

INGENUITY: A NEW SUPER- SKILL

SKILLS MATTER: A CONVERSATION ABOUT EDUCATION AND NATIONAL PROSPERITY

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The two most powerful words in the 21st Century are “**ABILITY TO**”, The fundamental facility of the skills and competencies systems that are the indispensable currency for participation, achievement and competitiveness in the global economy.

The ingenuity, agility and skills of the American people are crucial to U.S. competitiveness In an economy driven by innovation and knowledge ... in marketplaces engaged in intense competition and constant renewal ... in a world of tremendous opportunities and risks ... in a society facing complex business, political, scientific, technological, health and environmental challenges ... and in diverse workplaces and communities that hinge on collaborative relationships and social networking (*21ST CENTURY SKILLS, The Partnership for 21st Century Skills is a leading advocacy organization focused on infusing 21st century skills into education.*)

INTELLECTUAL CAPITAL AND INGENUITY, THE SUPER-SKILL OF THE 21ST CENTURY

A powerful new voice, A National Strategic Narrative sends us in search of the new 21st Century Skills that are essential to developing the “intellectual Capital” key to maintaining our national prosperity and security.

Published by the Woodrow Wilson Center at Princeton and written by two prominent advisers to the Joint Chiefs of Staff, Captain Wayne Porter of the U.S. Navy and Marine Corps Colonel Mark Mykleby, they state that “*We must recognize **that security means more than defense, “The first priority, should be “intellectual capital” and a sustainable infrastructure of education, health and social services to provide for the continuing development and growth of America’s youth.***”

Rising Returns Of Skills In The 2012 Skills Ecosystem.

Skills development is a prominent topic in today’s national and global education environments prompting a busy dialogue focused on skills development. Just as skills are “flowing in all directions” in today’s economic environment, so too are skills activities “flowing in all directions” from numerous global skills action groups. A mosaic of Skills Development Systems has been developed in the context of the various groups’ focus or culture of skills.

However, the current U.S. educational skills development paradigm has little legitimacy with students, educators or the business establishment.

Emerging skills expectations have overrun the reality of the current skills development paradigm disqualifying the traditional skills delivery systems with its hierarchal ladder of development courses. The test-taking mentality has introduced the dilemma of schools developing “test-takers” rather than “thinkers.” *“For the past decade, the United States has focused nationally on closing achievement gaps between the lowest- and highest-performing students—a legitimate and useful agenda, but one that skirts the competitive demand for advanced skills.”* (21st c. Skills) **The result is a degeneration of skills proficiencies development.**

New emerging Influences are transforming the national skills dialogue. An important rising influence is the author Thomas **Homer-Dixon** who identifies a growing innovative theory referred to as THE INGENUITY GAP, defined as “the space between problems that arise and our ability to solve them.”

HOMER-DIXON WRITES: *“Our economic processes are ultimately entangled with the production and use of ingenuity becoming necessary in today’s world”* (p3) with its problems of unexpected connections and the rising theory that *complex systems exhibit non-linear behavior.* (p 113) Homer-Dixon also links ingenuity to new leadership categories of creating “opinion leaders,” and a “super elite.”

His theory transforms our skills development focus, offering not only a new perspective of *“Skills For The Future- Based On Knowledge For The Future”*, but also providing a platform for the potential of our newly described SUPER- SKILL OF INGENUITY.

Homer-Dixon describes also that other theorists show that in a given economy the flow of ideas leading to useful technologies is a direct result of investment in human capital. (p. 228)

The Exceptionalism Demands Of “Intellectual Capital” Then Require Exceptional Skills. A Super-Skill Such As Ingenuity Contributes To And Helps Shape This Emerging Context.

Homer-Dixon provides the manifesto for defining this new super-skill, which will combat the gap between global problems and solutions. Here, Ingenuity performs as a new basic skill elevated to a super-skill.

-----1. Homer-Dixon citations are represented with page numbers.

Ingenuity Takes Its Place In The Skills Eco-System That Will Generate The Dynamic Chemistry To Be Demonstrated As “Intellectual Capital?”

Practitioners have identified various important skills categories including: (1) National Survival Skills and (2) Advanced Skills

THE NATIONAL SURVIVAL SKILLS And Intellectual Capital: Critical thinking and information literacy, (how to find and use information) stand beside oral and written communication skills as fundamental proficiencies required for academic, professional, and personal success. These lifelong learning abilities overlap and intersect in many areas, including the abilities of our students to be critical consumers of information as well as creators of new knowledge.

ADVANCED SKILLS OF INTELLECTUAL CAPITAL: Developing the tools of effective global engagement will include a different view of today’s student’s skills. Thomas Friedman, in *The World Is Flat, A Brief History of the 21st Century*, characterizes the new learner by his essential skills.

“He must be a Synthesizer, Explainer, Adaptor, Leverager who can figure out how one person can do the job of 20, a Localizer, who can discover local angles to global problems, a Collaborator skilled in networking and participating in teams, a Developer of An Environmentally Sustainable Enterprises.” We add that the learner must be an Integrator, A Relationship Manager, Information Manager, and Task Manager

Friedman also delineates higher level skills as integration, right-brain thinking, synthesis—RE” information: **Sift it, Sort it, and connect it.**” He adds: *“Integration is the new specialty.”*

WHAT IS A SUPER-SKILL?

The term “Super-Skill” does not appear in a Google review of skills terms and theories. Therefore, we can assume it is a new skill identity, joining others in the current skills eco-system. The term “**super-skilled individual**” described in a 2008 report provides some perspective. In this report, three categories of skills are identified as Soft, Scarce, and Super-Skills but the skills are not defined, only that the super-skilled have unique talents and very high productivity.

Only A Few Super-Skilled Individuals Have Super-Skills

“The selection of super-skilled individuals — those with unique talents and very high productivity — is particularly difficult. This paper demonstrates that instead of the simplistic division between low and high skills, future knowledge economies will increasingly have to draw on the global labor market to meet their requirements for super, scarce, and soft skills.”

“Super-Skills are those held by a small number of individuals who disproportionately drive economic activity and international competitiveness. They are becoming critical to economic success in industrialized countries, as creativity and innovation become central to value creation. “ (Collett, Elizabeth and Fabian Zuleeg. 2008. *Soft, Scarce, and Super-Skills: Sourcing the Next Generation of Migrant Workers in Europe*. Washington, DC: Migration Policy Institute)

DEVELOPING THE SUPER- SKILL OF INGENUITY, A PLURALIST SKILL SET, BLENDED WITH-- AND FROM-- OTHER SKILLS.

Homer-Dixon defines ingenuity as consisting of ideas applied to solve society's practical problems (p. 231) Ingenuity then is the skill at working out how to achieve things or the skill to invent new things or ideas. We propose that Ingenuity is a modern skill acting through the filters of other skill categories of creativity, innovation, communications and cognitive problem solving to promote the generation of new ideas and refining or solving idea problems.

THE NEW SUPER-SKILL OF INGENUITY-

Introducing the new super-skill of "Ingenuity" reflects the needs of a contemporary and future investment in skills. Educational concepts will address communication and relationship skills, concentrating on more complex relationships, as they become networks or system. The union of multiple skills reflected in the pluralist" super- skill generates a dynamic chemistry of connectedness relevant for the interdisciplinary nature required for today's problem solving.

As Ingenuity theory reflects an interdisciplinary nature of problem solving, ingenuity theory integrates with other contemporary theories to describe the growing complexity of society and its emerging new problems:

1. INFORMATION THEORY is touched upon, relating the amount of information required to describe a SYSTEM and the degree of the system's problem solving complexity.
2. CHAOS THEORY is used to describe how small changes can lead to widely varying results and path dependence.
3. GENERAL EQUILIBRIUM THEORY—the core idea of modern economics, which is that "everything is at least potentially connected to everything."

WHAT GIVES INGENUITY LEGITIMACY AS A SUPER-SKILL?

An ability to adapt and problem solve in today's global arena is consequential in 2012 when the U.S.'s Global Competitiveness Keeps Declining (L.A. Times, Sept 7, 2012) Homer-Dixon tells us there are growing disparities between those with the skills to "who adapt well and those who don't." (p1)

The relevance of the skill of Ingenuity is significant. *Ingenuity Skills and Success* are allied in the 21st Century environment, as **this modern skill of Ingenuity is a key to social well- being and economic prosperity. (P. 21)**

Skills Formation Model For Ingenuity: A Pluralist Skill, Blended With Other Skills

Developing Ingenuity Is an active skill process that reflects the properties and principles of several theories of psychology and communications, which provide a conceptual framework for developing the skill of ingenuity.

(1) Ingenuity theory reflects the interdisciplinary nature of problem solving as ingenuity development integrates with other contemporary learning-teaching theories to establish a presence in the learning-teaching network of behaviors.

(2) Ingenuity is not part of a skills sequence or hierarchy of skills as in Bloom's Taxonomy of skills. Ingenuity is unique in that it is a pluralist skill, blended with and from other skills. Newer terminology often replaces the generic term "skills" with broader terms such as: "abilities required", "acquired capabilities.

Ingenuity Has A Higher And Wider Application As A Fusion Of Creative, Cognitive, and Critical Thinking and Communication Skills

- Ingenuity derives its energy from theories of communication and creativity, acting as Inventive skills or Imaginative and clever design of new ideas.
- Synonyms for ingenuity include *inventiveness, resourcefulness, shrewdness, cooperative processes* resulting in the production of new ideas.
- Ingenuity uses the behavior of *"Working Creatively"* with others and blends working creatively with cognitive skills of developing, implementing and communicating new ideas to others effectively while demonstrating original and inventive problem solving.

"Recent research suggests that creativity is not simply a product of personality or individual psychology, but rather is rooted in **a set of teachable competencies**, which include idea generation, improvisation, metaphorical and analogical reasoning, divergent thinking that explores many possible solutions, counterfactual reasoning, and synthesis of competing solutions. Creativity also requires an ability to communicate and persuade, and the skills and leadership to apply diverse and specialized expertise. (*"The Creative Campus: Time for a 'C' Change for the Chronicle Of Higher Education, October 10, 2010"*)

- *Cognitive development principles represent behaviors related to idea development as reflected in the abilities to use metaphors and analogies, which can take into account various points of views, blend with creativity to produce new idea generation. "Metaphors open windows to new ways of seeing ourselves and our situations", Homer-Benton describes that we have an important capacity for metaphor: to see patterns and similarities among vastly different things and to allow ideas to flow across the porous boundaries of the specialized. (p. 202)*

INVESTING IN A NEW EDUCATIONAL PARADIGM FEATURING THE NEW SUPER-SKILL OF INGENUITY

A NEW TYPE OF SKILL COMMUNITY: CREATE IT: DESCRIBE IT; SHOW HOW IT WORKS.

Ten Questions For An Educational Paradigm Dedicated To Developing The Super-Skill Of “Ingenuity.”

1. Q: WHAT IS THE INGENUITY GAP AND HOW CAN EDUCATION CLOSE IT?

R: “ **The gap is the space between problems that arise and our ability to solve them.**”

(Homer-Dixon)

2 Q: HOW MUCH AND WHAT KINDS OF INGENUITY WILL BE REQUIRED? R: “**Social and technical ingenuity.**” (Homer-Dixon) Strategies and techniques for developing social and technical ingenuity include: (from *Promoting Active Learning, Meyers and Jones, 1993*)

- *Small group problem solving* **Cooperative Student projects* * *Simulation problem solving exercises* * *Case studies problems and solutions.*

3. Q: HOW IS INGENUITY A “PLURALISTIC SKILL?”

R: The number and variety of skills categories contributing to the development of INGENUITY, A SUPER-SKILL, create a large context of aptitudes, proficiencies and sub-skills, which will drive the skills formation process.

WHAT ARE THE CATEGORIES OF INGENUITY SKILLING? R. *Some* subskills include among others: *talking and listening, reading, writing, reflecting and a key cognitive skill of question asking.*

4. Q: WHAT INCENTIVES WILL PRODUCE NEW KNOWLEDGE AS THE CORE OBJECTIVE OF THE SKILLS OF INGENUITY?

R:

*Self-initiated learning * Active approaches to learning *Group interaction, classroom which stresses human relationships *Build capacity for self-idea exploration.

5. Q: HOW TO MEASURE INGENUITY?

R: According to Homer-Dixon:

- Measure of energy reflected in problem solving.
- Measure of the intensity and pace of the interactive speed of decision making (p 119)
- Measure the amount of information communicated in a message can be measured. (p115)
- Measure the use of rudimentary measure of complexity such as: information content, length of its grammar, mathematical tractability. (p115)
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6. WHAT ASSESSMENT PRINCIPLES WILL GUIDE SKILLS MEASUREMENT?

Homer Dixon: Emphasis on the collective action problem solving (p.202)

1. Key issues= involvement of student in his own assessment process.
2. Resumes will emphasize what can do, rather than what have done.
3. Documentation of learning tasks guides assessment.
4. Critical thinking skills and basic skills are different. Critical thinking, problem solving exist at each level of development. Key outcomes include **Aptitudes versus proficiencies.**
5. Student Focused Model
 - Ability to solve problems
 - Ability to understand and define problems.
 - List kinds of capabilities.

Recording substantive content of what is learned, rather than relative levels of accomplishment (*FROM NATIONAL THINK TANK ON OUTCOMES ASSESSMENT, MIAMI, FLORIDA, 1992*)

9. WHAT ASSESSMENT TOOLS ARE NEEDED?

R: Assessment tools should simulate the types of situations students actually will face on the job, such as coaching others and handling conflict.

Tools available from which to build an assessment program include:

- Peer Interaction
- Internal/External Customer Interaction
- Team Member (Coaching) Interaction
- Internal Partners (Managing Conflict) Interaction
- In-Basket Exercise
- Planning Exercise
- Group Discussion Exercise

10. HOW CAN WE INSTITUTIONALIZE THE DEVELOPMENT OF INGENUITY AS A SUPER-SKILL?

R: **CLASSROOM LEARNING FOR BLENDING SKILL DEVELOPMENT.**

The learning focuses on processes and practices of relevant sub-skills or proficiencies and behaviors such as the following that are blended in the Ingenuity Super-skill. These skills, comprehensively articulated by the partnership for 21st Century Skills.)

- Thinking critically and making judgments.
- Creativity a skill set highly associated with job success--the ability to think unconventionally, question the herd, imagine new scenarios and produce relevant work.
- Entrepreneurial thinking— the ability to recognize and act on opportunities and the willingness to embrace risk and responsibility,
- Collaboration, involves groups of people with different knowledge and skills who, collectively, add value to their organizations.
- Communicating and collaborating with teams of people across cultural, geographic and language boundaries—a necessity in diverse and multinational workplaces and communities. All Americans must be skilled at interacting competently and respectfully with others.
- Innovation: capable of creating new services, processes and products.

CONCLUSION: " IF SKILLS COULD TALK"

At the center of today's world is the need to be skilled. Skilled is the most prevalent term used as a synonym for *successful* or *elite*. A convergence of national needs and educational responses lend plausibility to the rise of a new Super-Skill such as Ingenuity, which is compatible with success in today's global arena.

Developing The Super-Skill of ingenuity Requires A New Paradigm For Skills Development Models

The core principle of this new paradigm recognizes that skills development is a dynamic process with new skills being identified. For example, *problem solving* rises to become *The Art of Problem Solving*. A new, emerging skill is **QUANTATIVE RIGOR**, an information predictive skill, uncovering trends in data that have not been available before, which describes how strategists are able to forecast War's future activities. (*L.A. Times, Forecasting War's Future, July 18, 2012*)

IF SKILLS COULD TALK

NOT EVEN THE BASICS: Fundamental is the separation between today's emphasis on the "basic skills" with its high cost of low student performance, a model whose time has come and gone, and tomorrow's emphasis on new essential skills.

New Essential Skills

A survey of national employers describes the new essential skills. While the three "R's" are still fundamental to every employee's ability to do the job, applied skills such as teamwork, critical thinking, and communication are essential for success at work. In fact, at all educational levels, these applied skills trump basic knowledge skills such as reading and mathematics in importance in the view of employers. In order to succeed in the workplace of the 21st Century, high school and college graduates need to master basic academic skills as well as a complement of applied skills. (*Buerlin, M. Chronicle of Higher Education, 2010, Employers Want 18th Century Skills*)

Today's skills development model has been trapped in a framework resulting in a high cost of low student performance. A new emphasis shifts the emphasis from student deficiencies to Skills Formation Systems with their emphasis on "Upskilling", a more relevant goal for Skills Formation Systems in preparing American students to participate successfully in a 21st Century environment where 2012 *Skills Formation Systems need to be dynamic to reflect new knowledge.*

A New Rhetoric of Skills Development Relies On New Theories Of Non-Linearity

Homer-Dixon describes that “complex systems exhibit non-linear behaviors essential to generating and implementing the right kinds of ideas with its problems of “unexpected consequences.”

A new rhetoric of Super- Skills Development discards the historical identity of skills as developed in a linear hierarchal progression from basic to advanced and instead now utilizes the characteristics of today’s powerful non-linear theoretical influences reflected in the identify of Ingenuity as a pluralistic, blended skill built on a fusion of aptitudes, proficiencies and abilities.

Conclusion: A New Conversation About Education and Skills Development and National Prosperity

This report titled INGENUITY-A NEW SUPER-SKILL, is based on THE INGENUITY GAP, the influential book by Thomas Homer-Dixon, which offers another powerful voice on 21st Century Issues. We expand on Homer-Dixon’s thesis that “Our Economic Processes Are Ultimately Entangled With The Use and Production Of Ingenuity’ by proposing that Ingenuity offers a new skill identity, as a Super-Skill, key to success and economic prosperity in today’s environment.

We repeat this key principle that “At the center of today’s world is the need to be skilled. Skilled is the most prevalent term used as a synonym for *successful* or *elite*. A convergence of national needs and educational responses lend plausibility to the rise of a new Super-Skill such as Ingenuity, which is compatible with success in today’s global arena. “

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