Assessing Arizona’s Education System and Workforce Preparedness:

An Interpretation of Demographic Data

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Abstract

This paper examines a sampling of demographic information reflecting the general condition of Arizona’s K-16 education system compared to the nation’s system as a whole. Specifically, it addresses data pertinent to elementary and secondary student core subject testing performance and various socio-economic data concerning students, schools, teachers, and state spending.

 Based on this information, this paper then identifies and summarizes trends impacting the current education system and workforce preparation programs and examines the probable impact these trends may have on the future workforce.

Assessing Our Education System and Workforce Preparedness:

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 The state of education in Arizona and the nation has been the subject of media attention and political rhetoric for many years. Nationally, our education system appears to be failing to produce a sufficiently educated workforce. Jobs once held by Americans, including but not limited to those related to technology are increasingly being exported to other countries. Why? The global workforce is reported to be cheaper, better educated, and overall better equipped to fill the labor needs of American-owned and foreign companies looking to stay competitive. It seems that the same capitalistic system that elevated the United States to economic prosperity following World War II is now being blamed for driving down our country’s standard of living and hopes of continued prosperity by looking elsewhere for workers. Industry points to the failure of our education system as a primary underlying reason for this trend.

 Arizona’s population has steadily risen over the last 50 years. According to the U.S. Census data on incorporated areas as of 2009, Phoenix is the fifth largest metropolitan area in the United States. Until recently, the local economy has largely been dominated on growth related industries such as home building. However, Arizona news sources and local politicians tell us that our state’s education system ranks consistently near the bottom when compared with other states and the nation as a whole, and this deficiency is currently and will in the future negatively impact the local economy and our population overall. Furthermore, we are warned that unless positive steps are taken to correct our educational deficiencies, Arizona’s future growth and the overall quality of life of its citizenry will decline.

Is the national system truly ineffective, and does Arizona’s education system consistently rank at or near the bottom? An examination of the data supports both statements.

**Demographics – Student Performance**

 Consider the following three data tables addressing core competencies for Arizona students compared to the rest of the nation at elementary and secondary grade levels as measured by performance on the National Assessment of Educational Progress math and reading tests given to all 4th and 8th graders in the United States. Table 1 addresses the percent of students demonstrating proficiency levels or better (2007), Table 2 addresses scale score gains 2003-2007, and Table 3 addresses average scores for 2009, 2007, and 2005.

Table 1

*The K-12 Achievement Index – State Achievement Indicators – Achievement Levels*

Achievement Levels Arizona Average Rank National Average

4th grade math – Percent proficient on NAEP (2007) 30.6% 43rd  38.6%

8th grade math – Percent proficient on NAEP (2007) 26.3% 38th 31.0%

4th grade reading – Percent proficient on NAEP (2007) 24.2% 46th 31.7%

8th grade reading – Percent proficient on NAEP (2007) 24.3% 42nd 29.2%

*Note:* Adapted from *Arizona, a Special Supplement to* *Education Week’s Quality Counts,* Editorial Projects in Education Research Center (EPERC), 2008.

NAEP – National Assessment of Educational Progress

Table 2

*The K-12 Achievement Index - State Achievement Indicators – Achievement Gains 2003-2007*

Achievement Gains Arizona Average Rank National Average

4th grade math – Scale score change on NAEP (2003-2007) +3.0 43rd +5.1

8th grade math – Scale score change on NAEP (2003-2007) +4.4 19th +4.1

4th grade reading – Scale score change on NAEP (2003-2007) +0.6 44th +3.2

8th grade reading – Scale score change on NAEP (2003-2007) - 0.5 30th - 0.3

*Note:* Adapted from *Arizona, a Special Supplement to* *Education Week’s Quality Counts*

Editorial Projects in Education Research Center (EPERC), 2008.

Table 3

*Average NAEP Scores – 2009, 2007, 2005*

Test Score Averages Arizona Average Rank National Average

4th grade math – Average score 2009 230 48th 239

4th grade math – Average score 2007 232 45th 239

4th grade math – Average score 2005 230 48th 237

8th grade math – Average score 2009 277 40th 282

8th grade math – Average score 2007 276 38th 280

8th grade math – Average score 2005 274 36th 278

4th grade reading – Average score 2009 210 48th 220

4th grade reading – Average score 2007 210 48th 220

4th grade reading – Average score 2005 207 48th 217

8th grade reading – Average score 2009 258 42nd 262

8th grade reading – Average score 2007 255 44th 261

8th grade reading – Average score 2005 255 44th 260

Source: U.S. Department of Education, Institute of Education Statistics, National Center for

Education Statistics, National Assessment of Educational Progress

**Interpretation of Performance Data**

 Tables 1 through 3 provide a clear indication that the majority of students in the 4th and 8th grade in the U.S. and Arizona are performing at a substandard level on national test scores. From this sampling of the K-12 data base, one would expect similar findings at other grade levels if they were tested. As Table 1 illustrates, with the exception of the 4th grade math data, only about one third of the 4th and 8th grade students nationally are demonstrating proficiency on their math and reading NAEP test scores, and the 4th grade math data is only slightly better than one third.

Nationally, 4th grade reading tests reveal that only about 3 out of every 10 kids at that age are proficient readers for their grade level. This demonstrates that practically from the very beginning of the educational journey, major challenges exist that can and often do hamper intellectual development for the majority of students. Since reading skills affect nearly every aspect of the learning process, if a student has trouble reading by the 4th grade one must surmise that their performance in all their 4th grade level subjects will suffer as well. If nothing is done to correct the issue, this pattern will repeat itself throughout their school years. They are playing catch up nearly from the start. It’s like starting a 16 year journey with a ball and chain shackled to your ankle. Some never catch up, and drop out or end up denied the opportunity to attend college or other career training. Eventually many of these same people end up in the adult world unemployed, underemployed, institutionalized, or supported by the state to some degree. And for many it starts with reading problems at or before they enter the 4th grade. Seventy percent of 4th graders nationally face this potential reality. Clearly, poor reading performance early in the learning process constitutes a root issue of the entire system nationwide.

Proficiency in math, or lack thereof, early in the educational process also carries ramifications that affect student development moving forward. As technology continues to become a bigger part of our world, math and science are being stressed more and more in the education process. As with reading, the failure to understand basic math carries future ramifications and is bound to hamper understanding at higher levels for math and science as well. Again, national scores indicate the majority of students at the 4th and 8th grade levels are struggling in math.

 As bleak a picture as these statistics paint on the national educational canvas, the state of Arizona’s education portrait is even darker – much darker. Table 1 demonstrates that whereas nationally, nearly 40% of 4th grade students demonstrated proficiency on their NAEP math tests, only slightly more than 30% of Arizona 4th graders hit the mark. In the other categories scored in Table 1, the proficiency averages drop to around 25% for Arizona students compared to roughly 30% nationally. These scores consistently place Arizona at or near the bottom 15 - 20% of states in the nation when it comes to state averages for student proficiency in reading and math at the 4th and 8th grade levels.

 The next body of data gives slight cause for optimism. Table 2 shows that gains in test scores in most categories are being slowly made both in Arizona and nationally. The one exception is 8th grade reading scores, which have actually dropped, both nationally and in Arizona over the 2003 – 2007 timeframe. On a national level overall scores are improving slightly over time and doing so gradually. On a state level scores are improving in Arizona, but typically not at the same pace as nationally. Scale score change for 8th grade math in Arizona is slightly higher than nationally. However, 8th grade reading scores have actually declined over the period nationally and even more so in Arizona. So, some gains are being realized but other scores are dropping. Nationally, 4th grade math scores are showing the biggest gains on Table 3, followed by 8th grade math. Reading scores for 4th graders nationally are showing more modest improvement while 8th grade reading scores nationally are actually dropping slightly over the same period.

Similar patterns are present in Arizona students. Both nationally and in Arizona, students are gradually scoring higher in math at both grade levels, 4th graders are scoring slightly higher nationally in reading and even less slightly higher in reading in Arizona. Overall, math scores are improving, early reading scores are improving slightly, and later reading scores are stagnant or declining – some slightly good news mixed with some not so good news. None of it is great news.

Table 3 further demonstrates that some progress is being made nationally. The average test scores for 4th grade and 8th grade math and reading are rising gradually. Gains are modest, but are being realized based on national average scores. Arizona reading scores for both 4th and 8th graders are rising at about the same rate as the rest of the nation. Arizona 8th grade math scores are losing ground compared to the rest of the nation, but are rising. Arizona 4th grade math scores are stagnant.

 Arizona 8th grade average reading test scores are consistently in the bottom 20% when ranked with the rest of the nation. Arizona 4th grade reading scores are consistently in the bottom 5% when ranked nationally. Arizona 8th grade average math scores have improved each year, but Arizona’s ranking in that category has declined from the bottom 38% to the bottom 20% from 2005 to 2009. However, when revisiting the data from Table 2, Arizona appears to be gaining faster than the rest of the nation with its 8th grade math scores. Different criteria were taken into account. In this area results are mixed. Score averages for 4th grade math in Arizona are stagnant, and the state ranks in the bottom 10% nationally for this category.

Based on the data presented in each of these tables, Arizona consistently performs very poorly compared to the national averages. Table 4, 5, and 6 provide data that could help explain these deficiencies at the national and Arizona state level

**Demographics – Socioeconomic Data**

Table 4 features socio-economic demographic data relevant to students and their families.

Table 4

*Chance for Success Index – State Success Indicators*

State Success Indicators Arizona Average Rank National Average

Children from families with incomes at least

200% of poverty level (2006) 54.8% 41st 60.1%

Children with at least one parent with a

Post-secondary degree (2006) 37% 41st 43.3%

Children whose parents are fluent English speakers (2006) 75.5% 48th 84.3%

Three- and 4-year-olds enrolled in preschool (2006) 32.3% 48th 46.1%

Public high school students who graduate (Class of 2004) 68.4% 35th 69.9%

Young adults enrolled in postsecondary or

with a degree (2006) 42.6% 49th 51.8%

*Note:* Adapted from *Arizona, a Special Supplement to* *Education Week’s Quality Counts,* Editorial Projects in Education Research Center (EPERC), 2008.

 Data from the National Center for Educational Statistics provides insights into the economic and socio-economic demographics relevant to the education system in Arizona and the nation. Consider these statistics:

 Table 5

*NCES Key Educational Statistics – Public Schools*

 Arizona Rank National Average

Expenditure per pupil 2005-2006 school year $6,515 49th $9,154

Low income students 2005-2006 45% 16th 40.9%

Limited English proficient 2005-2006 16% 3rd 8.5%

Pupil/Teacher Ratio 2005-2006 21.3 50th 15.47

*Note:* Adapted from Arizona’s *K-12 STEM Ed Report Card: How Arizona Compares,* The STEM Ed Coalition. Data is from the U.S. Department of Education, National Center for Educational Statistics.

 Other important economic data comes from EPERC:

Table 6

*Spending Indicators - 2005*

 Arizona Average Rank National Average

Adjusted per-pupil expenditures (PPE) –

Analysis accounts for regional cost differences $6,232 48th $8,973

Students funded at or above national average –

Percent of students in districts with PPE at or

above the U.S. average 4.5% 45th 46.1%

Spending Index – Per pupil spending levels weighted

by the degree to which districts meet or approach

the national average for expenditures 71.8 48th 92.7

Spending on education – State expenditures on K-12

as a percent of state taxable resources 3.4% 33rd 3.6%

 *Note:* Adapted from *Arizona, a Special Supplement to* *Education Week’s Quality Counts,*

Editorial Projects in Education Research Center (EPERC), 2008.

**Interpretation of Socioeconomic Data**

 Data from Tables 1 – 3 consistently ranks Arizona student performance low when compared with the rest of the nation. Tables 4 and 5 provide socio-economic data related to students and their families, and once again Arizona ranks very low compared to the rest of the nation across the board. This information further demonstrates that many Arizona students are at a disadvantage from the very start of the educational process.

Arizona students are more likely to come from families struggling financially with parents who are less educated than the national average. Only 54.8% of Arizona children come from families with incomes at least twice the poverty level compared to 60.1% nationally, ranking the state in the bottom 20% compared to the rest of the country. The state ranks 16th in the nation for number of low income students with 45% compared to 40.9% nationally. The parents of Arizona children are less educated than the national average with only 37 % having one or more parents with a post-secondary degree. Their parents make less money and are less educated.

In addition, language barrier issues are much higher in Arizona than other states. Only 75.5% of Arizona children come from homes where the parents are fluent English speakers. This statistic ranks Arizona in the bottom 5% of the nation for this category. The students themselves tend to be less proficient in English. At 16%, Arizona ranks 3rd in the nation for students with limited proficiency in English. Arizona students are nearly twice as likely to lack English proficiency compared to the national average.

As for student success in school, Arizona ranks 35th in the nation with a high school graduation rate of 68.4% compared to 69.9% nationally. These figures indicate that both on a state and national level roughly 3 out of every 10 high school students fail to receive a diploma. In addition, only 42.6% of young adults in Arizona are enrolled in postsecondary education or have a degree, placing the state 49th in the nation for this measurement. For every 100 ninth graders in Arizona, only 17% will graduate from college on time (Expect More Arizona, 2010).

A final statistic from Table 4 that’s revealing pertains to Arizona students attending preschool. Arizona is ranked 48th in the country for number of three and four year olds enrolled in preschool. Only 32.3% attend compared to 46.1% nationally. Again, the Arizona student is often at a severe disadvantage from the very start of the process by not participating in pre-school.

These stats are telling, but perhaps the most telling data pertains to state spending on education. Why do Arizona students perform so abysmally compared to the rest of the nation? One major reason is the lack of state funding. Consider the data from Tables 5 and 6. In the 2005-2006 school year, the expenditure per pupil in Arizona was $6,515. That is equal to 72% of the national average of $9,154 placing Arizona 49th in the nation in money per student. Adjusted per-pupil expenditures for the previous year set the figure at $6,232 per student which ranked 48th in the nation. With such limited funding, is it any surprise that the state’s education system produces sub-performing students?

Per capita, Arizona maintains a high number of school districts. Yet only 4.5% of Arizona students go to school in districts that meet or approach the United States average per pupil expenditures (PPE). Over 95% of its students go to school in districts that are underfunded on a per pupil basis compared to the rest of the nation. The national average of students attending class in districts with PPE at or above the national average is 46.1% - a ten-fold improvement over Arizona. It is not surprising that Arizona’s pupil/teacher ratio is extremely high as well. In fact at 21.3 students per teacher, the state ranks 50th compared to the national average of 15.47.

**Conclusions**

When reflecting on the body of data presented in this paper, the statistics present compelling evidence that the nation’s K-12 education system is doing a mediocre job, and the state of Arizona is doing a horrendous job educating its students. Early in the process students are falling behind in their basic learning skills such as reading and math. If they don’t understand first, or second, or fourth grade math, how can they learn algebra and calculus? If they don’t read at their grade level in the 4th grade how can they expect to read at more advanced levels in their later years? Adequate reading skills are a prerequisite for learning nearly everything. These core intellectual deficiencies carry over into other subjects and hamper students’ ability to learn and their continued development as they traverse their way through the K-12 education system and beyond. Trying to acquire learning skills and build a body of knowledge and when you can’t read is the equivalent of trying to build a sturdy structure on a shaky foundation. It just cannot be done.

With students leaving the education system underperforming, workforce preparation programs where they exist must largely cater to an underperforming workforce that can only qualify for low skill, low paying jobs. And so our national educational and economic dilemma is perpetuated – American jobs requiring higher educated, skilled workers are being exported to nations that produce more qualified candidates. Our workforce is being routed into less desirable jobs because those are the positions they are qualified to perform.

Arizona and must invest more money in its education system. The state has grown in population, but the education system has not kept up. Efforts must be made to improve learning in the early years by making pre-school programs more accessible for all its students. More emphasis must be placed on starting kids out on the right track in basic skills like reading and math. Students who are not proficient in English must have resources made available early in the process to get them proficient. More teachers must be hired to reduce pupil/teacher rations. Although some students excel in spite of the obvious negative trends, far too many are not leaving the education system as prepared as they should be to enter the workforce and productive society.

When the U.S.S.R. launched Sputnik in 1957 it set off the panic button that our educational system was falling behind. Our very survival was threatened. Our nation responded by pushing our students and our schools to produce a more technically proficient workforce, which it did. The current education crisis has come on more gradually, but just as in 1957 our survival is at stake – our economic survival. In Arizona, and the nation, we must recognize that we are in a crisis mode. A national education reformation will be required to change the current trends and more money must be allocated. Shortchanging the education investment in our young people now and in the future can only serve to doom the future workforce.

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