Foreign Languages & Innovation
Comment on the Strategy for American Innovation from the National Council for Languages and International Studies
September 2014

Overarching Questions

(2) What are the biggest challenges to, and opportunities for, innovation in the United States that will generate long-term economic growth, increased productivity, sustained leadership in knowledge-intensive sectors, job creation, entrepreneurship, and rising standards of living for more Americans?

The United States stands to derive a tremendous benefit in economic growth, productivity, leadership and entrepreneurship by investing in language education and promotion for its citizens. Economic growth and productivity can be facilitated by expanding the portion of Americans that can competently operate in cross-cultural settings in business as well as research. Specifically in the category of research and innovation, it is imperative that Americans in those fields possess the intercultural knowledge and language ability to converse and collaborate with their peers as they explore and innovate. To an ever-increasing degree, English is no longer the sole or dominant language of exploration and research, and our sector leaders will be cut off from valuable developments around the world if they are unable to communicate and understand their global counterparts, resulting in declining competitiveness as well as cooperation. Lastly, studies have demonstrated that language learning and bilingualism include cognitive benefits such as improved problem solving and creativity, skills essential for entrepreneurs and innovators.

(5) What innovation practices and policies have other countries adopted that deserve further consideration in the United States? What innovation practices and policies have been adopted at the state or local level that should be piloted by the Federal Government?

Governments around the world are investing in language education to give their students and workers an edge in the global market place and to fuel competition and development. English instruction is standard across the globe, but study is not limited to English. Our monolingual partners Australia and the Great Britain are outpacing the United States in investment in the languages of their trade partners and innovation competitors. Great Britain, after dropping language requirements a decade ago has reinvested, making language compulsory for all students up to the fifth grade. Similarly, the Australian government has recently opted to pilot pre-school foreign language programs, and is promoting study of other Southeast Asian languages in order to secure its influence in the region. The Irish government has invested in the Centre for Next Generation Localisation and the Localisation Research Centre, spending several million Euros per year. Similarly, the EU continues to invest in R&D and training for the
language industry, with a EU Master’s in Translation as well as research programs for computational linguistics, machine translation, and standards for translation and localization.

Skilled Workforce Development

(13) What emerging areas of skills are needed in order to keep pace with emerging innovations or technologies? What are successful models for training workers with these skills to keep up with emerging innovations?

There is a critical need to harness the technological capabilities to facilitate the acquisition of languages. Gone are the days that textbooks are the medium through which languages are learned. There are innovative approaches to language acquisition, such as Duolingo and WeSpeke, that should be replicated for use in the classroom in order to engage American students in the language learning process.

(14) What mechanisms or programs can effectively increase the supply of workers with technical training, from industry-recognized credentials and postsecondary certificates to two- and four-year degrees?

The federal government might create an industry-recognized level of language proficiency for specific technical jobs needed by the U.S. Government and by specific industry sectors. This would motivate Americans to pursue language learning specific ways to measure language outcomes. Until the federal government steps in to encourage Americans to learn languages other than English, we will continue to fall behind in the ability to engage with others around the world to pursue innovations in a wide variety of sectors. Additionally, federal investment in programs for translation, interpreting, and language engineering/localization should be made. These areas are critically under-resourced in terms of federal funding, and the US faces a significant gap in skilled workers in these areas.

National Priorities

(24) Which new areas should be identified as “national priorities,” either because they address important challenges confronting U.S. security or living standards, or they present an opportunity for public investments to catalyze advances, bring about key breakthroughs and establish U.S. leadership faster than what might be possible otherwise?

In an increasingly interconnected and interdependent world where American jobs and exports are more dependent than ever on foreign markets; where Americans are engaged diplomatically and militarily around the globe as never before; and where issues such as the environment, health and disease, poverty, development, and government instability are increasingly defined as global problems that require international understanding and cooperation, the ability to communicate in languages and with cultures other than one’s own has never been more vital. Even within our nation’s own borders, a growing foreign-born population has far-ranging implications on the need for employees with linguistic and intercultural skills.
Yet Americans remain glaringly deficient in language skills. Although the United States is a nation of immigrants, only 9% of Americans speak a foreign language while just 18% of K–12 students and 8% of college students study a foreign language. Moreover, a decreasing number of schools are teaching languages and only 10 states require a foreign language for graduation. Monolingual Americans are graduating into a global marketplace where 22 out of 25 industrialized nations begin language studies in Grades K–5 and where 22 European Union countries mandate that students have had a minimum of 9 years of at least one foreign language. As Leon Panetta, Former Secretary of Defense, stated in 2000, “The United States may be the only nation in the world where it is possible to complete secondary and postsecondary education without any foreign language study whatsoever.”

Presidential commissions as well as politicians, business leaders, and educators have been decrying the poor state of our foreign language competence for decades. In 1979, the President’s Commission on Foreign Language and International studies found that “Americans’ incompetence in foreign languages is nothing short of scandalous.” Thirty-five years later, the state of our nation’s language competence has not improved.

Therefore, we need a national priority to expand language learning at all levels of education, to train language workers, and to support the R&D required to keep the US at the cutting edge of this 21st century skill.

Appendices include responses that contributed to this submission from member organization of the National Council for Language and International Studies, as well as papers detailing the intersection of language and technology that were prepared at the request of OSTP in 2013 and 2014.

Appendix A: Response from Parents for a Global Education Association (PANGEA)
Appendix B: Response from the American Council on the Teaching of Foreign Language
Appendix C: Response from the Texas Foreign Language Association
Appendix D: Foreign Languages and STEM
Appendix E: World Languages and Technology
Appendix A

Response to the Office of Science and Technology Policy’s Request for Information from PANGEA

The mission of PANGEA (Parents for a Global Education Association) is to prepare our children to be successful and productive citizens in a globalized world by supporting and promoting language immersion education.

PANGEA started its activities in the Cambridge Public School District and is now active on the Massachusetts state level where we are part of a coalition pushing for legislation that would support language immersion education for all children.

As parents, we are preoccupied by the future and focused on preparing our children to succeed and achieve happiness in that uncertain future. Our children – and their ability to lead and innovate on the global stage - will determine the future of this country. Because of this, and the role we play in choosing and providing for our children’s education, it is imperative that the voices of parents be heard in any discussion of how best to enable innovation in the US.

It is our belief that language learning and, in particular, immersion language education are critical ingredients of future innovation in the United States. We speak as parents not experts but we have come to this conclusion for reasons that are based on solid evidence and research.

Knowing more than one language means knowing more than one culture which, in turn, opens up the ability to understand different perspectives and compare and contrast between cultures. The MIT data scientist Alex “Sandy” Pentland puts it this way: “We are used to emphasizing individual creativity, but we’ve found that creativity is mostly just the connecting of ideas that already exist. This is the source of innovation.”

To be entrepreneurial and innovative in today’s interconnected world one needs the skill set to spot opportunities in the global context and to assess the challenges posed by developments in other countries. Key ingredients of this skill set are speaking multiple languages and understanding multiple cultures. It is no coincidence that Chinese kindergartners are learning English and that Chinese high school students are studying American history. We as a country will be left behind if we are not able to understand our competition better.

Our public education system is in crisis. In a variety of different tests we compare badly with other countries. What is more the so-called “achievement gap” in public education is growing. Language immersion education offers a solution and hope. Research shows that the cognitive benefits of learning in two languages simultaneously can help level the playing field for children from lower socio-economic backgrounds. Research also shows that two-way language immersion programs serve English Language Learners (ELL) better than mono-lingual schools thus taking advantage of the huge resource that this country has with its myriad non English speaking communities.
There are a number of initiatives currently under way in the US that support language immersion teaching but they are piecemeal. The state of Utah is leading the way in elementary school education with its language immersion office and is providing support and advice to other states. The Asia Society is beating the drum for more widespread immersion teaching across the country. The DOD’s National Security Education Program supports advanced language learning at the undergraduate level. It is time for the Federal Government to make language learning a priority and to provide sustained and integrated support for language immersion education for all children – fluency in more than one language can make a significant contribution to boosting innovative thinking in the United States.

Maria Balinska and Jane Chiang
Co-coordinators, PANGEA (www.pangeacambridge.com)
Maria.balinska@btopenworld.com; jane_chiang@hotmail.com
August 30, 2014
Appendix B

Response to the Office of Science and Technology Policy’s Request for Information from the American Council on the Teaching of Foreign Language (ACTFL)

Skilled Workforce Development

What emerging areas of skills are needed in order to keep pace with emerging innovations or technologies? What are successful models for training workers with these skills to keep up with emerging innovations?

*There is a critical need to harness the technological capabilities to facilitate the acquisition of languages. Gone are the days that textbooks are the medium through which languages are learned. There are innovative approaches to language acquisition, such as Duolingo and WeSpeke, that should be replicated for use in the classroom in order to engage American students in the language learning process.*

(14) What mechanisms or programs can effectively increase the supply of workers with technical training, from industry-recognized credentials and postsecondary certificates to two- and four-year degrees?

*The federal government might create an industry-recognized level of language proficiency for specific technical jobs needed by the U.S. Government and by specific industry sectors. This would motivate Americans to pursue language learning specific ways to measure language outcomes. Until the federal government steps in to encourage Americans to learn languages other than English, we will continue to fall behind in the ability to engage with others around the world to pursue innovations in a wide variety of sectors.*

National Priorities

Which new areas should be identified as “national priorities,” either because they address important challenges confronting U.S. security or living standards, or they present an opportunity for public investments to catalyze advances, bring about key breakthroughs and establish U.S. leadership faster than what might be possible otherwise?

*In an increasingly interconnected and interdependent world where American jobs and exports are more dependent than ever on foreign markets; where Americans are engaged diplomatically and militarily around the globe as never before; and where issues such as the environment, health and disease, poverty, development, and government instability are increasingly defined as global problems that require international understanding and cooperation, the ability to communicate in languages and with cultures other than one’s own has never been more vital. Even within our nation’s own borders, a growing foreign-born population has far-ranging implications on the need for employees with linguistic and intercultural skills.*

Yet Americans remain glaringly deficient in language skills. Although the United States is a nation of immigrants, only 9% of Americans speak a foreign language while just 18% of K–12 students and 8% of college students study a foreign language. Moreover, a decreasing number of schools are teaching...
languages and only 10 states require a foreign language for graduation. Monolingual Americans are graduating into a global marketplace where 22 out of 25 industrialized nations begin language studies in Grades K–5 and where 22 European Union countries mandate that students have had a minimum of 9 years of at least one foreign language. As Leon Panetta, Former Secretary of Defense, stated in 2000, “The United States may be the only nation in the world where it is possible to complete secondary and postsecondary education without any foreign language study whatsoever.”

Presidential commissions as well as politicians, business leaders, and educators have been decrying the poor state of our foreign language competence for decades. In 1979, the President’s Commission on Foreign Language and International studies found that “Americans’ incompetence in foreign languages is nothing short of scandalous.” Thirty-five years later, the state of our nation’s language competence has not improved.
Appendix C

Response to the Office of Science and Technology Policy’s Request for Information from the Texas Foreign Language Association (TFLA)

Dear Sirs:

Please consider that languages are essential to a well-rounded education and global citizenship. The process of learning another language allows students to approach the world from different perspectives not reflected in their culture at home. It allows them to process information outside the confines of the society in which they live. It helps them understand that their opinions are not the only opinions, and not always the right ones. The study of languages breaks down barriers between people and countries by allowing them to appreciate differences in perspectives and opinions that could help them develop diplomatic and business relationships that can lead to peace and profitable business relationships. Beyond diplomacy and business, science and technology can benefit from the improved communication between scientists and technologists from various countries. The contributions from various sources aided by an improved ability to communicate in more than one language can lead to the development of vaccines and medicines, for example, in a more timely fashion. It can also lead to great leaps in technology that could benefit the human race.

If this is not enough to convince one of the necessity of learning a second or third language, consider how important it is to national security. Without the ability to understand what is being said by another person, one must rely on a third party to translate. Depending on that person’s intentions, many things can be lost in translation. How much better it would be to be able to communicate directly with the person, or at least be able to understand what the interpreter is saying, instead of simply trusting that what is said in one language, is what is being communicated in the other.

In order to make that happen, we must start educating our students at a much younger age for a much longer sequence of study. Language proficiency does not occur overnight and requires a sizeable investment of effort on the part of the student and the teacher. Not only does it require class time, but study abroad. Obviously, the latter requires money to cover the expenses of travel, lodging, and tuition. The money for salaries for teachers for the younger students needs to be made available, as well as scholarships for study abroad for older students and teachers. Since language evolves over time, refresher courses are a must for teachers so they can remain current in the latest terminology in that particular country.
Appendix D

Foreign Languages and STEM
June 4, 2013

Overview: This paper provides a rationale to recognize Foreign Languages (FL) as an integral element of the Nation’s STEM efforts. Beyond its role as a skill vital to the 21st century, FL has long been an element of the federal STEM portfolio. The work performed by the $15b US language industry is highly technologized. Finally, US STEM industries depend on the language industry to reach overseas markets worth $1.5 trillion.

Language has long been a STEM research subject: The Federal Government has funded R&D in a wide range of language fields for more than 50 years. These fields include theoretical and applied linguistics, sociolinguistics, the sociology of language, computational linguistics, first and second language acquisition, human language technology, translation and interpreting studies, machine translation, and many more. Funding derives from the NSF, DARPA, IARPA, NIH, OSD, and the IC, among others.

Language is a highly technologized STEM industry: The language industry is inextricably linked with technology, which now forms the core of nearly all work in the language sector. Localization is entirely digital, relying on workflow systems, translation management systems, translation memories, terminology and data mining, complex desktop publishing, content management systems, and machine translation, among other technologies. Translation and localization firms of any significant size have full IT teams to manage the required operating systems, interfaces, networks, and databases. Other language work, such as interpreting and teaching, relies increasingly on the information economy for the delivery of services. Finally, the language industry drives innovative R&D that cut across STEM, the social sciences, and the humanities.

America’s STEM industries depend on the language industry: The work of traditional STEM enterprises is now inevitably global; advances hardly occur in one country or market. Multilingual communication is intrinsic to today’s scientific progress, which means the language industry is fundamental to furthering every aspect of STEM professions and business. STEM companies in numerous sectors depend on the language industry to access more than $1.5 trillion in domestic and overseas markets.

Recommendation: As the U.S. supports and promotes STEM, it is vital that the language enterprise be included in the policy and planning for STEM. Specifically: languages should to be included in STEM educational policy; FL and linguistics research should be highlighted within the STEM accounts; and STEM-related policies on immigration reform, small businesses, and other areas should include FL.
Appendix E

World Languages and Technology

The past decade has seen a revolution in how languages work. Technology is now considered an essential component of every language-related area – learning, translation, interpreting, and more. Machine translation, automated speech recognition, network analytics, and other technologies have been fused with well-known increases in computing power, storage capacity, and bandwidth. Applications unforeseen as little as 10 years ago, in particular in social media and cloud computing, have generated whole new fields of activity for language. Below are some key ways language and technology now intersect.

**Translation and localization** have been completely transformed by technology. Translation work now relies on Translation Memories (TM), Content Management Systems (CMS), Machine Translation (MT), and Translation Management Systems (TMS) to connect and manage globally distributed teams. Today’s technologized translation industry is able to process an unprecedented volume, velocity, and variety of languages with greater consistency and reuse than ever before. Language technology has generated new categories of skills and jobs, and the opportunities for language work are exponentially greater.

**Interpretation**, still largely a face-to-face or in-person service, is increasingly being provided remotely on demand and for scheduled meetings. New forms of remote interpreting are emerging to meet increased demand in different settings. These platforms make use of wireless Internet, VoIP, video and web conferencing and other technologies to expand access while reducing costs associated with traditional service.

**Second Language learning and teaching**: Technology affords many advantages, among which are:
- Access to language instruction at a distance, including remote communities ([Middlebury Interactive](https://www.middlebury.edu/interactive_lang));
- Access to pedagogically appropriate authentic materials in almost any language via the web ([SCOLA](https://www.scola.org))
- Access to native speakers for conversation practice through language learning social media sites ([WeSpeke](https://wespeke.com))
- Tailoring curricula to optimize classroom time and homework ([Transparent Languages](https://www.transparentlanguages.com))

Taken together, learning technology is transforming language education in the US, allowing students to interact with authentic language sources, communicate directly with speakers of other languages, and work individually, with classmates, or with groups in the country of the language being studied. Technology enables flipped classrooms and facilitates teachers’ ability to meet the Common Core standards. Effective use of blended learning technologies has resulted in higher language proficiency outcomes, lower costs, lower attrition, and greater learner motivation at multiple US Government and academic language programs. Technology is also helping to level the playing field for certain students, including the non-traditional student, working students, students with families, and students with disabilities.

**Preservation** of languages of lesser diffusion and endangered languages is now possible because of digital recording technology, web-based access, and the ability to create new character sets. As a result,
some languages have been rescued from the brink of extinction, and more than 1,000 languages are now active and commercially viable online.

ACKNOWLEDGEMENTS: JNCL-NCLIS thanks its members who contributed to this report: the Computer Assisted Language Instruction Consortium, the International Association for Language Learning Technology, the American Council on the Teaching of Foreign Languages, American Councils for International Education, the American Translators Association, Interpret-America, the Defense Language Institute Foundation, the Center for Applied Linguistics, the Center for the Advanced Study of Language, the Linguistic Society of America, the Council of Language Resource Center Directors, Monterey Institute of International Studies, Kent State University Institute of Applied Linguistics, Middlebury Interactive Languages, SCOLA, WeSpeke, Transparent Language, Global Professional Search.