

# Tomorrow Is Now: Preparing Our Students for the 21<sup>st</sup> Century

## A Report by the 21<sup>st</sup> Century Learning Sub-Committee Of the District 39 Community Review Committee

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## **Tomorrow Is Now: Preparing Our Students for the 21<sup>st</sup> Century**

### **Section One: Executive Summary**

Given the rapidly changing and increasingly complex world in which we live, the 21<sup>st</sup> Century Learning subcommittee of the 2009-2010 Community Review Committee (CRC) was interested in investigating answers to the question: What additional skills should we be teaching our children currently enrolled in kindergarten through eighth grade that will best prepare them for their future in this century?

#### Overview of Report

Section One, the Executive Summary, highlights the committee's objective, our research process, and the "short list" of skill sets identified by the committee, based on our research, as being essential for functioning successfully in the 21<sup>st</sup> century. Sections Two through Five describe in more detail the committee's process of culling the research, the list of eight skill sets established by the committee, a review of the research that supports our list of 21<sup>st</sup> century skills, and our conclusions and recommendations relevant to District 39. Section Six includes the Appendices.

#### Objective

The objective of the 21<sup>st</sup> Century Learning subcommittee was to broadly research literature and other resources from a variety of disciplines on the topic of 21<sup>st</sup> century learning, with the goal of identifying a manageable number of recurrent and consistent themes that represent skills, literacies, and personal qualities District 39 should foster in its students to increase the likelihood of post-school success.

#### Research Process

The committee used a wide variety of resources to research the topic of 21<sup>st</sup> century learning. The major themes of each resource were captured on a standard review form (see Appendix #1). As a group, the committee identified a core list of recurring themes in our collective research and, using the completed review forms, reported on the research that supports each item on the core list.

## Our Core List of 21<sup>st</sup> Century Themes: The CRC Top Eight

Below are eight broad themes deemed by the committee as essential to preparing our students to meet the challenges and opportunities as adults, workers, and world citizens of the 21<sup>st</sup> century.

- Global Awareness and Perspective
- Technology
- Value-Added Skills
- Communication
- Collaboration
- Social Responsibility
- Teaching Style & Learning Process
- Learning Environment

## Section Two: Introduction

Twenty-first century learning has surfaced as a potential research topic in Community Review Committee (CRC) meetings for the past few years. This year, the topic seemed timelier than ever. In his 2009 Inaugural Address, President Obama pledged to make education a priority and, in his first Address to the Joint Session of Congress in February stated:

In a global economy where the most valuable skill you can sell is your knowledge, a good education is no longer just a pathway to opportunity – it is a pre-requisite. Right now, three-quarters of the fastest-growing occupations require more than a high school diploma ... we know the countries that out-teach us today will out-compete us tomorrow.

At the same time, the entire world is grappling with new challenges and opportunities, in economics, politics, employment and peacemaking (to name just a few), all of which require visionary and forward-thinking solutions. The choice to research 21<sup>st</sup> century learning is an acknowledgment that our children in District 39 must be prepared for such challenges and opportunities, and recognition of the need for visionary and progressive approaches to 21<sup>st</sup> century education.

### Background

For previous 20<sup>th</sup> century generations, moving into adulthood and procuring a job was, in retrospect, relatively less complicated. College was an entrée into a promising career, and possessing a college degree almost certainly guaranteed you a job. If you had a specific expertise or skill, even better. Without the current technological advances that make people available 24/7, the division between work life and personal life was comparatively clear. Although people volunteered their time to community service, the definition of “community” was narrower than it is in today’s global society.

Now, in the 21<sup>st</sup> century, our children face an increasingly complicated world that is changing at breakneck speed. Technology has contributed to that complexity and changed the way we conduct business and our personal lives. In his book, *The World Is Flat*, Thomas Friedman (2006) attributes the “flattening” of the world to the computer, the World Wide Web, the speed at which data can be transmitted, and the portability of data access through the use of PDAs, cell phones, and laptops. Business can be conducted at any time of day, with any part of the world. Research shows that “Millennial Students” – people born after 1982—“have a different relationship with information and learning than do previous generations,” due to Internet access and other technologies (Rodgers, Runyan, Starrett & Von Holzen, 2006). Their vast experience with technology – video games, e-mail, television, cell phones and computers – has impacted how they interact with their environment and how they learn. As a result, young students just starting elementary school will learn differently than previous

generations (Rodgers et al., 2006). This brings into question both *how* we teach 21<sup>st</sup> century learners and *what* we teach them.

Furthermore, the exponential development of technology and information accessibility means that the technical information – and information in general -- that students learn *now* may very well be outdated by the time they are of working age. This fast-paced growth and change no doubt will impact the job landscape for our children. According to former Secretary of Education, Richard Riley, the top ten jobs that will be in demand in 2010, did not exist in 2004 (Fisch, 2007).

Historically, education has been driven largely by the economy of the times, and the 21<sup>st</sup> century will be no exception. When the economy was agriculture-based, education was standardized to prepare people for an agrarian lifestyle and livelihood. From World War II until the 1970's, the focus of the U.S. economy was to excel at mass-production, producing the most goods at the lowest cost and consumer price point (Council on Competitiveness, 2008). Today, goods-producing industries continue their steady decline and our national economy has become predominantly service-based. In its first publication, the Council on Competitiveness (2008) stated that more than 75% of all jobs in the U.S. are in the service economy, and that 30% of those service jobs are in the “highest skill category of professional, technical, managerial and administrative occupations.”

This profound shift from manufacturing to service means that “human capital” is the critical factor that will differentiate who can compete in our national and global economy. Furthermore, it is no longer sufficient for that “human capital” to have a single expertise or “narrow skill.” This has never been truer than now when, as the U.S. Department of Labor estimates, *today's* learner will have 10-14 jobs by age 38. Narrow skill sets will become irrelevant or not readily transferable from job to job or across career silos. Rather, people, organizations, and countries will be competitive only if they add significantly more value than their counterparts, by bringing to the table more complex and creative skill sets being demanded by the service economy.

The key to competitive advantage, according to the Council on Competitiveness (2008), is not simply to manufacture more products faster, produce more young scientists and engineers, or even to be more technologically innovative. Instead, the U.S. needs to ask:

“Is just doing more of the same going to be enough in the 21<sup>st</sup> century?”  
The U.S. margin of leadership may depend not just on doing more, but on a strategy for doing things differently. If the competition has successfully imitated the American innovation model, then we should be thinking about the new model that will differentiate U.S. capabilities from the rest of the world.

Demographics related to age also will change the landscape of the marketplace and the work force. As baby boomers age, the 55-64 age group will increase by 9.5 million people (30.3%) by the year 2016. Meanwhile, the 35-44 cohort will *decrease* by 5.5%, and the 16-24 cohort will *decrease* by 1.1% (Dept. of Labor, Bureau of Labor Statistics, 2007).

Due in part to the large and aging Baby Boomer generation, health care and social services industries will grow, creating more market and job opportunities than other industries. Among all occupations in the economy, healthcare occupations are expected to make up seven of the 20 fastest growing occupations.

As a result of growing business complexity, professional and business services will rank second among fastest growing employment opportunities, including:

- Highly specialized Human Resources services;
- Management of companies and enterprises;
- Computer systems design, maintenance and network security;
- Seasonal and temporary workers.

Changing ethnicity demographics, too, will dramatically alter the marketplace, the labor force, and the landscape of the work world our children will be entering in 10-20 years. For our children, the development, marketing, and sales of products and services will be driven by the new ethnicity demographics. Minorities and immigrants, according to the Bureau of Labor Statistics, will comprise an ever-increasing share of the U.S. population by 2016. By 2050, the collective minority (Black, Hispanic, and Asian) population will make up the majority (55%) of the total U.S. population, with the Hispanic demographic growing the fastest (U.S. Census Bureau, 2008). According to the U.S. Census Bureau (2008), ethnic populations will change as follows:

- Hispanics to 30% of total population;
- Asians to 10% of total population;
- Blacks to 15% of total population;
- Whites to 45% of total population.

### Impact on our Schools

Schools are being called upon to prepare children for careers that will require higher-order, service-related skills, for jobs that require skills that rapidly evolve and become obsolete, for jobs that today do not even exist, and for entering adulthood in a country and a world that is increasingly diverse and interconnected.

All of these factors have implications for the education of our District 39 children. As our economy continues to evolve, and as institutions of higher learning now

grapple with the same issues related to how to best prepare students for the 21<sup>st</sup> century, educators and parents of children in grades K-8 also must examine how effective current curriculum and teaching methods are in preparing young students for college and beyond.

### Engineering as an Example

The Council on Competitiveness highlights engineering as an instructive example of the kind of education “renaissance” needed, across all industries, to fuse technical expertise and knowledge with 21<sup>st</sup> century skill sets. The current education of young engineers-to-be is flawed by, among other factors, a focus on narrow skill sets. For the U.S. to maintain a competitive edge in engineering, says the Council, pre-engineering students should be in a liberal arts environment where engineering is viewed as a “liberal art discipline” and equipped with high-value-added skill sets -- beyond strong disciplinary knowledge – that include:

- Global awareness and facility;
- Communication skills;
- Leadership competence;
- Multidisciplinary knowledge base;
- Intellectual breadth.

These skill sets put forth by the Council were echoed in many resources studied by the CRC (see Appendix #2) and, as such, are subsumed under the eight broad themes identified by the 21<sup>st</sup> Century Learning subcommittee.

### Essential Questions

Given this futurist scenario, what qualities, skills, and experiences will be necessary for our young children when they matriculate from college and enter the world as adults? More relevant to the present and District 39, what else can we as teachers, administrators and parents do *now* to prepare our children for this unpredictable and evolving future, and to make their transition to higher education and adulthood as smooth and successful as possible?

The objective of the 21<sup>st</sup> Century Learning subcommittee was to research and find answers to these essential questions that would be relevant to all stakeholders, including parents, teachers, administrators, board members, and students.

### Research Process

The 21<sup>st</sup> Century Learning subcommittee of the CRC researched the landscape of the future using a wide variety of resources. Committee members read books

and articles by “thought leaders,” investigated websites associated with 21<sup>st</sup> century “think tanks,” attended numerous workshops, viewed videos, and conducted interviews with professionals in business and education. For each investigated resource, committee members completed a Source Review Form (see Appendix #1) that detailed the major themes garnered from the resource and other information relevant to the topic of 21<sup>st</sup> century learning. The committee organized all information into cohesive groupings that then became the list of eight most critical themes.

### Related Issues

A few related and recurring topics surfaced in the committee’s ongoing discussion of 21<sup>st</sup> century learning. First, in putting forth this list, the committee is by no means recommending that the traditional core curriculum (e.g. reading, math, writing, social studies, and science) be abandoned. In fact, these subjects are more important than ever, as the U.S. struggles to keep up with other countries in math and the sciences. The committee is recommending, however, a more interdisciplinary approach, one that augments and infuses the traditional curricula with more progressive curriculum, mindsets, and teaching methods that reflect the demands of the 21<sup>st</sup> century.

Second, our research indicated that the implementation of a more interdisciplinary and progressive curriculum necessitates a shift in teaching and learning from a focus on the end product to a focus on *process*. In other words, the teaching of 21<sup>st</sup> century skills is most likely to occur in the *process* of teaching traditional core curriculum. For example, learning to work in teams of people who are different from you can occur in the process of doing a group project in math.

Third, many of the themes chosen for our core list will sound familiar and, perhaps, not all that different from the skills that have been viewed as critical to curriculum for decades. According to experts, however, the difference is that these qualities will be even more crucial to the success of our children than ever before and, as such, must be more intentionally incorporated into the curriculum. Our research made one point crystal clear: It will no longer be sufficient to have a technical expertise in scientific research, teaching, technology, medicine, or any other field. Our children will be expected to have additional competencies in working within diverse cultures, leading, managing, reading nonverbal communication, and a whole host of other higher-order, service-related skills to meet 21<sup>st</sup> century demands.

Finally, a few topics were omitted from this report because they were outside the range of the subcommittee’s research and/or had been researched by the CRC in the recent past. First, although the subcommittee’s discussions often turned to news that other countries like China and India are outperforming the U.S. in math and science, comparisons in education between the U.S. and other countries

were not within the scope of our research. Committee members' opinions varied widely, from thinking that the U.S. should increase its focus on math and science curriculum to keep pace with other countries, to the belief that the focus on a more broad, liberal arts education is what sets the U.S. system apart and, ultimately, what will set our children apart from students from other countries in the future. Second, although children's health and wellness is an extremely important and timely issue, it was not included in our report as a 21<sup>st</sup> century literacy because the district is currently addressing this issue as a result of a detailed report completed by the CRC in 2007-2008.

## Section Three: Core List of Themes and Review of Research

### Theme One: Global Awareness and Perspective

*Global awareness refers to the idea of weaving into our curriculum a more enhanced sense of the world around us and broadening our history, social studies and world languages curriculum from the traditional U.S. and Western Europe centric perspective to a more global perspective.*

Our children will not only hold 10-14 jobs by age 38, but they will also work beside, compete against, and collaborate with individuals and countries that are geographically distant and/or culturally different from the United States to a much greater extent than did their parents. Furthermore, many of our children will travel abroad and/or work abroad to a much greater degree than ever before (Marx, 2006).

When asked what critical 21<sup>st</sup> century concepts our children need to navigate today's education system and to prepare for the future of business and commerce, Hubert Joly, a Chief Executive Officer of Carlson Companies, said the study of different cultures was most important. As someone who has lived and worked in three different countries, he emphasized the importance of taking a holistic approach and studying the history, art, music, language, government, politics and social norms of each culture (Born, 2009).

The International Studies School Association (ISSA) advocates for our educational system to broaden its U.S. centricity and to address the need for a more global view of the world around us. As educator and publisher Catherine Scherer told participants at a 2003 ISSA conference, "The reality is that there are six billion people in the world, and 95 percent of them don't live here" (Marx, 2006). Betsy Rogers, the 2003 U.S. National Teacher of the Year, said that an education that helps students understand multiple cultures "must become a part of our curriculum K-12" (Marx, 2006).

We also need to instill greater global awareness and perspective for our District 39 students for the benefit of our country. As Distinguished Professor of Education at Michigan State University Yong Zhao (2007) states:

Understanding other cultures and languages is vital to the continued prosperity of the United States as a multicultural society...The first thing we, as educators, must do is change to a global mindset, to accept the reality of the globalization and seek opportunities, rather than to get distracted by the problems of the past.

### *Supporting Facts for the Global Awareness and Perspective Theme*

The United States' long standing status as the one and only dominant global economic and cultural super power is waning. The world is changing; many other countries are growing much faster than the U.S., and as such, other countries have gained or are gaining power and influence to a greater degree. Furthermore, the U.S. is more dependent on, and inter-connected with, others around the world than ever before. And finally, trends in global population, education, labor force, technology, immigration and geopolitical unrest have caused a dramatic shift towards globalization in the U.S. and abroad.

The world population is changing dramatically. China, with 1.33 billion people, stands as the world's most populated country, but this will change. Projected changes in world population for 2050 are interesting. Countries comprising the United Kingdom and Western Europe are facing flat to declining population outlooks whereas India, Pakistan, Bangladesh, Nigeria, the Philippines, Egypt and Congo are all projected to grow at a rate faster than the overall world forecast. By 2050, India will surpass China as the most populated country on Earth. (See Appendix 3)

The U.S. is losing its dominance as the strongest and sole global economic power. According to the Council of Competitiveness (2007), the U.S. share of:

- World output (as measured by GDP) was 40% and is now 21%;
- World published research was 61% but has fallen to 29%;
- Industrial patents are 52%, the lowest in our history.

China, India, and the former Soviet Union, until the mid 1980's, were state run economies closed off to most international commerce; yet, today they are key players. Between 2001 and 2006, these countries, along with other emerging economies primarily in Asia and Latin America, had averaged 7% annual growth compared to 2.3% annual growth in more developed countries ("The New Titans", *The Economist*, September 14, 2006).

According to Business Monitor International data, the U.S. and China will dominate the economic landscape by 2018 with Russia climbing to number four in the world. Also, notably, Western European economies of Germany and France will decline in their contribution to global GDP (See Appendix 4). China could surpass the U.S. economy in 2041, according to a report published by Goldman Sachs (2003).

The world is economically inter-dependent. As Federal Reserve Chairman Ben Bernanke (2006) said:

The traditional distinction between the core [countries] and the periphery [countries] is becoming increasingly less relevant...as the mature

industrial economies and the emerging-market economies become more integrated and interdependent.

Furthermore, the U.S. is dependent on many other countries. According to Paul Toscano (2009) of CNBC, the following eight countries/regions are among the top 15 holders of U.S. government debt:

- 1) China
- 2) Japan
- 3) Oil Exporting states (Ecuador, Venezuela, Middle East countries, Indonesia, Africa)
- 4) Caribbean Banking Centers
- 5) Brazil
- 6) United Kingdom
- 7) Russia
- 8) Luxembourg

The Council on Competitiveness (2008) in its publication writes:

Most Americans understand that globalization is a game-changer. But many are not sure that they are going to like the new game. For better or worse, the modern economy is a global economy, which the United States can influence given the sheer size of its market. But America is no longer the sole economic superpower.

The educated global workforce has grown as China, India, Russia, and other emerging economies are improving their education systems, all of which will provide greater competition for educated U.S. workers. The sheer numbers of educated people in these countries make up a continually growing pool of available talent. For example, China's labor force, those individuals working or seeking work, reached nearly 800 million in 2005, more than 5 times the U.S. labor force (Council of Competitiveness, 2008).

In his book *A Whole New Mind*, Daniel Pink (2005) writes about the influence of Asia and how the developing nations of Asia are producing millions of capable knowledge workers in white collar jobs that are performing financial analysis, radiology, accounting and computer programming for a much lower wage for companies domiciled in the developed nations.

The bottom line is that other countries have growing bodies of educated talent against which our District 39 students will compete more than ever before. Economic success for any country depends on the educational attainment of its population and the translation of that education into creativity, innovation, and production (Rust, 2007).

A key contributing factor to the changing cultural and labor composition of the United States is immigration. The United States has, and will continue to have,

one of the most robust immigration programs in the world. In 2000, the total foreign born population in the United States was approximately 31.1 million. In 2000, the U.S. had a net immigration of 980,000, and this number is expected to be more than 1 million annually between 2028 and 2046 (U.S. Census Bureau, 2004).

Immigrants who are here today, and will come in the future, will continue to influence the cultural fabric of the U.S., and our District 39 students need to understand these other cultures to be most effective in relating to and/or working with these individuals in the future.

Technology and business trends have also led to rapid globalization in commerce. Companies have faced globalization trends for years. According to Thomas Friedman (2006) in his book *The World is Flat*, technology has leveled the global playing field. He cites two specific trends that have caused countries and commerce to be more inter-connected than ever:

1. *Outsourcing* – a company chooses to have another company outside of the U.S. perform a specific function and re-integrates their work into the work of the home company;
2. *Off shoring* – a company takes one of its factories that is operating in the U.S. and moves the whole factory offshore to another country.

These trends have created businesses that locate separate functions in different parts of the world. As such, workers can work for any business anywhere through telecommunication or migration (Zhao, 2007; Marx, 2006).

To summarize, The Asia Society, the leading global organization working to strengthen relationships between Asian countries and the United States, states on its website:

Today's students will be the citizens and leaders of the 21st Century, heirs to a world that grows smaller and more interconnected everyday. For the United States to continue to prosper, all students must have the opportunities to learn about other world regions and languages. The world will demand it of them -- we need to demand it of our education system.

## *Recommendations*

**1. Expand beyond a U.S.-centric perspective in our curriculum and develop a global perspective in each of our District 39 students.**

Broaden our social studies, political, cultural, music, and world languages curriculum to include other cultures, particularly those in the fastest growing and/or largest population centers of the world:

- |              |           |
|--------------|-----------|
| -India       | -Russia   |
| -China       | -Pan Asia |
| -Middle East | -Africa   |

Use a holistic approach that includes the culture, history, politics, art, music, language, and typical social norms of each country/region. For example, study U.S. history in tandem with the study of other countries using a “compare and contrast” methodology (e.g. compare how and why countries were settled, how they are ruled, governing styles, etc.).

Establish a global micro-finance K-8 program for students to learn about people in developing countries and the socio-economic conditions they face. WJHS will launch a program using Kiva.org in the next school year as part of the new Economics of Math course. An organization such as Kiva.org provides opportunities for individuals or groups to lend small amounts of money to entrepreneurs in developing countries. Kiva sends the money to a local organization in the field, which then lends the money to the identified entrepreneur to buy product or machinery critical to their business, such as fertilizer for a banana farm, a truck for a transportation business, a cow, or supplies for a general store. Loans are repaid within 6-12 months, Kiva has a 100% payback rate, and individuals are able to work themselves out of poverty. See more at:

<http://www.youtube.com/watch?v=HdoSMgdkpBM> and [www.kiva.org](http://www.kiva.org)

- 2. Consider augmenting and/or replacing the teaching of Latin, German and French languages for grades 5-8 with Chinese, Arabic and/or Russian language study.** Keep Spanish as an offering.
- 3. Develop an “Immersion Program.”** Roll out one or two week “Immersion Weeks” in which students, teachers, and staff immerse themselves into the study of one particular culture, country, or region. The culture, politics, art, history, and geography could be studied and emulated throughout the entire school for a week. A program like this has been implemented at the Harley School, Rochester, New York, where they call it, “Focus Week.”
- 4. Increase exchange opportunities for students and teachers, both virtually and physically outside the U.S.** This is offered on a limited

basis in our French and German language study programs for those students and teachers. However, the recommendation is to offer travel opportunities to all District 39 students and teachers. White Bear Lake (Minnesota) Superintendent Ted Blaesing has rolled this out for their district and is looking to have students of all ages travel outside of the U.S. as a part of their normal course of study. Separately, the Federal Fulbright-Hays program offers support in this area.

This can also be accomplished virtually with technology. For example, Oracle Corporation ( [www.think.com](http://www.think.com)) has developed a platform for international networking of schools. ePals ( <http://epals.com>) is a source for global school partnerships on a number of topics.

- 5. Integrate cultural sensitivity instruction into the curriculum.** Given the increasingly global lives our District 39 students will lead, students can begin now to learn about international differences in interpersonal interactions, diplomacy, and conflict resolution.

*Specific resources for global awareness and perspective for educators, administrators and parents:*

- The Partnership for 21<sup>st</sup> Century Skills ( <http://www.21stcenturyskills.org>) lays out a framework for 21<sup>st</sup> century learning and teaching. Importantly, the Partnership cites 4 critical interdisciplinary “21<sup>st</sup> Century Themes,” of which global awareness is at top of their list.
- The Asia Society has assembled a number of resources for educators that include lesson plans, maps, background essays and a list of additional organizations and resources that support its mission to strengthen relationships and promote understanding between Asia and the United States. <http://www.asiasociety.org/education/>
- The Center for International Understanding, based in North Carolina, defines a globally competent student and focuses on providing K-12 educators with the skills, knowledge and resources to help their students become globally competent.  
<http://ciu.northcarolina.edu/content.php/ncworld/index.htm?submenu=5>
- The International Studies School Association (ISSA) is focused on what our educational system needs to broaden U.S. centrality.  
<http://www.du.edu/issa/>

## Theme Two: Technology

*Technology in the 21<sup>st</sup> century is a pivotal part of students' lives and development, which has created a necessity for technology expansion within and beyond the curriculum to maximize student success.*

The advances in technology in the 21<sup>st</sup> century have highlighted generational differences. Our current school-age generation has been raised with technology as an integral part of their daily lives and, therefore, has developed a natural inclination toward its use, resulting in the term "digital natives" to describe this generation of young people. Older generations, "digital immigrants," have had to learn how to incorporate technology into their daily lives. According to Marc Prensky (2001), author of *Digital Natives, Digital Immigrants, Part II*, digital natives' brains are physically different from the brains of digital immigrants as a result of all their time spent with digital inputs.

The speed at which our society is developing new technology is astounding. Marc Prensky (2006) compiled the following facts about how the average child will interact with technology. By the time they go to college, they will:

- Have spent over 10,000 hours playing video games;
- Have sent and received over 200,000 e-mails and instant messages;
- Have spent over 10,000 hours talking on cell phones;
- Have spent over 20,000 hours watching TV;
- Have seen over 500,000 commercials;
- Have spent, at most, 5,000 hours reading books.

Factual information of this nature is nothing less than a wake-up call to the need for instruction and integration of technology. The Apple Corporation predicts that by the year 2020, information will be doubling every fifteen minutes. School systems need to do their part to prepare students for this "information download."

### *Technology-Infused Curriculum*

The focus of educators needs to be centered on using 21<sup>st</sup> century tools to develop learning skills and enhance the classroom experience. Today's students live in a world where they do not view computers as technology, but as a part of life. As such, they expect computers to be integrated in the classroom. With the volume of information available to them, the speed at which they can access it, and their penchant for multitasking, today's students learn differently than previous generations and will benefit greatly from schools that embrace technology and recognize that it is changing the way students learn and how teachers teach (Rodgers, 2006). The model of technology infusion (as opposed to teaching technology skills in isolation) has been well established at Wilmette Junior High and has been recently introduced at Highcrest Middle School.

## *How Technology Can Be Infused into the Curriculum*

The Apple Corporation (2009) stresses that technology must be experienced and practiced throughout the school day rather than featured merely as a specialized subject area. By making technology a regular fixture in the classroom, students' needs are met in a multitude of ways including individualized instruction and assessment. Technology can be categorized into four levels of integration: (1) The **substitution** level, the most basic level of integration, exchanges one task for another (i.e. typing replaces writing); (2) As an individual's skills improve, technology can be used at the **augmentation** level, which uses tools to enhance a task, such as creating a PowerPoint presentation to supplement a presentation; (3) The next level, **modification**, redesigns a task to incorporate technology, such as creating a digital movie in place of composing a script or in-class performance; (4) At the highest level of technological integration, the **redefinition** stage, an entirely new task is created, such as the creation of a student web page. In this way, the integration of technology empowers students to have a greater voice in their own learning.

Technology infusion requires a pedagogical shift. The higher levels of integration of technology can be intimidating to teachers who traditionally prefer to feel that they are the "expert" before they bring technology into their curriculum. Instead, teachers must realize that they don't need to be experts before they teach with technology in the classroom. They can learn *with* their students as they model a devotion to lifelong learning.

Students who are part of the "digital native" generation can be utilized as resources for their teachers and peers. Many school systems have already incorporated a program in which students are trained to administer tech support in their individual classrooms. The skills that these students acquire help to build self-confidence and encourage cooperation and collaboration among classmates. By effectively infusing technological elements into the existing curriculum, teachers provide an opportunity for students to internalize the curricular information through a medium that they understand.

As technology becomes more and more prevalent in the classroom, computer programs and social networking can be used as a means of collaboration and a connection beyond school walls and school hours, as stated at the Illinois Computing Educators Conference (2009). Motivation and self-confidence can increase with the use of technology. Apple Corporation executives (2009) claim that students are motivated to do their best work when they have an audience. For example, if student work is published to a website, other students could be instructed to view the work of their peers, and make comments in response to what they learned. Furthermore, students could pose questions to their peers, to facilitate discussion outside of school. Some works may even be posted on the web safely for a global audience.

Technology infusion is also a natural fit within special education and federal mandated Response to Intervention guidelines, both of which require a greater than normal degree of individualization of instructional delivery.

### *Caveats*

As the curriculum makes room for technology, educators need to ensure a balance among technology and interpersonal skills and core instruction, according to Small and Vorgan (2008), authors of the book *iBrain: Surviving the Technological Alteration of the Modern Mind*. Student interaction still is essential in the classroom. Through the extensive use of technology, students could actually be communicating more but talking less. Electronic social networking cannot take the place of face-to-face communication and interpersonal skills. As social networking becomes a norm of technology, the potential for misuse and threats to occur is substantial. The onus is on schools to step up and teach kids to use technology responsibly, effectively, and positively.

The cost and logistics of keeping up with growing technology demands can pose a challenge to limited budgets within a school system. One suggestion offered by Apple Corporation to spread technology throughout the district is to identify the upper 10-15% of frequent tech-users in the building and provide them with access to the latest in hardware and software. The hope is that these tech-savvy teachers will pilot the new technology and discuss it with their peers, creating a trickle-down effect and spreading successful tech-infusion throughout the entire district.

### *Recommendations*

- 1. Evolve into a technology-infused structure throughout District 39 rather than teaching technology skills in isolation.** Technology teachers can be used to support technology integration (vs. teaching insular technology classes) by co-planning and co-teaching with classroom teachers and providing professional development. This, in turn, will allow our children to learn technology in the context of their core subjects.
- 2. Provide teachers with more professional development in technology.** Offer professional development to teachers to expose them to new programs and create a safe, non-judgmental environment in which teachers can learn. The more comfortable teachers are with technology, the more they will use it and incorporate it in their classrooms. By doing so, we will foster a technology culture that will not only expose our students to the advantages of technology, but also model, through our teachers, a passion for lifelong learning.

3. **Launch a student technology support program.** Identify and train students to administer technology support in their individual classrooms.
4. **Monitor effect of technology on students' interpersonal skills and teach on-line etiquette.** Watch for ways in which technology adversely impacts interpersonal development, student safety and online etiquette.

Consider creating e-mail addresses and "gaggle" accounts ( [www.gaggle.net](http://www.gaggle.net)) within classrooms – which allow teachers to have full control of students' e-mail and blogs -- to provide opportunities for students to practice online etiquette and receive feedback on safety issues.

5. **Provide opportunities for students to publish, write, converse, and receive feedback on the World Wide Web.** Technology now provides an excellent venue for our students to learn about, interact with and publish vis-à-vis the global theater. With the appropriate safeguards:
  - a) Permit students to publish completed works (e.g. stories, essays, art) on safe web sites for anyone in the world to see. This is empowering for students. As an example, Apple Corporation, in a January 2009 seminar, tells a story of a Native American school girl in Alaska receiving accolades globally for her work that was displayed on the web.
  - b) Establish a 21<sup>st</sup> century style 'pen pal' exchange between District 39 students and other children across the globe using a safe e-mail system. Students could exchange e-mails with a student from another country with specific assignments for sharing and gathering information about each other's country, culture, politics, government, etc.
6. **Continue to monitor and increase students' access to technology.** Consider increasing student-to-computer ratio in a consistent manner across the district. Study the impact of 1:1 trials at Avoca and other districts.

### Theme Three: Value-Added Skills of 21<sup>st</sup> Century Learners

*The 21<sup>st</sup> Century Learning subcommittee has identified the following skills we believe to be essential for successful 21<sup>st</sup> century students:*

- *Creativity*
- *Flexibility*
- *Risk-Taking*
- *Empathy*
- *Persistence*
- *Problem-Solving*
- *Self-Awareness/Discovery*
- *Life Long Enthusiasm for Learning*

*While this list is selective, it highlights characteristics universally lauded by leading-edge educators and researchers. It is these skills or characteristics that showcase uniqueness and will add significant value to society's workforce.*

*As we think about District 39's K-8 curriculum and philosophy moving further into the 21<sup>st</sup> century, we must look to the expectations of the high schools, colleges and eventual professions in which our children will be placed. Hence, we have distinguished these specific skills as necessary for success in the educational and professional environments our children will face. After significant research, it is apparent that these characteristics are - and will continue to be - important to foster in our children.*

#### *Creativity*

"Creativity is as important in education as literacy, and we should treat it with the same status," says education leader Ken Robinson (TED Conference 2006). Successful economies are driven by innovation and knowledge, and as knowledge becomes more accessible, creative innovation rises in importance. A recent report by the Partnership for 21st Century Skills (2009) now finds that most jobs are created through entrepreneurial endeavors. In fact, many of the fastest-growing jobs and emerging industries rely on creativity and the ability to think unconventionally (Schroeter, 2009). John Dewey, American philosopher and 20<sup>th</sup> century education reformer, has been famously quoted as saying, "Every great advance in science has issued from a new audacity of imagination." Creativity is the effectual merging of knowledge and imagination, as Daniel Pink (2006) stresses in his book. Pink emphasizes the need for merging the "right" brain with the "left." He claims that for the last 100 years, left brain capabilities (sequential, logical, and analytical forms of thought) have powered the Information Age. These are no longer sufficient. Right brain qualities (inventiveness, empathy, joyfulness, creativity and discerning meaning) are needed for success in the future Conceptual Age. Not only are schools beginning to offer more and more creative outlets, but libraries, museums, books, websites and learning

materials now recognize the astonishing use of creativity in multi-media interaction as a tool for disseminating information. International mathematics professor and editor of *Nexus Network Journal*, Ubiratan D'Ambrosio, explains:

The goals of education go much further than merely preparing for professional success. Education has a responsibility in building up saner attitudes towards the self, towards society, towards nature. Indeed, education has the responsibility of furthering creativity (Orey, 2009).

We must find ways to cultivate creativity in fundamental learning. Creativity brings inventiveness to core learning by breeding innovative thought, increasing the benefits of basic knowledge. "Promoting creativity among all people is essential to the common good" (Robinson, 2001).

### *Flexibility*

Technologies, processes, and overall standards change day to day; therefore the ability to think flexibly is critical for students as they enter rapidly changing work environments. If District 39 students will have 10 to 14 jobs by the time they are 38, as the Department of Labor estimates, the ability to adapt to new situations, as well as the ability to flexibly approach a problem from many angles, will be critical in the workplace. In his article entitled "Developing Your Child's Habits of Success in School, Life and Work," Arthur L. Costa (2001) repeatedly stresses the importance of thinking flexibly, which he defines as "the ability to consider other points of view to problem solve – and be willing to change one's mind with convincing data." He further elaborates this point in the book he co-authored with Bena Kallick (2000), *Habits of Mind*, by stating, "Flexible thinkers display confidence in their intuition. They tolerate confusion and ambiguity up to a point, and they are willing to let go of a problem, trusting their subconscious to continue creative and productive work on it." Flexibility is not only a "hard skill" of the mind, it is also a "softer" skill, useful for working with others and solving problems. As project-based learning becomes more common, and as collaboration increases in the workplace, flexibility is an essential trait for our kids to begin to develop.

### *Risk-Taking*

"The only way to succeed is to be brave enough to risk failure" (Jindal, 1999). Learning how to take appropriate risks is imperative to any entrepreneurial venture. When people hold back from taking risks, they miss opportunities," declare Costa and Kallick (2000) in *Habits of Mind*. Education experts such as Arthur Costa and Tony Wagner (2008) realize that the kids who are encouraged to take risks in their thought processes and personal projects are those who out reach their peers for higher standards. In a recent interview, distinguished University of Chicago Booth School of Business Professor of Creative Management, Harry Davis (Born, 2009), also emphasized the impending need for educators to provide a "safe" environment for

learners to take risks, as risk-taking leads to creativity. Additionally, educators such as Resa Steindel Brown (2006) remind us that encouraging children to take risks, and not be afraid to fail, empowers kids to search inward and rely on themselves for solutions to problems. Risk-taking in a safe environment gives students permission to experiment and empower their own creativity.

### *Empathy*

Hearing others “with understanding” is how Arthur Costa (2001) defines empathy, one of the key traits of successful business people in the 21<sup>st</sup> century. The dominance of the service sector will demand relational skills such as empathy, and it is workers in the service industries who will drive the U.S.’s future economic growth. “If there is any secret of success, it lies in the ability to get the other person’s point of view and see things from his angle as well as from your own,” stated notable inventor Henry Ford. Empathy has also been discussed in the news recently, ever since President Obama cited it as the key trait he envisions in the next Supreme Court Justice. Empathy drives the connectedness we feel as humans. The ability to relate well to others creates a good foundation for relationships and a sense of unity within groups of people. Sam M. Intrator (2005) discusses the importance of understanding emotions like empathy in his book *Tuned In and Fired Up: How Teaching Can Inspire Real Learning in the Classroom*. He offers, “It is important that the presence of emotion is not seen as an indication of the absence of thought. Feeling and thinking work in concert” (Intrator, 2005). Empathy is an emotion that holds power as a tool for working with others and creating people who are successful in group settings. Empathy has been a major theme for this year’s seventh grade at our own Wilmette Junior High. The entire class has taken on philanthropy as a pursuit and many have joined a huge fundraising project called Kirathon, which has raised over \$35,000 for art therapy programs at Children’s Memorial Hospital. Kirathon has become a popular effort that has engendered school and community-wide participation and empathy for kids with cancer. Some seventh graders have also held events and raised money for Rescue Refugees, in which students have met and collaborated with refugees from other countries. These are the kinds of programs our schools must continue to support in an effort to foster empathy and increase our children’s worldview. See also “Social Responsibility” section herein.

### *Persistence*

Professor Davis (Born, 2009) claimed, “What really separates successful performers from everyone else is their commitment and discipline to sticking to it.” Finding the right solution to any problem will take persistence. Children develop persistence by finding alternate problem-solving strategies and by being inspired to gain a desired outcome. Persistence is evident in high achieving students; however, it is also an acquired skill. Children need “...systematic methods of analyzing a problem, knowing ways to begin, and knowing what steps must be performed and what data need to be generated or collected” (Costa, 2001) to achieve persistence. On his website, best-

selling marketing author Seth Godin (2008) states: “Persistence isn’t using the same tactics over and over. It’s having the same goal over and over.” For success in any field or any pursuit, one must persist. Persistence requires time, sometimes years, as well as the patience and confidence to keep plugging away. Any great advancement has occurred through some individual or group’s will to persist. This is a trait that has long been seen as an essential component to producing beneficial results. President Obama depicted a visible example of persistence and the impact it can have with his message of Yes We Can. “I’m a big believer in persistence,” he declared in a recent news conference (Farber, 2009). Due to the complexities of 21<sup>st</sup> century careers, our children will need to solve the many issues they will face and take charge of their efforts through the applied use of persistence.

### *Problem-Solving*

“You can tell whether a man is clever by his answers. You can tell whether a man is wise by his questions,” exclaimed 1988 Nobel Prize winner Naguib Mahfouz. The Partnership for 21<sup>st</sup> Century Learning (2009) defines problem-solving as the ability “to recognize and investigate problems; and formulate and propose solutions supported by reason and evidence.” Problem solving has always been an integral part of academic success, even where standardized testing is concerned. Arthur Costa (2001) states, “We want children to be alert to and recognize discrepancies and phenomena in their environment and to inquire into their causes.” Problem-solving is a skill that is of critical value, useful in learning as well as in life. John Dewey proposed that the process of education become “an active effort by learners interested in resolving particular issues” (Torp and Sage, 2002). With effective problem-solving techniques, students are stakeholders in a problem and its solution and can become self-directed learners. Daniel Pink (2006) states, “Today facts are ubiquitous, nearly free, and available at the speed of light ... as a result, what matters more now is not finding facts to answer questions but the ability to place facts in context...” In other words, it is in training students to apply their will to solve problems that our district will help bridge kids from the classroom to the workplace.

### *Self-Awareness and Discovery*

Meta-cognition, or thinking about thinking, is “our ability to plan a strategy for producing what information is needed, to be conscious of our own steps and strategies during the act of problem-solving and to reflect on and evaluate the productiveness of our own thinking” (Costa and Kallick, 2000). Meta-cognition is an ability to self-reflect, which is now recognized as an asset to finding solutions or analyzing situations. At the University of Chicago Booth School of Business, incoming students undergo a series of self-awareness exercises during their orientation. These exercises are designed to help the students realize not only their strengths and weaknesses, but also give them a better understanding of how they think (Born, 2009). Many managers are using similar assessment tests to gauge the strengths of team employees and utilize their skills. Isabel Briggs Myers (co-founder of the Myers-Briggs Personality Type test) offers on the Myers & Briggs Foundation website

( [www.myersbriggs.org](http://www.myersbriggs.org)), “Whatever the circumstances of your life, the understanding of your (personality) type can make your perceptions clearer, your judgments sounder, and your life closer to your hearts’ desires.” Programs like teacher 3<sup>rd</sup> grade teacher Julie Mirabelli’s Creative Dramatics at Central School are already finding great success in building self-awareness and discovery by having children conceive and develop their own points of view. As Mirabelli reports, “Instead of writing persuasive essays, we are having persuasive debates” directed by the individual (2009). This allows students to explore their own thinking. It is in truly knowing themselves and their abilities and desires that students can bring truth and purpose to self-expression. District 39 must become a safe, inspiring platform for students to discover themselves and their unique skills as they prepare for the challenges of higher education and career.

### *Life Long Enthusiasm for Learning*

To be fundamentally curious about the world around us is a great start for success, and anyone who has benefited from an engaging teacher knows that enthusiasm can be generated. Enthusiasm for learning is directly linked to academic accomplishment and bringing that enthusiasm into real world scenarios is paramount. “Enthusiasm is fueled by our surroundings,” said Ron Clark (2004), Disney Teacher of the year, in *The Excellent 11:Qualities Teachers and Parents Use to Motivate, Inspire, Motivate, and Educate Children*. “Successful people find enjoyment, enthusiasm and fascination in their work and world” (Costa, 2001). With changing times, over-scheduled activities, and mounting testing pressures, students are not always able to deeply explore personal areas of interest. Whereas former models of teaching emphasized the learning of content for some future application, it is now obvious that students learn best when content and application work together to generate interest about a particular subject. As they teach important core content and skills such as computer science and math, teachers also have the chance to allow children to apply their knowledge in personalized ways, thereby fueling the fire of enthusiasm. This is how students will be inspired to want to learn. Continuing to fuel the fire of enthusiasm can create formidable learners and workers, whereas mounting pressures from teachers “teaching to the test” is a danger to a child’s lifelong enthusiasm for learning. Tony Wagner (2008) discovered, in his in-depth research of three innovative schools, that students displayed great enthusiasm for learning when:

- They felt close, personal relationships with their teachers;
- Their questioning prompted further areas of study;
- Their interests were the driving force behind personalized curriculum planning.

Maria Montessori, John Dewey and Rudolph Steiner were education innovators at the beginning of the 20<sup>th</sup> century who recognized that children were not the “empty vessels” to be filled with facts and figures that educators had previously assumed

them to be. Even then the need to inspire children and shift from a memorization style of teaching to more deeply ingraining, personalized approaches was apparent. One of Montessori's long-standing credos is that people learn best when they are actively engaged.

### *Summary*

The eliciting of these characteristics necessitates innovation in our educational system. These are indispensable life skills that can be viewed as both "hard" and "soft" in the professional and educational realms, and they are certainly more complex than the valued skills of past generations. Additionally, the skills we have cited compliment and enhance a core curriculum, stretching the teaching of basic knowledge deeper and wider.

It has been extensively posited that the characteristics discussed here are gradually becoming accepted as fundamental tools for potential employers to require. Many of them may seem innate, but all are teachable. It is the responsibility of District 39 to utilize this innovative research and nurture these skills in our classrooms as we forge our own 21<sup>st</sup> century path.

### *Recommendation*

#### **Create opportunities to foster, teach and integrate the value-added skills identified by this committee:**

- Creativity
- Flexibility
- Risk taking
- Empathy
- Persistence
- Problem solving
- Self awareness and discovery
- Life long enthusiasm for learning

Look for opportunities to integrate value-added skills into curriculum and cite them as part of parent and teacher dialogues.

## Theme Four: Communication

*The goal of communication is to articulate thoughts and ideas clearly and effectively through various modes of communication, including speaking and writing, telecommunications and other technology. Communication, however, is not just what we say and hear; the essence of communication is an exchange of meaning (Adler, 1977). Communication, then, is both verbal and nonverbal, including tone of voice, behavior, and facial expression. In interactions between individuals who differ from each other in some way, such as when crossing cultural, geographic or language boundaries, the need to understand culture is essential.*

The need for effective communication and listening skills is not unique to the 21<sup>st</sup> century. However, globalization and advances in communication technology demand refinement of these skills. Everyone must be able to interact competently and respectfully with others to secure mutually beneficial relationships (Partnership for 21<sup>st</sup> Century Skills, 2009). Whether it is educational background, geographical culture, race, gender or ethnicity, to name a few – cultural understanding becomes just as essential as the need to choose appropriate words, use precise language and common terms, correct names, labels, and analogies for correct interpretation of the intended meaning (Costa and Kallick, 2000).

The possibility for communication barriers and blunders are most likely to occur between or among people who differ on some level, such as by race, ethnicity, gender or even organizational culture (Cox, 1994), thus making it imperative to understand the communication differences between cultures. Many mistakes have been made by individuals and organizations that didn't make the effort to understand how diversity can impact how and what we communicate. A speech made in Poland by former President Jimmy Carter is infamous for his expression of "appreciation" of the Polish women, incorrectly translated by his translator as "lusted for" (Ricks, 1993). Nonverbal communication such as hand signals and head nods are subject to cross-cultural misunderstanding as well. The OK hand signal common in the U.S. means "zero" in France, "money" in Japan, and is a vulgar gesture in parts of South America. Automobile companies have had their share of blunders in naming products due to insufficient research into cross-cultural, sometimes hidden, meaning. General Motors was stumped by poor sales of its Chevrolet Nova in Puerto Rico, where "nova" (literal translation, "star") sounds like "no va", which in Spanish means "it does not go" (Ricks, 1993). And Ford, hoping for good results with a low-cost truck in developing countries, found that their Fiera meant "ugly old woman" in Spanish, also translating into disappointing sales (Ricks, 1993).

## *Technology and Communication*

Competent communication skills are needed in every medium, whether it's e-mail, texting, Facebook, etc. Teens, for example, are in a constant state of communication with their peers (Chute, 2009). Incorporating these types of written communications into the school curricula would support proficiency in all types of communication styles (Apple Corp, 2009). For example, Stanford University now uses Facebook as part of its core form of course communication, including syllabi, class assignments and other professor-student communications.

Good communication leads to collaboration, in which listening skills play an essential role. The tendency to stop listening while you formulate your own response compromises true understanding of another's point of view or delivery of information. "The ability to paraphrase another person's ideas; detect indicators (cues) of feelings or emotional states in oral and body language (empathy); and accurately express another person's concepts, emotions, and problems -- all are indicators of listening behavior. (Piaget called it 'overcoming egocentrism.')" (Costa and Kallick, 2000). Empathizing and understanding another's point of view is one of the highest forms of intellectual behavior. It is a complex skill requiring the listener to refrain from adding their own values, judgments, opinions, and prejudices, so they can truly listen to and process another person's thoughts.

"We spend 55% of our lives listening, but it is one of the least taught skills in schools" (Costa & Kallick, 2000). The increased use of technological gadgets as a primary source of communication, starting in teenage years or earlier, compromises students' listening and communication skills through lack of use. Digital communication has further eroded listening skills due to the decrease in oral communication (Small and Vogan, 2008). Overcoming this trend is a challenge, but one that can be met with a mindful curriculum. Both Apple Corp. and Stacey Kole, Deputy Dean at the University of Chicago Booth School of Business, have stressed that the keys for lifetime success are communication and listening skills, which will naturally enhance collaboration and teamwork (Born, 2009). Rob Gordon, former director of the American Politics Program at West Point and career military officer, suggested that teachers should "teach them [students] to write! Effective communication is key in everything we do—people need to learn to communicate effectively with each other and with external communities" (Wagner, 2008).

Mike Summers, vice president for Global Talent Management at Dell Companies, spoke vehemently on the issue of effective communication:

We are routinely surprised at the difficulty some young people have in communicating: verbal skills, written skills, presentation skills. They have difficulty being clear and concise; it's hard for them to create focus,

energy, and passion around the points they want to make. They are unable to communicate their thoughts effectively.

Further, Annmarie Neal, vice president for Talent Management at Cisco Systems remarked, “The biggest skill people are missing is the ability to communicate: both written and oral presentations. It’s a huge issue for us” (Wagner, 2008). “Most teachers aren’t trained or encouraged to teach this kind of writing...they are often asked to teach...a simplistic formula style of writing that will enable the students to pass standardized tests, and they have very little time to do anything more” (Wagner, 2008).

### *Recommendations*

- 1. Increase the practice of speaking and listening skills.** Provide ample classroom and project-based opportunities in which students are required to engage in effective verbal, in-person conversation with an emphasis on effective listening.
- 2. Expand current opportunities to foster public speaking and presentation skills.** Look for further opportunities in the curriculum for students to practice public speaking and presentation skills from grades K-8.
- 3. Expand current opportunities to practice writing skills.** Continue to emphasize writing techniques appropriate for various purposes and media.
- 4. Educate students about how differences/diversity impact communication.** This could be incorporated into the study of other countries/cultures; for example, students can research cultural differences in interpersonal communication. Encourage students to think about what makes them different and unique, and then to communicate that in some creative way. This could be part of a module that investigates “cultures,” including students’ own cultures (defined broadly). Encourage students to ask questions about each others’ presentations to model that it is okay to ask people appropriate questions about differences and similarities.

## Theme Five: Collaboration

*Collaboration refers to working in groups to create a more optimal or innovative outcome than any one individual would have done alone. We define collaboration to include interacting effectively with people who differ in both visible and invisible ways, including but not limited to race, ethnicity, cultural backgrounds, work styles, learning style, education, gender, and physical ability.*

### *Why Collaboration Matters*

In the “information age,” most ideas, information, and best practices “are freely available to be copied and exploited” by all, requiring tomorrow’s citizens to innovate by building upon these readily available ideas, information and practices (Brown, 2008). Ironically, innovation actually requires them to be skilled at looking beyond the information stream to carefully and closely observe and interact with each other:

Problems . . . that can be solved only through innovation all have people at their heart. They require a human-centered, creative, iterative, and practical approach to finding the best ideas and ultimate solutions (Brown, 2008).

To foster this innovation as problems become more complex, companies have turned increasingly to collaboration as part of their working culture, and also have begun to assess collaboration skills when evaluating people for employment. Therefore, the ability to collaborate with others, whether at school, work, or in other types of groups will continue to be critical in the 21<sup>st</sup> century, given the trends in globalization, demographics, information technology, the emergence of a service and knowledge-based economy, and the increase in problem complexity previously mentioned in this report.

Moreover, collaboration becomes an increasingly critical component of students’ learning behaviors and hence, an increasingly effective teaching tool as they advance in grade level (Lillard, 2005). Several studies have shown that “people learn better when working collaboratively than when working alone” (Lillard, 2005). Collaborative learning also improves “the social climate of the classroom,” better accommodates “individual readiness to learn,” and enhances “individual well-being” (Lillard, 2005).

### *Collaboration and Diversity*

Although work teams or groups of people convened for some common goal may not always have *visible* differences (e.g. race, gender, physical ability, etc.) among the group members, *invisible* differences (e.g. thinking style, learning style, religion, geographical culture, education, sexual orientation) almost

certainly will be present. Harnessing the power of diversity in any type of group is key to the success of the group.

Diversity in a group presents both unique challenges and opportunities. In her book, *International Dimensions of Organizational Behavior*, Nancy Adler (1997) states that diverse teams have the potential to be far more effective and productive than homogeneous teams. They also have the potential to be highly ineffective. The key difference between highly effective and highly ineffective diverse groups, says Adler (1997), is directly related to how well they are managed and how well the group learns to collaborate and learn to use their differences. For diverse teams, learning to collaborate is likely to take longer and present initial challenges such as dealing with conflict and communication mishaps.

The benefits of diversity in groups that learn to collaborate effectively, however, can in the long run far outweigh the initial challenges, and these benefits are well documented in organizational development and group dynamics research and literature (Adler, 1997). The CEO of PepsiCo, a company that has worked on valuing diversity for many years, once stated:

Great ideas still come from people....The challenge is to create the right environment to encourage innovation and ideas. The diversity of people in a corporation promotes innovation because it achieves greater diversity of ideas. There is a link between diversity and innovation that's not theoretical – it's real (Walkup, 2005).

From the boardroom to the front line, and beyond the work place into communities, diverse perspectives lead to broader consideration of issues and more effective decision-making. The breadth of knowledge from multiple diverse backgrounds produces better performance, higher quality decisions, and more and better solutions to complex problems. "Creativity thrives on diversity" (Morgan, 1989), as multiple points of view stimulate non-obvious alternatives. Thus, creativity and innovation are fostered by diversity on teams.

Finally, diversity in groups reduces the probability of "groupthink," the phenomenon of an absence of critical thinking in groups when group cohesion and unanimity override the desire for finding the best alternative solution. Diverse groups or work teams that have learned to collaborate are more likely to challenge the organizational status quo or group culture (i.e. "because that's just how we do things around here.") if and only if group members are willing and able to use collaborative methods that will leverage their diverse ideas, experiences, and perspectives to produce innovative or optimal results.

## *How to Teach Collaboration*

Collaboration has been made easier and more widespread by technology, which has provided ways for individuals to collaborate anytime, and anywhere, through use of online tools, including Internet tools like Wikipedia, Skype, and mobile devices. Nevertheless, the use of these tools to collaborate effectively must still be taught, and schools have begun to focus on teaching this skill. For example, Francis Parker Essential School in Boston, Massachusetts has placed a tremendous emphasis on collaboration. They believe it's a critical 21<sup>st</sup> century skill for the students and, therefore, students collaborate with one another daily as part of the curriculum, including the frequent use of group projects (Rogers, 2009). Similarly, the Montessori schools believe collaborative arrangements can be conducive to learning and set up the classes accordingly (Lillard, 2005).

While collaboration can take many forms, the sources reviewed have identified several characteristics of effective groups that are particularly appropriate to teaching not only collaboration skills but also underlying curriculum in nearly all subjects. Whether described as “jamming” (Thornburg, 2002), “integrative group culture” (Ephross and Vassil, 2005), the “Jigsaw method” (Lillard, 2005), or “design thinking” (Brown, 2006), experts describe an “integrative group” that not only recognizes but uses the diversity and humanity of its members to foster open innovation and active learning. The characteristics of an “integrative group” include the following:

- First, the integrative group is organized around a project, problem, task, or challenge that will “provide opportunities . . . to explore every subject area within the context of a single theme.” This encourages students to pull information from their teachers as needed, rather than having it pushed upon them as in traditional education (Thornburg, 2002). For example, the Mars Millennium Project challenged students to design habitable communities for placement on Mars. This task required students to collaborate in the assembly and management of mathematical, scientific, social studies, artistic, and other subject matters taught in schools.
- Second, the integrative group is context-oriented. It places its efforts in context by developing a thorough observation and understanding of what people really want, think, need, and how they react to situations and live their lives. Students must learn to “imagine the world from multiple perspectives . . . in minute detail . . . notice things that others do not, and use their insights to inspire innovation” (Brown, 2006). Project-based collaboration thus can be used to bring context and perspective to subjects not traditionally associated with innovation, such as history. For example, the Battle of Gettysburg may be more fully placed in context by presenting groups with the basic facts about troop placements, supplies, human factors, and information known by the combatants. Then, the teacher can ask them to command the battle from both sides, comment on

the outcomes, and consider how those outcomes might have been impacted by the technology, communications, and social mores of today.

- Third, the integrative group embraces diversity. Its members are “in tune with their feelings and with each other’s. Emotional and intellectual energy is directed and utilized so that it is part and parcel of and contributes to the accomplishment of the work task” (Ephross and Vassil, 2005). It also actively seeks and encourages diversity of thought types, backgrounds, skills, interests, nationalities, and intellectual disciplines of its members. For example, in the corporate world, an integrative design team may include participants not normally associated with each other, such as “engineers and marketers, anthropologists and industrial designers, architects and psychologists” (Brown, 2006). In the school context, the group similarly would expect each member “to contribute a unique element that requires everyone else to pick up on the lead and follow it wherever it goes,” which virtually guarantees that new ideas will emerge that the members would not have thought of on their own” (Thornburg, 2002).
- The integrative group is non-hierarchical, with empowering rather than restrictive rules. An integrative group may have a leader, chair, or teacher, whose role is not to forge consensus or provide direction, but rather to maintain the group’s objective within common view and encourage full and free thought around that objective—so that all may learn, including the teacher. Using an analogy, if the group itself can be imagined as the waters of a stream, together with all the flora and fauna within, and the given constraints as the banks of the stream, then the leader would provide the current of the stream, subtly directing it toward the objective lying at the stream’s end, wherever located. Thus members are encouraged to “pose questions and explore constraints in creative ways that proceed in entirely new directions” (Brown, 2006). They are encouraged to help each other while exhibiting their own creativity, as would occur in a jazz combo (Thornburg, 2002), and, to that end, are allowed to work with whomever they choose and make their own choices about how to divide up the group’s sub-tasks (Ephross and Vassil, 2005).
- Finally, the integrative group’s culture is imbued with motivating rapport and optimism. The “central governing features of an integrative group are a resonating admixture of the group’s basic urges of work and emotions, based on reality, mutual respect, and clear goals” (Ephross and Vassil, 2005). This rapport is supported by a philosophy of optimism “that no matter how challenging the constraints of a given problem, at least one potential solution is better than the existing alternatives.” This permits the group to persist to prototype solutions, weather the inevitable failures, learn, and start over with enthusiasm . . . thus deploying the “99%

perspiration” inherent in “genius” according to Thomas Edison—a pioneer in integrative *group* inspiration (Brown, 2006).

It is hoped that, through the teaching and use of effective integrative collaboration skills beginning in grade school, students will become facile in the habits and the methods that will permit them to observe, experience, and harness the unique power of humanity and diversity that lurks behind the common information easily available to them.

### *Recommendations*

- 1. Increase collaboration in the classroom.** Foster productive collaboration by using integrative groups that recognize and leverage the diversity of group members to encourage innovation and learning. The characteristics of an “integrative group” include the following:
  - Organized around a project, problem, task, or challenge;
  - Context-oriented;
  - Embraces diversity;
  - Non-hierarchical;
  - Has a culture of motivating rapport and optimism.
- 2. Utilize 21<sup>st</sup> century tools to teach effective collaboration.** For example, Virtual Collaboration (Web 2.0 ) has been made easier and more widespread by technology, which has provided ways for individuals to collaborate anytime, and anywhere, through use of online tools. The use of these tools to collaborate effectively must still be taught, and schools have begun to focus on teaching this skill.
- 3. Perform a more extensive literature review on teamwork.** In the educational field, these are current and important topics related to collaboration and were more far-reaching than our research. They warrant further research into how they are being taught in K-8 classrooms and how they can be integrated into District 39 curriculum.

## Theme Six: Social Responsibility

*Social responsibility encompasses respect for individuals, service to others, and ethical behavior. Inherent in being socially responsible is the need to:*

- *Understand and respect differences;*
- *Learn from and work collaboratively with individuals who represent similar and diverse cultures, religions, and lifestyles in a spirit of mutual respect;*
- *Understand and address global issues;*
- *Gain environmental literacy;*
- *Develop a conscience for those less fortunate;*
- *Live with a sound moral and ethical compass.*

*We previously discuss many issues intertwined with social responsibility, including global awareness and perspective, empathy, collaboration, and communication. In addition, social responsibility includes the concept of operating in society with a solid ethical grounding, understanding the spectrum of right to wrong, and with a moral duty and obligation to oneself and society.*

In today's complex world, a strong sense of social responsibility is critical, and we need to foster it with our District 39 students. As Charles C. Haynes (2009), Senior Scholar at the First Amendment Center, says:

At a time when the United States faces unprecedented challenges at home and abroad, public schools must do far more to prepare young people to be engaged, ethical advocates of 'liberty and justice for all.' Yes, reading and math are important. But what matters most is what kind of human beings are reading the books and doing the math.

### *Why now?*

Social responsibility is not a new concept. However, new trends in globalization, technology, poverty, expedient and affordable transportation, increased scientific discoveries, environmental challenges and the current economic crisis caused this committee to desire to infuse social responsibility further into the curriculum.

Globalization and global interdependence has caused the world to become smaller. Technology and transportation advances have broken down distance and information barriers. Employers and employment are more global, and a growing number of companies in the U.S. have non-U.S. owners. Likewise, our students are likely to work and/or travel abroad more than ever before. As such, today's citizens have a responsibility to develop a solid base of diplomatic skills. Gary Marx (2006) defines these diplomatic skills as "an open mind, natural curiosity, patience, courtesy and good manners, a sense of tolerance, and the ability to put oneself in someone else's shoes."

Furthermore, with national security as a critical challenge here and abroad, according to Professor Yong Zhao (2007), “it [national security] depends less on military might, as some might suppose, than on diplomacy, cross-cultural communications, intelligence, and maintaining a positive image across the world.”

Therefore, our schools need to provide opportunities for students to learn and practice diplomatic and civic skills, including the opportunity to engage with local, nationwide, multi-cultural, and/or cross-border problems. Our students need to understand political processes here and abroad, so they can serve as informed, constructive members of society and effect social change constructively. As Charles Haynes (2009) said, “We need schools that actually practice what their civics classes are supposed to teach.” The 2008 presidential election, with over 50% voter turnout among young people, demonstrated how extensively young citizens can engage (Levine, 2009).

District 39 students are developmentally capable of learning about and contemplating social change even at the elementary school level. As Rahima Wade (2009), an educational consultant, states in her article:

The rationale for supporting young students’ work for social change is informed by the developmental stages of children, the nature of learning, and the increased opportunities people have to learn about injustice around the world. The elementary school years find rapid growth in children’s abilities to empathize with others.

Scientific discoveries and technology advances will push the ethical envelope. Gary Marx (2006) states, “As we consider scientific discoveries, for example, we are faced with a virtual explosion of possible benefits that will inevitably be measured against their potential side effects or unintended consequences.” Our students will face a greater number of choices and challenges around issues such as poverty, stewardship of the environment, genetic modifications, computer ethics (e.g., sharing information, hacking, imparting viruses, privacy), and human rights, just to name a few.

The American Association of School Librarians (2007), in their “Standards for 21<sup>st</sup> Century Learner” article, emphasizes the need for ethics in the context of information use. “In this increasingly global world of information, students must be taught to seek diverse perspectives, gather and use information ethically, and use the social tools responsibly and safely.” While the idea of an ethics course has been part of colleges, universities and business schools for some time, we need to infuse an ethical dimension at all levels of education.

Environmental changes and concerns also raise difficult choices for society. Whether you personally subscribe to the idea of global warming or not, the

environmental dialogue has come to the forefront of current issues and has been prioritized by our new President. District 39 students will be engaged in this dialogue and will face difficult choices throughout their lives. Achieving environmental literacy today, so that District 39 students can make effective and informed decisions for tomorrow, is critical. A focus on environmental literacy has the added benefit of teaching children that their actions have a broader impact on the world and other people. To date, District 39 has raised environmental awareness considerably, but this topic merits additional coverage in the K-8 curriculum.

The current economic crisis provides evidence of ethical failings. The 2001-2003 Enron Era of poor decision making, bad judgments, and unethical behavior proved to be just a warm-up for the current financial crisis. In addition to the ethical failures seen in the current economic crisis, it was also clear that individuals were lacking in financial skills to serve as financially responsible citizens. Financial literacy, however, is one content area not explicitly and widely incorporated into District 39's K-8 core curriculum but was noted in the subcommittee's research. Given the current economic environment and the thousands of mistakes that precipitated the crisis, the committee agreed that additional integration of financial literacy content is needed in the curriculum. Martha Boudos, former CFO of Morningstar, a company that provides independent investment research so investors can make smarter choices, observes a shortfall of financial literacy content in most K-8 curricula. Now head of Morningstar's Community Outreach, Boudos feels strongly that financial literacy skills should be incorporated into any K-8 curriculum. Charles Haynes (2009) comments on the deficiency of financial instruction in the most recent edition of Educational Leadership:

Even in those schools committed to developing character and conscience, much of the curriculum continues to undermine the ethical message the schools wish to convey. Because we are in the worst economic crisis in more than 70 years (a crisis rooted in greed and exacerbated by unethical behavior), let me single out economics education for special concern.

And finally, poverty trends require greater awareness and empathy. Despite the economic power of the U.S., the number of U.S. citizens living in poverty was 12.5% in 2007, based on the most recently available U.S. Census Bureau data, and this figure typically increases in times of economic crisis and recession. In certain countries, this number is significantly higher. The number of other social injustices in the U.S. and abroad are countless.

### *Summary*

In summary, we need to impart the knowledge and values of social responsibility and citizenship when our children are young. Parents, of course, are optimally positioned to instill morals and values in their children, but educators must work

in partnership to continue to develop students' ethical and moral compasses and learn citizenship skills. Charles C Haynes (2009) continues in his article:

Developing students' hearts, I believe, is what educators are called to do. Each and every small act of honesty, service, responsibility, and compassion that teachers and administrators encourage daily in their students—and model consistently in their own lives—helps create moral and civic habits of the heart that instill in students the courage to care.

In a 2002 study of young people and their civic participation, it was found that young people who are active with social institutions do better in life. They are more likely to stay in school and out of trouble (Eccles and Gootman, 2002).

The benefits of developing a sense of social responsibility are many. To paraphrase Tony Wagner (2008), it's no longer how much you know that matters; it's what you can do with what you know. When students learn to be good citizens, they are:

- More thoughtful about world issues;
- Better prepared for college;
- More successful in work;
- More able to demonstrate greater involvement and advocacy.

### *Recommendations*

- 1. Expand current community service and outreach learning opportunities.** Expand both local and global community service learning opportunities for our District 39 students. Engage in community exchange programs.
- 2. Infuse an age-appropriate ethics component to the core curriculum.** This naturally fits with social studies, science and technology but could be considered in language arts and other subjects.
- 3. Continue to teach and enhance the environmental awareness curriculum.** See also the other 2009 CRC subcommittee report on "Going Green."
- 4. Integrate citizenship skills into the curriculum.** Provide opportunities for students to learn, understand, and practice serving as good citizens. This includes understanding the U.S. democratic system and other government systems abroad; appreciating the rights, freedoms and liberties that Americans are afforded in this country; and learning how to effect change constructively in the U.S. See efforts by [www.firstamendmentschools.org](http://www.firstamendmentschools.org), among others.

- 5. Consider implementing a “Micro-society” concept.** Consider implementing the concept of a “Micro-Society” as articulated by Thomas Armstrong in his book, *The Best Schools* (2006). The idea is to reconstruct the world inside a school building. This was first created by a Brooklyn school teacher in 1967. Currently the approach is used in more than 250 schools nationwide. Students study traditional academic subjects for half or part of the day and in the afternoon, they apply their knowledge by constructing a mini-society within the school walls. For example, the Micro-Society has its own banks and economic systems (whereby students are ‘paid’ for their work and can use the money to buy things), government systems (students are tried and punished according to student rules), merchandising (students create and run businesses), and their own artistic and cultural institutions. With such replication of the “real world,” students can practice social responsibility.
  
- 6. Integrate financial literacy into the curriculum.** As a start, an Economics of Math course is being launched at the WJHS during the 2009-2010 school year for 7<sup>th</sup> graders. However, more opportunities exist to integrate age-appropriate financial literacy concepts throughout the K-8 curriculum to teach students to be socially responsible with finances.

See also recommendations under “Global Awareness,” “Communication,” and “Collaboration.”

## Theme Seven: Teaching Style and Learning Process

*How will the changes described elsewhere in this report affect the teachers in District 39? Our teachers will have to respond to two trends: (1) the relentless pace of change makes it imperative that teachers constantly learn and adapt; and, (2) the trend toward education directed at process relative to product. “Americans live and work in a service economy, yet are only just beginning to teach and train students and workers to improve service sector productivity and innovation” (Council on Competitiveness, 2008).*

As has been described at length in other parts of this report, we are living in a world in which the pace of change has accelerated. When many of our 8<sup>th</sup> graders were born, there was no Google. The company was started in 1996. Today, there are more than a billion Google searches a day (Fisch, 2007). Change is a fact of life in the 21<sup>st</sup> century. All of us, including our teachers and administrators, will need to be prepared for change.

While it is difficult to predict the direction of change or the form it will take, this committee’s research suggests that the technological changes ushered in by the Internet and accelerated by the development of ever more portable devices mean that information is now ubiquitous. The pace at which information is being generated is staggering. It has been estimated that one week of The New York Times has more information than the average person received in a lifetime during the 18<sup>th</sup> century (Fisch, 2007), and it is available to everyone. It is estimated that there were  $4 \times 10^{19}$  pieces of unique information generated in 2008. That is more than in the previous 5,000 years. It is estimated that the amount of new technical information is doubling every two years (Fisch, 2007).

In addition to the accelerating pace at which information is being generated, that information is now available to everyone. In our schools, with an internet connection, the access to knowledge is unlimited. That information is also available in Berlin, Delhi and Beijing. The ability to research a topic or develop a website is no longer limited by geography.

For teachers, the first conclusion is that no single person, not even a teacher, can assimilate this new information at this pace. So, it is critical that, along with imparting knowledge, teachers need to serve as learners in the classroom with their students.

The implication that follows from the fact that vast amounts of information are now available to everyone is that the information, or more importantly, knowledge of that information, has little value. What matters now – what gives value – is what is done with that information (Friedman, 2005). This leads to two other trends that this committee has identified from the literature: First, process should be emphasized relative to knowledge or product. What a person knows, while important, is not enough anymore. Everything they know is now available on the

internet, and it is available to everyone. Second, learning needs to be self-directed. A child's education will, in the future, be tailored to his or her individual needs and interests. As to their interests, the child needs to have a say and a stake in the direction.

### *Teachers as Learners*

Life-long learning is expected to be the new education model for everyone, especially teachers (Wehring, 2008). The need for teachers to constantly learn is evident in adaptation to new technologies in the classroom. This year, the introduction of Smartboards into our classrooms presents only the most recent need for teachers to learn about new technologies and to learn how these technologies might be most effectively used. Shifts in pedagogy, as discussed below, will also require teachers to adapt to change. With the democratization of information, everyone, including students, have access to the content that teachers once held exclusively. Our teachers are no longer the sole content carriers but are now content facilitators. Their role has evolved from dispensing facts, "moving from teacher to mentor where they facilitate peer-to-peer learning" (Rodgers, 2006). As the teacher moves from the Sage-on-the-Stage model to the Guide-on-the-Side model, the teacher becomes more of an observer than a director (Wehring, 2008). As a student's education becomes more individualized and self-directed, the good teacher will need to stand back and observe, intervening only as necessary, rather than directing the child. An important component of this shift in focus is that teachers will need to model the process of learning (Brown, Resa Steindel, 2006). In the current information-rich environment, nobody knows everything. Nobody has all of the answers. However, the good teacher can model the process of getting to the answer.

Finally, the success of this new model of teaching will require greater teacher learning and collaboration within schools. "Teachers must be the primary driving force behind change. They are best positioned to understand the problems that students face and to generate possible solutions" (Stigler and Hiebert, 1999). District 39 recognizes importance of providing time for teacher collaboration and the opportunity for teachers to learn from each other. The 2007-2008 CRC Scheduling subcommittee studied those needs and made recommendations on this topic.

### *Process needs to be emphasized over content*

A recurring theme in the research is that schools today need to emphasize process over content. With the rapid pace of information growth, schools should foster environments where more emphasis is on "making connections, thinking through issues, and solving problems" and less on memorized material (Rodgers, 2006).

District 39 has recognized the importance of process as evidenced by the new report cards, which evaluate a student's process skills. Companies want employees with skills such as teamwork, imagination, leadership, critical thinking, and the ability to ask good questions. These are all skills involving process more than knowledge. Companies are confident that they can teach the required hard skills (Wagner, 2008). According to Professor Harry Davis (Born, 2009), teachers need to instill in students a desire to learn more than they need to provide them with the end-product of knowledge. It only makes sense in a labor market in which our children will change jobs frequently that the hard skills associated with any given job are less important.

The committee's research revealed several educational methods associated with reinforcing process skills, including creative models that emphasize problem-based learning and collaboration. To varying degrees, both models are already being used within the district.

### *Learning needs to be self-directed*

The model that schools have long operated under is of a teacher who imparts knowledge to the children, much as a pitcher fills an empty cup (Lillard, 2005). Our research suggests that if we want our children to grow up to be independent thinkers and initiators, we need teachers to stand back and let each student develop his or her own direction. One important way to foster self-directed learning is through group projects where students "experience learning first hand – to learn through exploration." Today's students "want to be challenged to reach their own conclusions, find their own results" (Rodgers, 2006).

District 39 already strives to customize learning plans for individual students. Some of the committee's research suggests the need to involve children more in the direction of their education. Such a philosophy gives children greater ownership in their education, allows them to pursue individual interests, and seems to give them the confidence they need to take risks and be creative. Self-direction is an element of process-oriented learning and is consistent with experiential learning and problem-based learning. The marketplace is demanding self-directed individuals. Finally, colleges are recognizing the desire for students who pursue their passions rather than those students who are classically well-rounded, according to Stacey Baker, the owner of Riley Baker Education Consultant, a private college consultancy (Fortier, 2009).

### *Recommendations*

- 1. Guide teachers to model for their students the process of learning and moving from questions to answers.** Encourage teachers to accept their inability to know everything. It is valuable to the students to see how a teacher works through a problem. For example, our research suggested that teachers are often reluctant to use technology until they have

mastered it. This is a valuable opportunity for a teacher to collaborate with students to learn to use software or a Smartboard to their mutual benefit. In the end, this creates an environment in which risk-taking, being a learner, and enthusiasm are rewarded.

- 2. Create a system that encourages teachers to exchange knowledge gained through experience in the classroom.** Provide teachers time to collaborate regarding experiences on a daily or weekly basis. In addition, provide teachers the technology/infrastructure to collect and share successful experiences. Efforts to bring about change can be more effective if knowledge is institutionalized, sustained and then shared with other educators. (See: *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*, Stigler, Hiebert (1999)). Similarly, experienced teachers have opportunities to learn from teachers with specialized knowledge, for instance, those now entering the profession who have grown up immersed in information technology.
- 3. Strive to “individualize” learning to a greater degree with student input.** Thomas Armstrong articulates in his book (2006) that the best learning methods involve the child as an active participant in constructing authentic knowledge about the world. Learning may be enhanced by customization with the appropriate input of the student. This can provide children with greater ownership and choices in their education which, in turn, may result in children being more engaged and better learners. A program to incorporate student-led goal setting, self-reflection and year-to-year “student-owned” continuity plans also may be considered by the district.
- 4. Promote and use more project-based learning.** Children learn better by *doing*. Project-based learning incorporates the trend toward self-directed learning and an emphasis on process over product, and adapts easily to other trends discussed throughout this report, such as collaborative learning, communication, and many of the value-added skills. Project-based learning additionally allows children to involve themselves in real life solutions which can lead to greater depth of knowledge and understanding.

## Theme Eight: Learning Environment

*Learning environments themselves are an essential component to supporting successful 21<sup>st</sup> century outcomes for students. How does physical space support the human relationships that matter most to learning? Though the term “learning environment” suggests a place or location, for the 21<sup>st</sup> century student it is really the structure, tools, and communities that inspire students and educators to attain the knowledge and skills that the 21<sup>st</sup> century demands. A learning environment, therefore, can be physical, on-line, human or technological.*

Georgetown University researchers have found that improving a school’s physical environment can increase test scores by up to 11% (Bransford, Brown, Cocking, 2000). The qualities, therefore, of where we learn affect the quality of how we learn.

The Partnership for 21<sup>st</sup> Century Skills (2009), identified two aspects of the 21<sup>st</sup> century learning environment: space and time.

### *Space*

Because no one can predict how educational needs will change or evolve, learning spaces must be adaptable. To achieve this flexibility, classrooms, or “learning studios,” should be designed with moveable furniture and walls that can easily be reconfigured for different purposes. Further, these flexible design spaces should offer openness and accessibility to facilitate the increased interaction that often cannot take place in a typical classroom. Both students and educators need this type of space to enable collaborative planning and information sharing.

The library is, of course, a key element of any school. As more and more content moves into virtual form, the “new” library should become the nerve center of the school. It should be a place where students gather to get and create information, a place where they can get excited about learning, and a place where they can escape from the pressures of the day.

In essence, the library should:

- Bring information resources to learners;
- Provide tools and infrastructure that enable learners to analyze, synthesize, and evaluate resources in ways that demonstrate learning and create new knowledge;
- Offer places for:
  - Formal learning in which large groups can gather for presentations;
  - Social learning where teams can collaborate on projects;
  - Individual learning where individuals can find a quiet space for reading or relaxing;

- Connect students to the wider world beyond the school by providing the audio and video communication technologies that bridge people and places all over the globe.

These concepts of both classroom and library space are confirmed by David Thornburg (1999). He stresses four types of environments necessary for 21<sup>st</sup> century learning: the cave, the watering hole, the campfire, and the mountain top.

- The cave refers to an individual space that we all need to think and to create. For students, this might be their own cubbies or another quiet, private space to sit and write, read, or think.
- The watering hole refers to a place to socialize one's learning in the form of sharing and discussing ideas. This type of physical space might be a comfortable and inviting space in school such as a grouping of chairs or a rug for students to talk with one another about school work.
- The campfire is the spot where students gather with their teachers. Though it is teacher-centered space, it needs to be flexible space with a comfortable atmosphere.
- The mountain top is the area in which students' work can be published and displayed. Thornburg's (1999) research indicates that students are far more motivated to do well when they know their work will be seen by people other than the teacher. LCD projectors in stairwells, student galleries, and safe internet sharing sites would all successfully serve this purpose.

A 21<sup>st</sup> Century Learning Environment report further emphasizes the need for schools today to move from being isolated from the community to being connected to the community through a people network. Schools should connect to the outside world by opening school space for community use and seeking community input when designing schools. This will advance the notion of integrating the school community with the non-school community (Cisco, 2008).

### *Time*

Besides having flexible space, 21<sup>st</sup> century learning environments also need flexible time. Units of time that are more malleable than a 50-minute class period are required for project-based or interdisciplinary work. Flexible-block scheduling is a good tool used to create bigger, more adjustable time slots for student learning.

Establishing time during the day for collaboration and planning is another way to advance 21<sup>st</sup> century teaching practices. This can be more easily attained when the school day is not so rigidly scheduled.

What seems certain is that learning does not happen on the clock. In fact, a seamless approach to learning is needed to integrate all the forms of learning

that can occur in a student's typical day. Powerful learning includes internships, community service and online learning. The use of virtual space – and connecting it to the traditional classroom – is a new option that will become a powerful tool for 21<sup>st</sup> century learners.

Interestingly, the Montessori school has been embracing these concepts of physical space and time since its founder, Dr. Montessori, became interested in education at the beginning of the 20<sup>th</sup> century. The typical classroom in a Montessori school is large and has a feeling of openness. Further, the children choose how long they work in each of the areas that they are studying (i.e. art, music, math, etc.). The children spend as much time on their activity as they need or until they are ready to move on. This allows them the time needed to master their task. Among the many principles of Montessori education is that learning and well-being are improved when people have a sense of control over their lives (Lillard, 2005). The use of space and time in the Montessori educational system helps to bring this concept to fruition.

The modern world demands learning environments that embrace the wide world of people, places, and ideas. Both the use of space and the function of time need the type of flexibility that is now demanded of our schools.

### *Recommendations*

- 1. Incorporate multi-purpose spaces and spaces for the different needs of students in future building and classroom design.** As schools look at future building projects, be mindful of creating multi-purpose spaces. For future classroom design, incorporate the concept of movable walls and furniture so that our classrooms are more adaptable to the various types of learning possibilities. Furthermore, be more aware of the types of areas that students need (private space, social space, etc.) for various individual and group activities.
- 2. Adapt current spaces to various types of learning needs.** First, brainstorm with teachers regarding how they would use flexible space, both to generate ideas and to obtain a sense of how familiar teachers are with the many uses of flexible, multipurpose spaces. Then develop and implement new ways to use current space.
- 3. Increase and enhance the use of flexible-block scheduling.** Increase the use of flexible block-scheduling in portions of the school day to give more time to certain subject areas where necessary.
- 4. Provide professional development for teachers and administrators on the importance and possibilities of flexible space and time.** Familiarize administrators, teachers, and parents with the advantages of

the new trends in the use of alternative space and time, and provide professional development as necessary.

## Section Four: Concluding Statement

With a new millennium stretched out before us, the desire to reach new educational heights, combined with current domestic and global events, presents ideal timing for this research project on 21<sup>st</sup> century learning. The CRC subcommittee set forth to answer the question, “What more could we as parents and educators be doing to prepare our children for their future in this millennium?”

Our research process – which involved looking into a crystal ball, of sorts, to extrapolate from the literature, interviews and workshops what the future will hold for our children – resulted in the eight themes described in detail in our report. In addition, the research process revealed several key consensus points, both in the literature and among committee members.

First, although relatively new, the concept of skill sets uniquely relevant to the 21<sup>st</sup> century is not novel to researchers and thought leaders in education and business. Much has been written and presented about the need to re-think how we prepare our young students for the distinctive opportunities and challenges of this millennium. Some schools have already begun these discussions or have even implemented changes, and certainly more school systems will jump on the bandwagon in the coming years. Implementing 21<sup>st</sup> century skills and concepts on a macro level, however, is still in its infancy. Fortunately for District 39 constituents, many 21<sup>st</sup> century themes and skills already are addressed within some District 39 classrooms, but none are implemented on a consistent and uniform basis across the K-8 curriculum. District 39 has a unique opportunity to be on the cutting edge of innovation by consciously and systemically integrating 21<sup>st</sup> century skill sets into: strategic planning; curriculum mapping; facilities utilization and forecasting; equipment purchasing; budgeting; staffing; and, of course, in the classroom. Parents, too, have a unique opportunity to support and partner with the District by collaborating with the schools as well as being mindful of the 21<sup>st</sup> century learning trend within their homes.

Second, the consensus in educational research is that the fundamental core curricula -- language arts, mathematics, science and history -- continue to be essential for K-8 education because the concepts and basic skills developed through these remain the foundation upon which all future learning is built. Likewise, The Partnership for 21<sup>st</sup> Century Skills concludes that “a 21<sup>st</sup> century education must be founded on the solid ground of content knowledge,” and puts forth on its website a list of core subjects as the keystone of their 21<sup>st</sup> century skills framework ( [www.21stcenturyskills.org](http://www.21stcenturyskills.org)). The 21<sup>st</sup> Century Learning subcommittee – including parents, teachers and administrators -- is unanimous in the belief that “the core” is vital to our children’s education and should not be *replaced* with other core subjects.

Third, clearly proponents of 21<sup>st</sup> century learning advocate a liberal arts core

curriculum that is broad, rather than focusing on fewer select subjects aimed at closing a reported “achievement gap” between the U.S. and other countries (e.g. TIMSS – Trends in International Mathematics and Sciences Study). Many programs started by well-intentioned business and political leaders have fueled a heightened urgency about an achievement gap, not the least of which is No Child Left Behind (NCLB). Reform efforts such as NCLB have alerted our nation to an increasing discrepancy in math and the sciences between school-age children in the U.S. and those of other countries such as India, China and Japan, and in effect have focused our nation’s schools on closing that gap.

According to Professor Yong Zhao (2007), the problem with NCLB and some other reform efforts is that their success in closing the achievement gap is dubious. Even more concerning, they have led to a “narrowing of what students learn,” increased testing, and “teaching to tests,” and effectively attracted attention away from the very skills that will enhance success in the 21<sup>st</sup> century.

Furthermore, continues Zhao, espousing a “single criterion” approach to education will suffocate creativity, one of the linchpins to innovation in this millennium, and a quality that has set the U.S. apart – and ahead – for decades and decades. While the U.S. is busy attempting to close an achievement gap, Zhao says that Asian nations that have for centuries valued conformity, collectivism, and continuity, now are “working on closing the creativity gap” (2007). “These countries cannot compete with the U.S. in creativity and innovation,” says Zhao. U.S. parents and educators typically have accepted, even embraced, the concept of “multiple intelligences” first introduced by Howard Gardner in 1983, a concept that has not been widely embraced by other countries.

Fourth, the case for curricula that includes skill sets specific to millennial learners does not conflict with maintaining the traditional core curriculum. As David Schroeter, Vice President of Gale Cengage Learning, a world leader in e-research and educational publishing for libraries, schools and businesses, notes:

While these [21<sup>st</sup> century] skills have always been important, today’s blinding pace of change makes developing these skills an absolute necessity for every person. Still, a focus on 21<sup>st</sup> century skills is meant in no way to detract from creating a rigorous core academic curriculum. To ensure positive student outcomes, these rigorous courses must be paired with the learning of 21<sup>st</sup> century skills (2009).

The challenge is how to retain the existing essential core and include additional skill sets, at a time when teachers’ plates already are overflowing with the demands of continuously expanding curriculum, increasing state and local testing requirements, and limited time in the overall school calendar. Overwhelmingly, our research found that the key is to *integrate* rather than incrementally add to

curriculum content. One of the best ways to do this is through curriculum mapping, whereby new content can be woven into the existing core to *enhance* it, rather than replace it, add to it, or detract from it. In *Getting Results with Curriculum Mapping*, Heidi Hayes Jacobs states that “curriculum mapping provides an avenue where teachers can streamline these important initiatives through the curriculum rather than working the initiatives in parallel with the curriculum” (2004).

Another solution to integration lies in the shift in focus from product to *process*, as discussed in section three under “Teaching Style and Learning Process.” This shift in focus also supports the “learning to learn” philosophy highlighted in that section. Many of the 21<sup>st</sup> century themes identified in this report are process-oriented skill sets that can be integrated into the core by altering the *process* by which the core content is taught.

Below are two examples – one existing and one proposed -- of how teachers can accomplish the goal of integration of 21<sup>st</sup> century themes into a core subject by focusing on the learning process.

Example #1:

A teacher at Central School promotes 21<sup>st</sup> century skills through a weekly take-home math sheet containing 4-6 challenging word problems. Students are told that “there is always a 3<sup>rd</sup> grade way” to solve the problems and are instructed to *show* how they solved the problem (*self-awareness and discovery; problem-solving*). Working independently at home, they are expected to give it their best shot (*risk-taking*), bring the sheet back to school to receive feedback in the form of minimal hints, and then bring it back home to continue working until all problems are solved correctly (*persistence*), even if that process takes a few weeks.

Example #2:

Involving more grade levels in the Kiva organization (referenced in a recommendation under the Global Awareness section) would provide an opportunity to incorporate into the curriculum numerous 21<sup>st</sup> century themes identified in this report. Kiva is a non-profit organization dedicated to facilitating the microfinance movement by making *very small* loans – as small as \$25 -- to specific entrepreneurs in impoverished and developing countries.

Making a small loan available to an entrepreneur through Kiva could afford students, as a class, opportunities to experience many of the 21<sup>st</sup> century learning themes in this report, for example:

- Research the countries represented by the entrepreneurs seeking loans through Kiva (Global Awareness);
- Discuss socio-economic conditions in the U.S. and other countries (Global Awareness);
- Discuss the role of technology in making an organization like Kiva operational (Technology);
- Choose -- through teamwork, presentation, consensus – one entrepreneur to whom the class would make a small loan (Collaboration);
- Learn about the system of loan-making, such as what makes a “smart” loan and how you get repaid (Social Responsibility; Financial Literacy);
- Decide as a class how the money for the loan will be raised (Problem-solving; Creativity; Collaboration);
- Create a presentation on some aspect of the class project (Communication);
- Experience global citizenship (Social Responsibility);
- Be involved in a longer-term, project-based learning experience that evolves as the class chooses (Teaching and Learning Style);
- Experience the “classroom” expanded to the internet and the globe (Learning Environment; Technology).

In summary, valuing multiple talents, creativity and innovation, individuality, and a broader definition of success is what sets the U.S. education system apart. Embracing the kind of 21<sup>st</sup> century curriculum championed in this report not only leverages what already distinguishes our education system but also ensures that our students and our schools are equipped for this millennium and remain on the cutting edge of a new world order. The following “Recommendations” section is a compilation of all recommendations that are contained in this report at the end of each section. Underlying all recommendations is a focus on *integration* and *process*. The committee encourages the Board of Education, administrators, teachers, and parents to familiarize themselves with the 21<sup>st</sup> century themes contained in this report and to mindfully integrate 21<sup>st</sup> century learning into the daily education, experiences and parenting of our District 39 students.

## **Section Five: Recommendations**

Along with maintaining the core curriculum, the committee has developed several recommendations for District 39. These are grouped into “Broad Spectrum” recommendations that transcend all 21<sup>st</sup> century themes identified in this report and “Specific Recommendations” that comprise a summary list of the individual recommendations found in each theme section of this report.

### Broad Spectrum Recommendations

The following are general recommendations that are relevant to all themes covered in this report:

1. Use this report to inform, update and amend the District 39 Strategic Plan;
2. Similarly, update and amend K-8 curriculum maps;
3. Perform a gap analysis between what is being done in the classroom today and what is being recommended in this report;
4. Produce a “best practices” repository of current 21<sup>st</sup> century methods being practiced today and in the future, for the benefit of all teachers and administrators in the district;
5. Familiarize all teachers and administrators with the 21<sup>st</sup> century learning trends and provide professional development as needed;
6. Develop a set of guidelines for parents to partner with the district on 21<sup>st</sup> century learning opportunities for home use.

### Specific Individual Recommendations by Report Theme

Some of these individual recommendations are currently being implemented in some District 39 classrooms, but none, as far as the CRC 21<sup>st</sup> Century Learning subcommittee knows, are being implemented consistently throughout the district. We want to acknowledge the terrific efforts underway, and as part of our recommendations, we look forward to having teachers and educators share those current practices throughout the district.

Theme	Summary Recommendation	Additional Detail or Comment
<b>Global Awareness and Perspective</b>		
	<p><b>1. Expand beyond a U.S.-centric perspective in our curriculum and develop a global perspective in each of our District 39 students.</b></p>	<p>Broaden our social studies, political, cultural, music, and world language curriculum to include other cultures, especially the fastest growing and/or largest population centers of the world:</p> <ul style="list-style-type: none"> <li>-India                                 -Russia</li> <li>-China                                 -Pan Asia</li> <li>-Middle East                         -Africa</li> </ul> <p>Use a holistic approach that includes the culture, history, politics, art, music, language, and typical social norms of each country/region.</p> <p>Establish a global micro finance K-8 program for students to learn about people in developing countries and the socio-economic conditions they face. WJHS will launch a program using Kiva.org (See reference to Kiva.org in Global Awareness section) in the next school year as part of the new Economics of Math course.</p>
	<p><b>2. Consider augmenting and/or replacing the teaching of Latin, German and French languages for grades 5-8 with Chinese, Arabic and/or Russian language study.</b></p>	<p>Keep Spanish as an offering.</p>
	<p><b>3. Develop an “Immersion Program.”</b></p>	<p>Roll out one or two week “Immersion Weeks” in which students, teachers and staff immerse themselves into the study of one particular culture, country or region. The culture, politics, art, history, and geography could be studied and emulated throughout the entire school for a week.</p>
	<p><b>4. Increase exchange opportunities for students and teachers, both virtually and physically outside the U.S.</b></p>	<p>This is offered on a limited basis in our French and German language study programs for those students and teachers. However, the recommendation is to offer travel opportunities to all District 39 students</p>

		and teachers  This can also be accomplished virtually with technology. (See examples under “recommendations” in Global Awareness section)
	<b>5. Integrate cultural sensitivity instruction into the curriculum.</b>	Given the increasingly global lives our District 39 students will lead, students can begin now to learn about international differences in interpersonal interactions, diplomacy, and conflict resolution.
<b>Technology</b>		
	<b>1. Evolve into a technology-infused structure throughout District 39 rather than teaching technology skills in isolation.</b>	Technology teachers can be used to support technology integration (vs. teaching insular technology classes) by co-planning and co-teaching with classroom teachers and providing professional development. This, in turn, will allow our children to learn technology in the context of their core subjects.
	<b>2. Provide teachers with more professional development in technology.</b>	Offer professional development to teachers to expose them to new programs and create a safe, non-judgmental environment in which teachers can learn.
	<b>3. Launch a student technology support program.</b>	Identify and train students to administer technology support in their individual classrooms.
	<b>4. Monitor effect of technology on students’ interpersonal skills and teach on-line etiquette.</b>	Watch for ways in which technology adversely impacts interpersonal development, student safety and online etiquette.  Consider creating e-mail addresses and “gaggle” accounts ( www.gaggle.net) within classrooms – which can provide a safe learning environment.
	<b>5. Provide opportunities for students to publish, write, converse, and receive feedback on the World Wide Web.</b>	Technology now provides an excellent venue for our students to learn about, interact with and publish vis-à-vis the global theater. With the appropriate safeguards: <ul style="list-style-type: none"> <li>• Permit students to publish completed works (e.g. stories, essays, art) on safe web sites for anyone in the world to see.</li> </ul>

		<ul style="list-style-type: none"> <li>Establish a 21<sup>st</sup> century style 'pen pal' exchange between District 39 students and other children across the globe using a safe e-mail system.</li> </ul>
	<b>6. Continue to monitor and increase students' access to technology.</b>	<p>Consider increasing student-to-computer ratio in a consistent manner across the district.</p> <p>Study the impact of 1:1 trials at Avoca and other districts.</p>
<b>Value-Added Skills of 21<sup>st</sup> Century Learners</b>		
	<p><b>Create opportunities to foster, teach and integrate the value-added skills identified by this committee:</b></p> <ul style="list-style-type: none"> <li>Creativity</li> <li>Flexibility</li> <li>Risk taking</li> <li>Empathy</li> <li>Persistence</li> <li>Problem solving</li> <li>Self awareness and discovery</li> <li>Life long enthusiasm for learning.</li> </ul>	<p>Utilize this innovative research and nurture these skills in our classrooms as we forge our own 21<sup>st</sup> century path.</p> <p>Look for opportunities to integrate value-added skills into curriculum and cite them as part of parent and teacher dialogues.</p>
<b>Communication</b>		
	<b>1. Increase the practice of speaking and listening skills.</b>	Provide ample classroom and project-based opportunities in which students are required to engage in effective verbal, in-person conversation with an emphasis on effective listening.
	<b>2. Expand current opportunities to foster public speaking and presentation skills.</b>	Look for further opportunities in the curriculum for students to practice public speaking and presentation skills from grades K-8.
	<b>3. Expand current opportunities to</b>	Continue to emphasize writing techniques appropriate for various

	<b>practice writing skills.</b>	purposes and media.
	<b>4. Educate students about how differences/diversity impact communication.</b>	This could be incorporated into the study of other countries/cultures; for example, students can research cultural differences in interpersonal communication.
<b>Collaboration</b>		
	<b>1. Increase collaboration in the classroom.</b>	Foster productive collaboration by using integrative groups that recognize and leverage the diversity of group members to encourage innovation and learning. The characteristics of an “integrative group” include the following: <ul style="list-style-type: none"> <li>• Organized around a project, problem, task, or challenge;</li> <li>• Context-oriented;</li> <li>• Embraces diversity;</li> <li>• Non-hierarchical;</li> <li>• Has a culture of motivating rapport and optimism.</li> </ul>
	<b>2. Utilize 21<sup>st</sup> century tools to teach effective collaboration.</b>	For example, Virtual Collaboration (Web 2.0 ) has been made easier and more widespread by technology, which has provided ways for individuals to collaborate anytime, and anywhere, through use of online tools. The use of these tools to collaborate effectively must still be taught, and schools have begun to focus on teaching this skill.
	<b>3. Perform a more extensive literature review on teamwork, collaboration and cooperative learning in the educational field.</b>	This topic warrants further research into how teamwork and collaboration are being taught in K-8 classrooms and how they can be integrated into District 39 curriculum.
<b>Social Responsibility</b>		
	<b>1. Expand current community service and outreach learning opportunities.</b>	Expand both local and global community service learning opportunities for our District 39 students.  Engage in community exchange programs.

	<b>2. Infuse an age-appropriate ethics component to the core curriculum.</b>	This naturally fits with social studies, science and technology but could be considered in language arts and other subjects.
	<b>3. Continue to teach and enhance the environmental awareness curriculum.</b>	See also the other 2009 CRC subcommittee report on “Going Green.”
	<b>4. Integrate citizenship skills into the curriculum.</b>	Provide opportunities for students to learn, understand, and practice serving as good citizens. See efforts by <a href="http://www.firstamendmentschools.org">www.firstamendmentschools.org</a> among others.
	<b>5. Consider implementing a “Microsociety” concept.</b>	Consider implementing the concept of a “MicroSociety” as articulated by Thomas Armstrong in his book, <i>The Best Schools</i> (2006). The idea is to reconstruct the world inside a school building.
	<b>6. Integrate financial literacy into the curriculum.</b>	As a start, an Economics of Math course is being launched at the WJHS during the 2009-2010 school year for 7 <sup>th</sup> graders. However, more opportunities exist to integrate age-appropriate financial literacy concepts throughout the K-8 curriculum.
<b>Teaching Style and Learning Process</b>		
	<b>1. Guide teachers to model for their students the process of learning and moving from questions to answers.</b>	Encourage teachers to accept their inability to know everything. It is valuable to the students to see how a teacher works through a problem.
	<b>2. Create a system that encourages teachers to exchange knowledge gained through experience in the classroom.</b>	Provide teachers: (1) time to collaborate regarding experiences on a daily or weekly basis and (2) infrastructure/technology to document and share successful experiences.
	<b>3. Strive to “individualize” learning to a greater degree with student input.</b>	Learning may be enhanced by customization with the appropriate input of the student. A program to incorporate student-led goal setting, self-reflection and year-to-year “student-owned” continuity plans also may be considered by the district.
	<b>4. Promote and use more project-based learning.</b>	Project-based learning incorporates the trend toward self-directed learning and an emphasis on process over product, and adapts easily to other trends discussed throughout this report, such as collaborative

		learning, communication, and many of the value-added skills.
<b>Learning Environment</b>		
	<b>1. Incorporate multi-purpose spaces and spaces for the different needs of students in future building and classroom design.</b>	As schools look at future building projects, be mindful of creating multi-purpose spaces, and for future classroom design, incorporate the concept of movable walls and furniture so that our classrooms are more adaptable to the various types of learning possibilities.
	<b>2. Adapt current spaces to various types of learning needs.</b>	With teacher input, develop and implement new ways to use current space more effectively.
	<b>3. Increase and enhance the use of flexible-block scheduling.</b>	Increase the use of flexible block-scheduling in portions of the school day to give more time to certain subject areas where necessary.
	<b>4. Provide professional development for teachers and administrators on the importance and possibilities of flexible space and time.</b>	Familiarize administrators, teachers, and parents with the advantages of the new trends in the use of alternative space and time, and provide professional development as necessary.

## Section Six: Appendices

### Appendix One

#### Source Review Form

CRC: 21<sup>st</sup> Century Sub Committee  
2008-2009  
**Source Review Report**

#### **The BASICS:**

Your name, phone and email: \_\_\_\_\_

Title and Type of Source (book, article, video, interview, etc.)  
\_\_\_\_\_

Author: \_\_\_\_\_

Year published: \_\_\_\_\_

#### **3-6 Key 21<sup>st</sup> Century Literacies/Concepts/Skills/Qualities:**

<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	

**Research and Details That Support the Main Concepts Above:**

*Please be specific: list interesting or important details that may be useful in writing the report e.g., a practical example, an analogy, a story, data, chart reference, page numbers, etc.*

**Which topics, if any, does this source cover:**

**Technology:** \_\_\_\_\_ **Global Awareness:** \_\_\_\_\_

**International Education:** \_\_\_\_\_ **Business:** \_\_\_\_\_

**Other Topic(s) Covered:** \_\_\_\_\_

**Should a Second Reader review/read this book?** \_\_\_\_\_

**What struck me about this source was?**

**Please attach any significant diagrams or charts that speak to any key points made above.**

**Significant and Relevant References:**

## Appendix Two

The committee would like to acknowledge the existence of several other resources, including *The Partnership for 21<sup>st</sup> Century Learning* website, the *Council on Competitiveness, Leading and Learning with Habits of Mind* by Costa and Kallick, and *16 Trends* by Gary Marx. All of these are excellent original sources for comprehensive information on 21<sup>st</sup> century skills; see “References” section for information on these resources.

Although the authors of these sources have developed their own list of “most critical” 21<sup>st</sup> century skills and qualities, the subcommittee chose to conduct a much more broad investigation of 21<sup>st</sup> century learning and to synthesize the information gathered. These resources were valuable in developing our own list, and were referenced where appropriate.

## Appendix Three

### 2008 and 2050 Forecast Population for the Top 25 Most Populated Countries in 2008 (highlighted are the countries growing above the overall world growth rate)

2008 Rank	Country	2008		Projected 2050		2050 Rank	2008/2050 % Growth	Average Annual Growth
		Population (millions)	% of World Population	Population (millions)	% of World Population			
1	China	1,330	20%	1,424	15%	2	7.1%	0.16%
<b>2</b>	<b>India</b>	<b>1,148</b>	<b>17%</b>	<b>1,808</b>	<b>19%</b>	<b>1</b>	<b>57.5%</b>	<b>1.09%</b>
<b>3</b>	<b>US</b>	<b>304</b>	<b>5%</b>	<b>439</b>	<b>5%</b>	<b>3</b>	<b>44.3%</b>	<b>0.88%</b>
4	Indonesia	238	4%	313	3%	4	31.8%	0.66%
5	Brazil	196	3%	261	3%	8	32.8%	0.68%
<b>6</b>	<b>Pakistan</b>	<b>173</b>	<b>3%</b>	<b>295</b>	<b>3%</b>	<b>5</b>	<b>70.8%</b>	<b>1.28%</b>
<b>7</b>	<b>Bangladesh</b>	<b>154</b>	<b>2%</b>	<b>234</b>	<b>2%</b>	<b>9</b>	<b>51.6%</b>	<b>1.00%</b>
<b>8</b>	<b>Nigeria</b>	<b>146</b>	<b>2%</b>	<b>264</b>	<b>3%</b>	<b>7</b>	<b>80.7%</b>	<b>1.42%</b>
9	Russia	141	2%	109	1%	15	-22.4%	-0.60%
10	Japan	127	2%	94	1%	18	-26.4%	-0.73%
11	Mexico	109	2%	148	2%	12	35.6%	0.73%
<b>12</b>	<b>Philippines</b>	<b>96</b>	<b>1%</b>	<b>172</b>	<b>2%</b>	<b>11</b>	<b>79.0%</b>	<b>1.40%</b>
13	Vietnam	86	1%	108	1%	16	25.1%	0.54%
<b>14</b>	<b>Ethiopia</b>	<b>83</b>	<b>1%</b>	<b>278</b>	<b>3%</b>	<b>6</b>	<b>237.1%</b>	<b>2.94%</b>
15	Germany	82	1%	74	1%	22	-10.6%	-0.27%
<b>16</b>	<b>Egypt</b>	<b>82</b>	<b>1%</b>	<b>128</b>	<b>1%</b>	<b>14</b>	<b>56.1%</b>	<b>1.07%</b>
17	Turkey	76	1%	101	1%	17	33.2%	0.68%
<b>18</b>	<b>Congo</b>	<b>67</b>	<b>1%</b>	<b>189</b>	<b>2%</b>	<b>10</b>	<b>184.6%</b>	<b>2.52%</b>
19	Iran	67	1%	81	1%	21	21.9%	0.47%
20	Thailand	65	1%	69	1%	25	5.8%	0.13%
21	France	64	1%	30	0%	24	-53.5%	-1.81%
22	UK	61	1%	64	1%	29	5.0%	0.12%
23	Italy	58	1%	50	1%	36	-13.3%	-0.34%
24	S. Africa	49	1%	49	1%	38	1.3%	0.03%
25	S. Korea	48	1%	43	0%	42	-10.4%	-0.26%
	<b>World</b>	<b>6,711</b>	<b>100%</b>	<b>9,536</b>	<b>100</b>		<b>42.1%</b>	<b>0.84%</b>

Source: U.S. Census Bureau, International Data Base. Data updated 12-15-2008 ( Release notes)

## Appendix Four

### **Forecast 2009 and 2018 Nominal GDP, US \$ billions**

<b>Rank by 2009 GDP</b>	<b>Country</b>	<b>Projected 2009</b>	<b>Projected 2018</b>	<b>Avg Annual Growth</b>	<b>Rank by 2018 GDP</b>	<b>Country</b>	<b>Projected 2018</b>	<b>Avg Annual Growth</b>
1	US	14,004	20,380	4.3%	1	US	20,380	4.3%
2	Japan	4,710	5,262	1.2%	2	China	10,744	11.2%
3	China	4,127	10,744	11.2%	3	Japan	5,262	1.2%
4	Germany	3,188	3,904	2.3%	4	Russia	4,205	13.4%
5	France	2,540	3,351	3.1%	5	Germany	3,904	2.3%
6	United Kingdom	2,068	3,728	6.8%	6	United Kingdom	3,728	6.8%
7	Russia	1,358	4,205	13.4%	7	France	3,351	3.1%
8	India	1,351	2,950	9.1%	8	India	2,950	9.1%
9	Mexico	846	2,592	13.3%	9	Mexico	2,592	13.3%
10	South Korea	710	1,507	8.7%	10	Turkey	1,783	13.5%

Source: Business Monitor International, April 2009

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