field research project to discover the perceptions of math and math education in the Midwest. The teams divided the community up into six zones and went door-to-door seeking respondents for interviews and to fill out the short survey's employed to discover the perceptions of the *folk*. Using *folknography* as the method and a similar design as the last project executed in Appalachia, the research team successfully interviewed 174 respondents and surveyed 1358 individuals (www.folknography.org). The research team facilitated four focus groups and two plenary sessions. These efforts produced a satisfactory amount of qualitative data for analysis. Concerning math and math education, *folks* in the Midwest think:

I. Young People Can't Do Simple Math

The folk from Midwest City consider the importance of math as a useful tool for everyday life circumstances. Yet, many believe that the youth of Midwest

City need to rediscover the skills of basic arithmetic in order to add, subtract, make change, and solve everyday mathematical problems. In fact, analysis of the qualitative data from this research reveals that the older adult *folk* of Midwest City have a difficult time delineating the difference between arithmetic and math. Consider these examples lifted from folknographic narratives from the project:

Simple Math Example #1

I enter the shop and immediately spot *Big Guy*; his rotund figure fills the aisle behind the counter. He looks me over as though I do not belong in this type of store. *Big Guy* does not smile or greet me readily. Instead, he stands with his hands inside the slanted pockets of his size 3X bibs, left unbuttoned at the waist for obvious reasons. He peers through thick glasses and finally he speaks—but only after I greet him. The poor man seems even more befuddled when I tell him the reason I stand before him. “Math!” He bellows. “Let me just tell you something about math...I have a thirteen-year-old granddaughter who can’t add two and two! She doesn’t know diddly-squat about math and she’s a ‘B’ student!” Without time to take a breath he continues, “What these schools need to do is throw away the d*mn calculators and get back to teaching the basics. Teach these kids how to do math on paper first—then and only then should they be allowed to use calculator!” (Excerpt from a narrative by Teresa Stockton).

Simple Math Example #2

Willy understands why I am here to speak with him, and he too, is anxious to get on with our dialogue. He shares his staunch “belief in the importance of math...and the lack of math education in the area. Kids just don’t have it,” he says. He goes on, “Oh a few do, but I’d say 80% are crippled by math incompetence.”

As he begins again, he shakes his head and says, “Let me tell you something that took place shortly after I bought this restaurant. I decided I would offer a 10% discount to senior citizens. When the customer approached the register to pay for his meal, the problem surfaced. The young waitress came to me and questioned the discount.” He leans forward for emphasis and says, “I reminded her of our policy to give senior citizens a 10% discount.”

“How do I do that?” she asked.

“I was stunned! I couldn’t believe what I was hearing. I explained that all she had to do was move the decimal point over one place. She was as shocked to find out how simplistic the process was as I had been when I found out she didn’t know how to do the math in the first place! So, as I see it,” *Willy* says, “the problem is that kids these days don’t learn on paper. They can *only* solve a math problem with a calculator in their hands.”

“Students amaze me,” he says. “I once had an Honor Student who couldn’t do basic math, and I do mean *basic* math. While on break one day, she sat with her checkbook in hand and looked up at me and asked, *Willy, what’s thirty-seven minus twenty-five?*” With sad eyes, he says, “Kids have absolutely no critical thinking skills. They have no idea how to problem solve.” (Excerpt from a Narrative by Teresa Stockton).

Simple Math Example # Three

I ask him about his math teachers in school and he exclaims, “My teachers were real nice and taught me a lot. But, I’m afraid that these young people aren’t learnin’ from their teachers.” My eyes widen as he continues. “These kids today wouldn’t be able to do math if they didn’t have an addin’ machine. They can’t give you the right change if the addin’ machine breaks down, and they don’t know what to do if I give them an odd amount of change for a single bill back. They can’t figure change for some reason.” (Excerpt from a narrative by Charity Brown).

Simple Math Example # Four

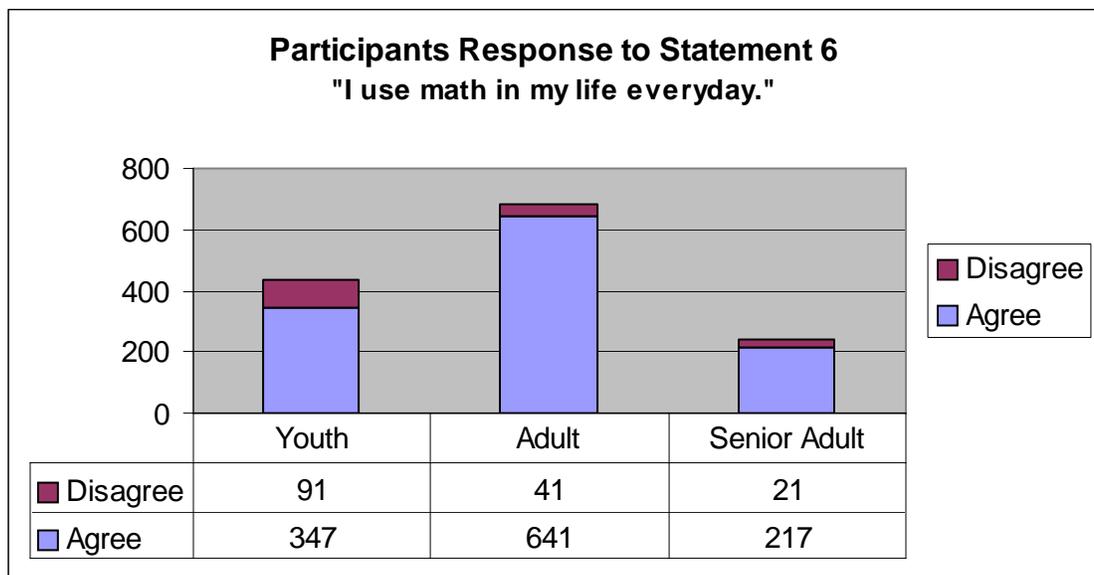
He speaks with a twang in his voice, “I asked my young step-sisters what 9×9 was and they couldn’t do it. My sister graduated from college, and she still sends her checkbook to my mom cuz she can’t balance a (*expletive* omitted) checkbook. I mean if you can’t use numbers, your sh*t outa luck.” he says while he shakes his head. (Excerpt from a narrative by Charity Brown).

Simple Math Example # Five

After I establish some credibility with the two ladies, they both declare that the “have children and grandchildren.” They tell me, “We have a very difficult time when trying to understand the math that the grandkids bring home,” which they referred to as “new math.” They also add that “we see the trouble that technology plays in today’s world. Our kids are too dependant on calculators and computers,” *Lady Two* contributes. “We talk about our kids and their inability to do basic math like making change in a restaurant all the time.” They both see math as something we use everyday and something that schools need

to teach by returning to the basics. (Excerpt from a narrative by Chuck Queen).

Perhaps this inability to do simple mathematical computations is evidenced in responses to survey statement number six -- "I use math in my life everyday." Over 38% of the adult and senior adult respondents indicated strong agreement with this statement while only 17.8% of the youth that were surveyed strongly agreed with this statement. Over 93% of the adult and senior adult respondents indicated agreement or strong agreement with this statement with 79% of the youth responding similarly. This failure to use math daily in practical activities may contribute to some youth's inability to correctly carry out simple mathematical activities such as mental computation and counting change.



In all of these examples the *folkknographer* is compelled to infer that the adult respondents fail to see a difference in math and arithmetic. Then,

in view of this evidence, the novice concerning math feels compelled to ask, “What is the difference between math and arithmetic?” For the answer, we turn to Illana Weintraub (2004) who spent most of her life teaching high school math. In responding to the question as to the difference between math and arithmetic she writes,

My favorite quick answer is that *arithmetic* is to *mathematics* as spelling is to writing.

The dictionary definitions of these two bodies of learning are:

a rith me tic

- (1) the branch of mathematics that deals with addition, subtraction, multiplication, and division,
- (2) the use of numbers in calculations

math e mat ics

- (1) the study of the relationships among numbers, shapes, and quantities,
- (2) it uses signs, symbols, and proofs and includes arithmetic, algebra, calculus, geometry, and trigonometry.

Having spent most of my life teaching high school math, it was disheartening to hear my uncle say that what I am teaching is not real math – his world was teaching the math of particle physics to advanced graduate students at Stanford University. Only a handful of people in the world understood the papers he wrote. His definition of arithmetic is that it is structured and that math is not – in his mind, counting through calculus is arithmetic. The theoretical math in his papers was gibberish to me but symbolic prose to him – the marriage of math and science. From his point of view, until you get to advanced physics, the math is not *real math*. Perspective is everything. In conclusion, arithmetic uses numbers and mathematics uses variables – each discipline has its own complexities and thought processes.

The logical conclusion here reveals the need for the math community to better explain the differences and relationships between arithmetic and math.

If indeed arithmetic is to math as spelling is to writing then the math

educators need to develop strategies to let the adults in the Midwest know about the differences and make a case for emphasizing math more than the more basic sibling arithmetic.

II. Too Much Technology!

The adult *folk* living in and around Midwest City hold the basic perception that too much technology can have a significant negative impact on the developing minds of the students in the Midwest. The respondents indicated that, especially in regard to math, the students need to learn to solve problems in their heads before they solve them with their hands (using the keyboards of electronic gadgets). Consider these representative statements:

Too Much Tech Example #1

The kids don't make the situation any better, according to *the Hippie*. "Kids today just don't give a damn." He tells me how his generation did so much for this country and the environment. He sees the importance of making math required for all students. He thinks that all the basic math (just a glorified sort of algebra) needs to be mandatory at all levels. The students should not be allowed to use calculators or computers until they have a grasp on the material. "Kids today are just lazy. They want to use their gadgets instead of their brains. We gotta reverse this trend before we get left in the dust by the Europeans and the Chinese!" We talk about urban versus rural education. He sites that there are definite differences from location to location. He says that he heard on the news that teachers in Florida are considering not teaching kids about snow because they never get it down there. He said, "I'll have to check his facts, but that's just one example of the different types of education you can get from place to place." (Excerpt from a narrative by Chuck Queen).

Too Much Tech Example #2

Two welders speak about the importance of math. *Second Welder* jumps into the conversation, "Yeah, I like welding." He supports *Simple Welder* because of all he has said. I ask the other welder, "Were

you successful solving math problems in school.” “Yes, but I haven’t been in school since 85. It was different back then.” I ask him to talk about his math experience in school and why it was different. “I had good math teachers; I learned how to do basic everyday things. Now they don’t teach that. Now they teach the advanced stuff, but the kids can’t do simple things. They can’t make change; they don’t spend enough time on the basics. The kids today use gadgets but can’t do simple math problems. They ought to learn how to solve the stuff first then use the machines.” *Simple Welder* adds his comments. He adds, “The kids need the basics. The basics are important. Teachers start teaching advanced stuff before kids understand the basics. The kids use the machines before they can use their heads. That’s just no good for what a person needs in a job. You have to learn to think.” (Excerpt from a narrative by Eric Melvin).

Too Much Tech Example #3

Tilling Talker giggles to herself as she thinks of the many times she has needed good math skills. She says that “on several occasions, my friends and I would go shopping and would have a difficult time figuring out the discounts offered.” She says, “We would whip out our cell phones and do the calculations so that we’d know what the price should be. We’d use that little calculator, clicking those keys like sixty.” She jokingly admits how sad that is. “We can’t do the math without those little keys. We need to learn how to do that in our heads, right?” (Excerpt from a narrative by Holly Harrison).

Too Much Tech Example #4

I ask about her thoughts on technology and math and she answers briefly, “In some ways I think technology is good. But, I think they still need to read books. You know, the students need to be able to solve the problems so they can solve difficult situations in life. We can’t use machines to teach us how to live. We can’t depend on gadgets. We have to depend on each other.” (Excerpt from a narrative by Roxanne Wilson).

Too Much Tech Example #5

We ask his thoughts and opinions about technology in the math classroom. His reaction is quick as if he was prepared for this particular question. “I think technology should be playing a role, but I’m concerned that we are already past it being a play toy or just for entertainment. I think we have a long way to go incorporating technology in our classrooms. We need to figure out a way in which technology can assist in learning rather than just providing final answers or checking answers. Somehow we have to make technology a teaching instrument.” (Excerpt from a narrative by Roxanne Wilson).

These folk in Midwest City seem to agree with one voice. The use of technology should be used as an enhancement and teaching tool in education, not as an end all. These respondents seem to echo the recent findings of a study done in Germany. Christian Science Monitor reported:

For all the schools and parents who have together invested billions to give children a learning edge through the latest computer technology, a mammoth new study by German researchers brings some sobering news: Too much exposure to computers might spell trouble for the developing mind.

From a sample of 175,000 15-year-old students in 31 countries, researchers at the University of Munich announced in November that performance in math and reading had suffered significantly among students who have more than one computer at home. And while students seemed to benefit from limited use of computers at school, those who used them several times per week at school saw their academic performance decline significantly as well.

The German study stands out on account of two features: its unusually broad, international sample and its bid to isolate computers as a performance-shaping factor. Mindful that computers are more common among affluent families, whose children often outperform more disadvantaged ones, the University of Munich researchers controlled for such variables as parents' education and working status.

When computers were removed from the equation, having more than one computer at home was no longer associated with top academic performance. In fact, the study says, "The mere availability of computers at home seems to distract students from learning." Computers seem to serve mainly as devices for playing games.

To hear new questions raised about the educational value of technology is music to the ears at the Waldorf schools, an association of 350 schools where students don't touch computers until the 11th grade. There the priority lies with training students to think, says Patrice Maynard, leader for outreach and development, because problem-solving acumen and creativity lead to success and a joyful life. (MacDonald, 2004).

III. Math Makes the Career

During the research field work, the folk of Midwest City made the connection between acquiring math knowledge and achieving a dynamic career. No matter the age, most of those interviewed confirmed the importance of math and the need to study math even if the respondent did not like math as a subject. In Midwest City none of the youth respondents talked about math as a way out of the community or region. Youth talked about going to college, but none of those interviewed seem to seek an escape from their home town environment. Almost all of the respondents believed in the value and power of having math skills. Consider these examples from recorded narratives:

Math Makes the Career Example #1

She explains to me the importance of math in her daily activities. “I think that math is important in everyday life. It helps me when I go to the store or when I do my check book. I use it all the time,” she says as she constantly twirls the long green plant stem in her hand. (Excerpt from a narrative by Charity Brown)

Math Makes the Career Example #2

Teresa asks him about what he feels about math, he says, “I love it. Where would I be without? If I couldn’t figure, I wouldn’t be in business; I’d probably be on welfare,” he says. (Excerpt from a narrative by Charity Brown)

Math Makes the Career Example #3

“I use math everyday when I balance my checkbook or pay my bills. I do it all in my head and then use my calculator to check out my work.” She takes great pride that she knows how to do these things. She again adds her hope that the future generations will at least learn the basics. She has a fear that our technological society will collapse on itself and then we’ll be set back a hundred years. “Kids need to understand how important math is for their daily lives. We ought to have a math fair or something with games, prizes, and scholarships.

Kids need to feel the excitement of math in their lives.” (Excerpt from a narrative by Chuck Queen).

Math Makes the Career Example #4

It is not something that she enjoyed in school, but she would take geometry (and all of the other math classes) even if they were not required. She sees the importance of math. She knows that it is something that everyone uses everyday. She uses it when she goes to the store or works the concession stand. “I tell my kids everyday that a good education in math will change their lives and give them a promising career. We all have to do things we don’t like. Even if you don’t like math you need to take it, study it, and make it an important part of your life.” (Excerpt from a narrative by Chuck Queen).

Math Makes the Career Example #5

Trucker says “I didn’t like math in high school, but I do now. At the time, I couldn’t see the point.” He goes on to illustrate about how math makes his career. “I’m a truck driver” he declares proudly yet humbly at the same time. “I use math all of the time at work” He explains that with truck driving, the driver must figure percentages, pay per mileage, fuel per mileage, distance, time, and so on.

“I only took basic math in high school”, *Trucker* explains. I look over at his wife. She completes the survey. She hands it to me smiling; happy to contribute. As I ask *Trucker* questions, I keep glancing over at his wife, including her in the conversation with my eyes. She seems uncomfortable in talking, so I concentrate on *Trucker*.

“I finally took an algebra class” he continues, “but that was in college.” I ask him what he had taken in college, and he explains, “I originally tried for an associate in business, but decided it wasn’t for me about a third of the way through. I couldn’t pass all the classes. But I learned a lot!” I become sad for *Trucker*, but I try not to show it. I don’t want to display the pity I feel for him. “I wished I had taken more math classes,” he admits. “I know I’d have a better job. Don’t get me wrong, trucking’s ok. But, I could teach I think.”

I see him start to think more deeply about math, life, his career, and his future. “I guess a person has to take all they’ve learned and put it to use. I use what math I have.” He may have been thinking of where he would be if he had more. Nevertheless, he seems to have a good life: a beautiful family, a steady job, and he enjoys the nice afternoon outdoors. His hands appear rough, his arms ripple in his shirt, and his face beams red with sun through countless days of driving his truck. His voice resonates with mellow tones as he speaks. His smile speaks volumes.

“I have my math, my family, and my job. What else could I want?” I sense an inner confidence in him as we finish the interview and we exchange smiles. I say goodbye but even as I write this narrative his smile remains with me. Strange how talking about math can draw people together! (Excerpt from a narrative by Holly Harrison).

Math Makes the Career Example #6

“Math is important. It’s everywhere. You can’t move up without it.” the father declares flatly. He says, “I work for Caterpillar and math is very necessary for this line of work. My son works as a corrections officer and uses counting everyday.” As with most of our participants, the father says that, “the math becomes increasingly harder with each grade and eventually students get behind. The reason is not necessarily because of the teacher but more of from a motivational standpoint where kids lose interest. It’s hard making math seem like fun or a game. It’s repetition.”

Both men seem to consider themselves to be successful at solving math problems but also contend that computers have taken many peoples’ math skills away. The son says, “When I was in school I probably wouldn’t have taken math if I didn’t have to. But when after maturing I probably would have realized that no math is a mistake, but I couldn’t take the classes then. I’d be out of luck.”

The father chimes back in, “Math is important to daily life. Without math cashiers can’t even make change. Hey, besides, having a lot of math is good for your resume! You make half the money with less math education. So, tell your friends at your college: study math and make money!” (Excerpt from a narrative by Ryan McClintock).

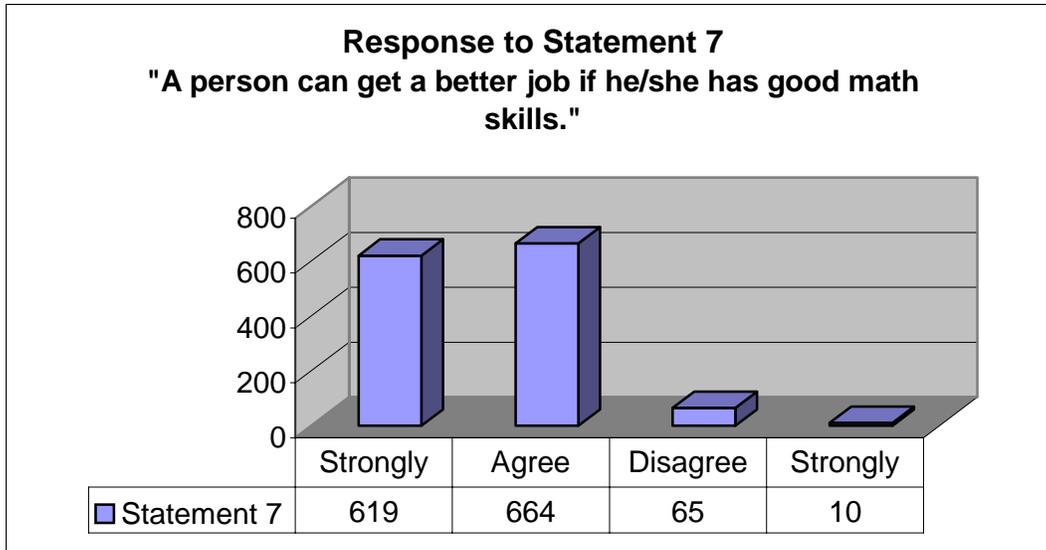
The folk of Midwest City seem to sense that, even though many of them (young and old) fear math; they still need math to achieve their hopes and dreams. The respondents recognize the need, the value, and the potential of a strong math background.

Think about how mathematics has changed over the past few decades. Think about how there has been, and rightfully so, a greater emphasis on mathematics and science. In our technological world there is an ever greater need for students to graduate in those fields, and that need will not go away. In fact, the future top careers will go to the students prepared with the skills that they learn in their math and science classrooms (Snyder, 2006).

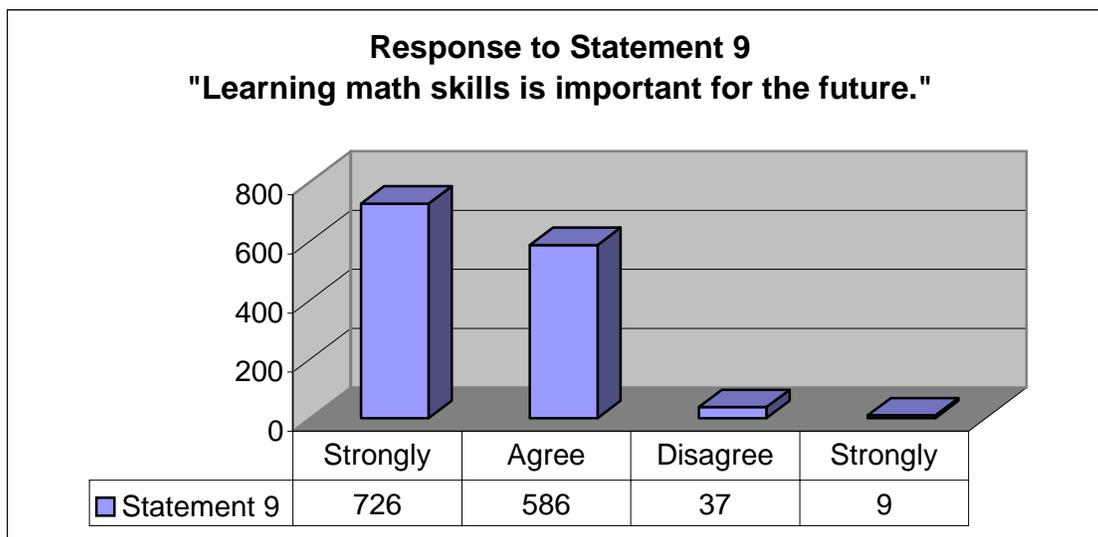
This belief that mathematics opens more career opportunities is also evidenced by participants' responses to survey statement number seven -- "A person can get a better job if he/she has good math skills." Only 5.5% of participants responded negatively to this statement by disagreeing or strongly disagreeing. While 94.5% were in agreement with this statement, over 45% of those surveyed strongly agreed with the idea that possession of good math skills can lead to a better job.

However, a much smaller percentage, 79.8%, of the respondents agreed or strongly agreed with statement ten -- "Advanced math skills can improve employment opportunities in this area." While about 14% less responded positively to this statement than to statement seven, it is not clear whether this statement reflects different beliefs about jobs in their specific region or if this difference in response might be because of the specific mention of *advanced* math skills.

Responses to statement twelve -- "Few jobs in this region of the country require advanced math skills," are also interesting. About half of the participants either agreed or strongly agreed with this statement with the other half disagreeing or strongly disagreeing. Again it is interesting to note that while over 94% agree that a person can get a better job if he/she possesses good math skills, only about half feel that jobs in their region require advanced math skills.



In responding to statement nine -- "Learning math skills is important for the future," participants further indicated their value of mathematics. Over 53% strongly agreed with this statement while just 3.4% either disagreed or strongly disagreed with this statement.



In a way, these comments may be like preaching to the choir. Probably most math enthusiasts and educators realize that better employment opportunities come with stronger math skills. Yet, the respondents in Midwest City came to this knowledge through experience and observation. They came to this knowledge in spite of feeling alienated by the math education process because of testy teachers. They instinctively recognize the need for math by peering through the challenges of their lives. This is a powerful endorsement for math education.

IV. Too Many Testy Teachers!

Many of the folk in Midwest City responded to the math questions by mentioning the tyrannical attitudes and actions of math teachers. In a previous study on the perceptions of math and math education in Appalachia numerous respondents complained of mean and cruel math teachers who terrorized students in the classrooms (www.folknoigraphy.org). The respondents from Midwest City echoed some of the same sentiments as they explained:

Testy Teachers Example #1

I ask her about the teachers and she says, “The math teachers...they never seem to make it real ...there is no application to what they teach,” she shakes her head and looks over towards the purses. “I think math teachers live in their own world and they can’t seem to explain to us where that world is.” She giggles. “They need social lessons before they go and teach school.” (Excerpt from a narrative by Charity Brown).

Teachers Example #2

The *Gardener* immediately volunteers the information that he does not like math and that he cheated his way through his high school math classes. He tells me that his math teacher was not a bad teacher, but that he was overbearing and simply not likeable. “There are not too many people in my life that I really haven’t liked and he is one of them” says *The Gardener*. (Excerpt from a narrative by Tiffany Sloan).

Testy Teachers #3

She tells us how the teachers in her high school did not give her enough one-on-one time and that would have really helped her. This happens to be the problem that her kids also face. They have teachers that do not care if the kids learn the material, they just hope to collect a paycheck and get their summers off for vacation. (Excerpt from a narrative by Tiffany Sloan).

Testy Teachers Example #4

I want to know what she thinks of the math teachers that she had in school. She tells me, “My geometry teacher was horrible at explaining problems. She would just come and work the problem for us. She knew how to do it, but she could not come down to our level and teach us how to solve problems. We could never measure up to her expectations. It was awful!” (Excerpt from a narrative by Tiffany Sloan).

Testy Teachers Example #5

“Look,” he says to me as he leans over his corn planter, “I’m not an educated man. I don’t have a college education. I’ve farmed all my life. But I do know some things about life. One thing I know for sure is that you can’t go ‘round yell’in at kids and get them to learn. We got a math teacher in this school and he yells at everyone. He’s a miserable man and he makes the kids miserable. He’d make you miserable in any other class but it just so happens he teaches math. My wife and I go to church every Sunday. None of the Sunday School teachers yell at the kids. So, they laugh and smile and learn things. Then, these same kids go to school, get yelled at, and hate math and we wonder why? Not me. I know why. My math teacher was mean. He was a tyrant. So, that’s what I think is wrong with math in schools. Math teachers need to smile and enjoy teaching math so we can all enjoy taking it.” (Excerpt from a narrative by David Lucas).

Testy Teachers Example #6

“Again I say, no one teaches them to think. They are forced into textbook math and that just doesn’t work for everyone.” He closes by rewording an earlier thought. “Teachers have got to step over the

line—work outside the box. If they will just teach the student and not teach to the test, the tests will take care of themselves!” (Excerpt from a narrative by Teresa Stockton).

Testy Teachers Example #7

The *Fisherman’s Son* says he is successful at solving math problems most of the time. Yet, he says math is hard for him because of his math teacher. “She’s terrible! She either over teaches or under teaches everything. She doesn’t give us enough to study. Most of the people in my math class are failing. We’re all confused. She grips at us but we don’t understand what she wants” He says they’re not allowed to use calculators in class and that they are all highly discouraged. (Excerpt from a narrative by Eric Melvin).

The data indicate that personality continues to play a large role in the classroom environment for many students. Certainly, this data does not prosecute all math teachers, but the fact that these comments bubbled up in the interviews should give cause for pause to those who train math teachers or those who aspire to teach math. Students inhibited by the prospects of math make personality judgments about the math teacher the same as any other instructor. In other words, according to these findings, math teachers must spend training and time in the area of classroom technique and behavior. Support, methods, and presentation stand as important skills.

V. Seeking Successful Schools

The final domain found in the qualitative data gleaned from the investigation in Midwest City rests in the idea that the respondents seek a successful school. More to the point, the informants yearn for a school or school system that makes learning math an exciting, invigorating, and motivating experience. This desire surpasses a judgment of teachers or their

techniques. This dream comes as a result of the Midwestern belief that schools exist to serve the student and promote a strong, lively curriculum including effective lessons in math. Respondents, both young and old, seek a successful school in the community so that they might be adequately or even completely prepared to move ahead in this ever-changing world.

Successful Schools Example #1

As we begin to discuss math perceptions, *Mr. Casual* wastes no time as he shares his feelings. “Oh my god—our schools aren’t worth a sh*t at teaching math!” he blurts out. He immediately displays an anxious look, worrying that he has been too blunt. I give assurance that what I seek is honesty—that his choice of words causes no offense. “Don’t let kids use calculators; they are one of the biggest problems with math education today. I had to learn how to do math on paper, but kids today can’t add two and two without a calculator!” He is confident that “if high school curriculum required four years of math, many students who began with the opinion that *math sucks*, might find *one* enthusiastic teacher able to alter their thinking. The whole school experience can be salvaged by one teacher that makes a difference!” (Excerpt from a narrative by Teresa Stockton)

Successful Schools Example #2

“Now, as the parent of a child with a learning disability I see things from a different perspective. I realize first of all, how important education is, and as my wife and I struggle with what’s best for our child we are sometimes confused by what goes on in the schools.”

He frowns now, and this simple conversation suddenly turns very serious. “Allow me to give you an example,” he says. “I asked my child what 2×12 was, and she told me 40.” And what do they want to try to teach her? *Algebra!* Please, if you can, enlighten me as to how that makes sense!”

“We no longer have time in the classrooms of today’s schools to give a student individualized attention. Are we not all unique individuals who are therefore deserving of diversity in teaching styles?

We are all so very different—and yet we are all so much alike. Each of us has needs specific to who we are, what our particular standpoint is, as well as our level of intellect. Teaching (as well as learning) should focus on individualism...and until we step back a bit; until we are

willing to place ourselves in a learning environment based on that thinking, we will continue to produce high school graduates with less than desirable life skills.” (Excerpt from a narrative by Teresa Stockton)

Successful Schools Example #3

She explains to me the first problem with the education system; “First off, small towns are all based on your last name; most people won’t help you. My math teacher would always give preference to the cheerleader or the wealthier kid than to me [whenever I raise my hand in class]. I got into with him before. I walked out of a class before because I am *not* one to feel degraded. I won’t let anyone run over me! And I’ll tell you this: I have nothing against sports but education should stop focusing on athletics. If you’re not into playing sports in this school, well then you may as well kiss your butt goodbye. I used to play high school sports and one time I failed a test, but the administration said ‘that’s okay, you can just take it over.’” She recalls how athletes got out of disciplinary action in her school and how the school believes that sports holds the most importance over any type of education. (Excerpt from a narrative by Janet Thompson).

Successful Schools Example #4

“Well, there were only 500 students in my entire high school. A lot of things I didn’t understand. Teachers in the schools I don’t think do a very good job around here. My grandson was having problems with decimals and where to place them. It became such a big problem that he was failing his math class. So we decided to put him in summer school. He works one on one with a teacher and the problem is solved within a week. Why couldn’t his regular school do that for him?”

Her eyebrows lower, she crosses her arms and continues, “I think part of the problem is not enough hands-on work. I think the real question is how much of it’s him and how much of the problem is the teacher, the environment, or the school program.”

I probe more, trying to find out what she thinks the schools can do for the students. She pauses for a few seconds and looks down at the green carpet and says, “I think if teachers just spend time and explain it to the students. Maybe if they had to take a test before they start each school or grade level they could then place them in the level of math they tested for and qualify in. And if they are at the bottom then they should put them in the most basic math class. Without basics, they don’t have anything.”

She begins talking particularly about the school system in Midwest City. She comments with a tone of annoyance in her voice, “Now see, my oldest son was in the weighted classes and was second in his class.

They ended up dropping these classes right before graduation. When everyone was trying to get accepted into their colleges with the honors classes they were taking, well now they couldn't. They just dropped them with no warning and kids suffered."

She uses her hands now, almost aggressively, and says, "A parent with the right name and right power has a kid who didn't take the honors classes so they decided that the weighted classes weren't important. But, because of this change, their child ended up moving up on the class rank. In other words, the discarded classes helped the status of the high class!" She shrugs her shoulders and says, "They just had the right name...that's a small town for ya." (Excerpt from a narrative by Roxanne Wilson).

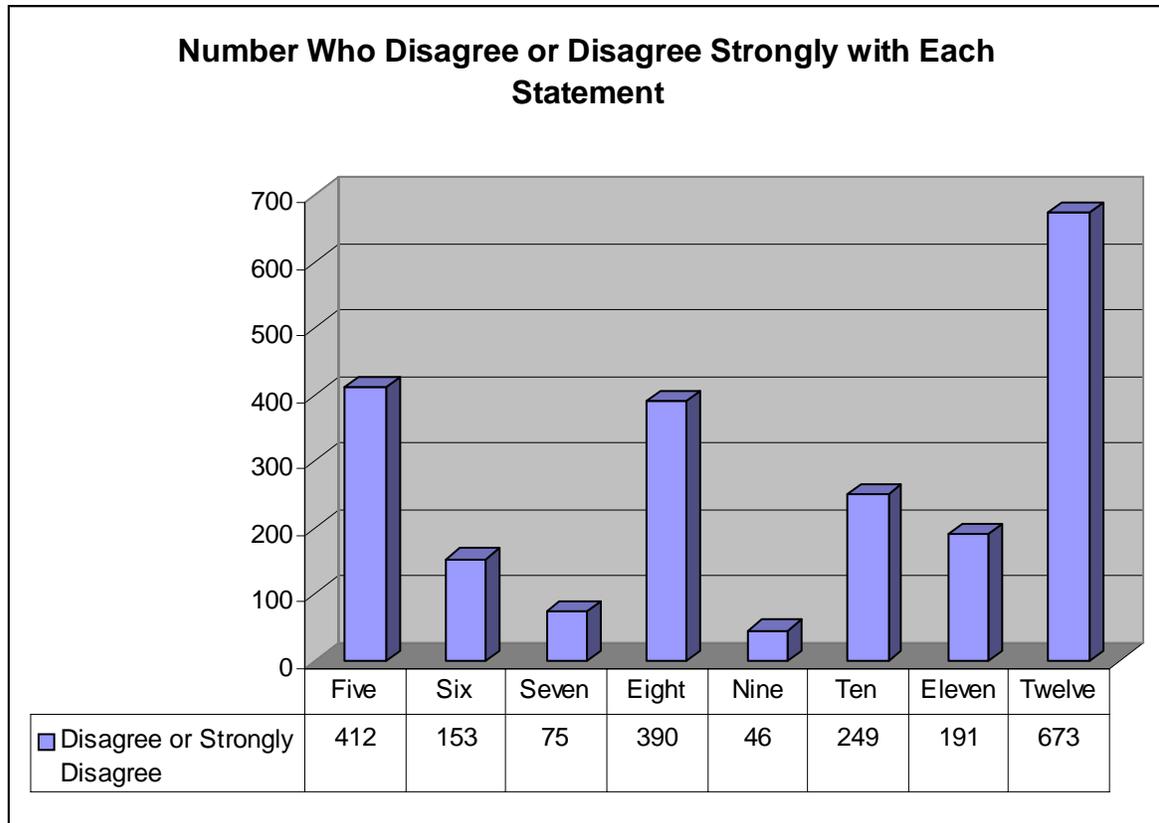
Successful Schools Example #5.

"There should be absolutely no difference when it comes to the processes or techniques of teaching. Just because you live in the country or," she lifts her hands briefly in the air and mimics quotation marks, "out in the sticks." Sooner or later you will be competing with the students from the urban areas. Most of our kids don't stay around Midwest town anymore. It's like a little duck in a big pond."

The *Pretty Librarian* continues, "The school systems need to be a lot stricter and demand more. If you demand more from the students, then you will get more from them. The more you expect, the more you get." There is a serious tone in her voice that becomes obvious as she talks about testing, "The programs, the lesson plans, the curriculum...It's all geared towards testing. You know it is." She shows her emotions through her hand gestures and continues, "All they want to prepare them for is the testing. They are teaching to the tests. I wish we could return to the days when schools could teach the subjects and not teach to the test." (Excerpt from a narrative by Roxanne Wilson).

This desire for quality mathematics instruction in schools is related to participants' responses to survey statement number eight -- "Our local schools do a good job in teaching math." About 71% of respondents either agree or strongly agree with this statement while about 29% disagree or strongly disagree. While statement number eight did not receive the largest number of negative responses, it is noteworthy that only responses were

significantly more negative to one statement, that being statement twelve. Thus while individuals in Midwest City desire a successful school with high quality mathematics instruction, a significant number of respondents seem to question the reality that this desire at this time.



Informants from Midwest City hold that math makes a strong school. They strongly believe that strong schools provide the basis for a successful community. Their strong family values cause them to constantly seek strong schools through school board elections, funding, teacher recruitment, and parental involvement. Good schools remain as the focus for the folk of

Midwest City and math, they believe, features prominently as a major building block in this effort.

Summary of Results

The residents of Midwest City believe that a good math education prepares a young person for success in college. College, they believe, offers youth a better and successful future. Math is viewed as the key for gaining stronger logic, better opportunities, and greater leverage in the world of academic competition.

This study discovered that many adults see the failure in schools to offer effective math education comes as a result of the emphasis of too much technology and not enough of the basics. Folk think that testy, grouchy teachers often ruin the attitudes of many students because of the pressure, criticism, and verbal abuse wielded out by these teaching tyrants. Adult respondents seem to confuse basic arithmetic with advanced math skills. Youth who cannot quickly make change are viewed as math ignorant by many adult respondents while youth contend that arithmetic does not necessarily translate into a successful, modern math education.

Math teaching techniques were topics of conversation with *folk* as well as the management or actual governance of the school or school system. Respondents wish for math instructors that seek to make learning math more of an enjoyable experience rather than a scholastic chore. The *folk* of Midwest City seemed involved, informed, and interested in the teaching of

math and math education in their schools. Good math instruction was seen as a strong suit for youth and for schools. According to the *folk*, successful schools offer strong math education.

Folk of Midwest City see that a strong math education enhances the individual's opportunities, helps to establish strong schools, and strengthens the overall success of the community and region. To the *folk* of Midwest City, math and math education matter.

Bibliography

Appalachian Collaborative Center for Learning, Assessment, and Instruction in Mathematics. <http://www.acclaim-math.org>.

Begg, Andy. *Rethinking the image of mathematics*. Public Understanding of Mathematics and Mathematics Education. ICME 10, DG7: Copenhagen, Denmark. 2004.

COMPAS. *Special Report on Teacher and Public Perceptions*. 2004. Annual State of Education Survey, Commissioned by the Ontario College of Teachers. Compas Inc. September 7, 2004.

Fraser, Alison, Fleishauer, Amy, and O'Conner, Mallory. *Public to Policymakers: "More Math Please."* Mass Insights Education and Research Institute. Boston, Massachusetts. April 2004.

Interactive Illinois report card. (n.d.). Retrieved Jan. 11, 2006 from <http://iirc.niu.edu/scripts/aypacc.asp>.

Lott, Johnny W. *Improving Perceptions of Mathematics Education through Political Action*. National Council of Teachers of Mathematics. 2004.

Lucas, David M. *The Handbook of Folkography: A Qualitative Research Method for Giving Voice*. Pearson Publishing. Boston, MA. 2005.

Lucas, David M., *The Perceptions of the Importance of Math and Math Education in Appalachia*. <http://www.acclaim-math.org>. February, 2004.
http://www.acclaimmath.org/docs/monographs/Monograph_01_Lucas.pdf

MacDonald, Jeffrey, *Contrarian Finding: Computers are a drag on learning*. (Learning Section) Christian Science Monitor. December 6, 2004.

McLoughlin, John Grant. *Mathematics Assessment and “Doing Mathematics”*: *Narrowing the Gap*. Prospero. Volume 4. Number 2. 1999.

Quickfacts, <http://quickfacts.census.gov/qfd/states/17000.html>.

State and county quickfacts. (n.d.). Retrieved Jan. 15, 2006 from U.S. Census Bureau.

Snyder, Barbara. *Mathematics – We’re Counting on Help from the Parents*. PC – Calculators.Com. September 17, 2006.

Watt, H.M.G. *Development of Adolescents' Self Perceptions, Values and Task Perceptions According to Gender and Domain in 7th through 11th Grade Australian Students*. Child Development. Vol. 75. Issue 5. September, 2004.

Weintraub, Illana. *What’s the difference between arithmetic and math?*, MathMedia Educational Software, Inc. 2004. www.mathmedia.com
www.folknography.org

Appendices

Appendix 1

Perceptions of Math in the Mid-West Interview Questions Adults (18-55)

Before beginning any interview or questions, you must secure the verbal permission (oral consent) of the participant. You **must have** permission to commence the interview.

Questions:

1. Would you please describe your feelings about math?
2. Do you feel that math is important for your life? (Probe for examples)
3. Did you enjoy taking math in school? (Probe for stories)
4. Do you consider yourself successful at solving math problems?
5. If math were not required in school, would you have taken math classes? (Probe for reasons)
6. Do you use math in your present career (job)? (Probe for how)
7. Describe how your life might be different if you had additional math skills. (Probe for examples)
8. Describe what levels of math should be required for youth in school.
9. Do you think that your teachers did a good job explaining math?
10. Describe your math education you had in school.

Appendix 2

Perceptions of Math in the Mid-West Interview Questions Seniors (55-Over)

Before beginning any interview or questions, you must secure the verbal permission (oral consent) of any participant. **You must have permission** before commencing the interview.

Questions:

1. Would you please describe your feelings about math?
2. Do you feel that math is important for your life? (Probe for examples)
3. Did you enjoy taking math in school? (Probe for why/why not)
4. Do you consider yourself successful at solving math problems?
5. Describe what levels of math should be required for youth in school.
6. Do you think that math education prepared you for life?
7. Do you use math in your daily activities? (Probe for examples)
8. Do you think it's a good idea to offer math classes to retired adults in your community? (Probe for why)
9. Do you think that your teachers did a good job explaining math?
10. Describe the math education you had in school.

Appendix 3

Perceptions of Math in the Mid-West Interview Questions Youth (Ages 10-17)

Before beginning any interview or questions, secure the permission from both the minor participant's parent/guardian **AND** the minor participant. You must have permission (verbal consent) from both the parent or guardian and the minor participant **before** commencing the interview.

Questions:

1. How do you feel when you hear the word "math?"
2. Do you feel that math is important in your daily activities?
3. In what ways might math be important for your future?
4. Do you consider yourself successful at solving math problems?
(Probe with questions about the use of the calculator)
5. If math were not required in school, would you still take math classes?
6. After you have completed all of your schooling, do you think you will ever use your math knowledge? (Probe for future uses)
7. What are your feelings about advanced math?
8. Do you enjoy taking math in school? (Probe why or why not)
9. Do you think that your teachers do a good job explaining math?
10. After you graduate, will you seek a job here in the Padua area that involves advanced math? (Probe for examples or ideas)

Appendix 4

**Perceptions of Math Survey
Mid-West**

1. **Date:** 5/ ___/06 2. **Age Group:** (10-17) _____ (18-55) _____ (55-Up) _____

(Check Only One)

3. **Gender:** Male _____ Female _____ 4. **Employed?** _____ Yes _____ No

Directions: *After reading the following statements, select (circle) the response that best fits your feelings or attitude.*

5. I like math.

Agree strongly Agree Disagree Disagree strongly

6. I use math in my life everyday.

Agree strongly Agree Disagree Disagree strongly

7. A person can get a better job if he/she has good math skills.

Agree strongly Agree Disagree Disagree strongly

8. Our local schools do a good job in teaching math.

Agree strongly Agree Disagree Disagree strongly

9. Learning math skills is important for the future.

Agree strongly Agree Disagree Disagree strongly

10. Advanced math skills increase employment possibilities in this area.

Agree strongly Agree Disagree Disagree strongly

11. Math classes should be required at every level of school.

Agree strongly Agree Disagree Disagree strongly

12. Few jobs in this region of the country require advanced math skills.

Agree strongly Agree Disagree Disagree strongly