

Career Clusters™ and the Revision of the Knowledge and Skills

June 2012

Washington, DC

Objectives

- Context of Career Clusters
- Revision Process
- Transition to the Common Career Technical Core

What are Career Clusters?

- Career Clusters are groupings of occupations and industries.
- These groupings are used as an organizing tool for curriculum design.
- Used for Career Counseling and Guidance.

How Were Clusters Developed?

- First started in 1970
 - Education Focused
- Later revisited in 1994 as part of School to Work Act
 - Industry Sector Focused
- USDE Linkages project from US Department of Education in 1996
- 2002 State's Career Cluster Initiative



**The Personal and
Business
Services Cluster**



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**The Government
Services
Cluster**



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**The
Transportation
Cluster**



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**The
Manufacturing
Cluster**



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**The
Communication
Cluster**



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**The
Education
Cluster**



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*The Arts,
Culture
And Religion Cluster*



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**The
Agriculture
Cluster**

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The Finance Cluster

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The Natural Resources Cluster



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THE ENERGY CLUSTER

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The Retailing and Wholesaling Cluster



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The Insurance Cluster

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The Hospitality Cluster

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The Health Care Cluster

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Career Clusters 2.0

- Began in the mid 1990's with grants from the U.S. Department of Education
- Career Clusters were organized by common knowledge and skills in occupations

Career Cluster Title	Lead State/Organization
Health Science	Utah
Manufacturing	Indiana
Information Technology	EDC
Transportation, Distribution & Logistics	Illinois
Arts, Audio-Video Technology & Communications	VTECS

Career Cluster Title	Lead State
Agriculture, Food and Natural Resources	Idaho & Iowa
Architecture and Construction	Pennsylvania
Marketing, Sales and Service	Ohio
Finance	North Dakota
Hospitality and Tourism	West Virginia
Business, Management and Administration	South Carolina
Human Services	Kentucky
Law, Public Safety and Security	Arkansas
Science, Technology, Engineering and Mathematics	North Carolina
Education and Training	Michigan
Government and Public Administration	Oklahoma & DC

Clusters Management

- National Advisory Committees
 - Business and Industry
 - Labor
 - Government
 - Education (secondary and postsecondary)



Career Clusters 2.1 - Programs of Study


SAMPLE

Agriculture, Food and Natural Resources: Agribusiness Systems
Career Pathway Plan of Study for ▶ Learners ▶ Parents ▶ Counselors ▶ Teachers/Faculty

*This Career Pathway Plan of Study (based on the Agribusiness Systems Pathway of the Agriculture, Food and Natural Resources Career Cluster) can serve as a guide, along with other career planning materials, as learners continue on a career path. Courses listed within this plan are only recommended coursework and should be individualized to meet each learner's educational and career goals. *This Plan of Study, used for learners at an educational institution, should be customized with course titles and appropriate high school graduation requirements as well as college entrance requirements.*

EDUCATION LEVELS	GRADE	English/ Language Arts	Math	Science	Social Studies/ Sciences	Other Required Courses/ Other Electives/ Recommended Learner Activities	*Career and Technical Courses and/or Degree Major Courses for Agribusiness Systems Pathway	SAMPLE Occupations Relating to This Pathway
<i>Interest Inventory Administered and Plan of Study Initiated for all Learners</i>								
SECONDARY	9	English/ Language Arts I	Algebra I	Earth or Environmental Science	State History Civics	All plans of study should meet local and state high school graduation requirements and college entrance requirements. Supervised Agricultural Experience (SAE) and participation in appropriate FFA activities support and reinforce classroom and laboratory learning and should be a requirement for all students.	- Introduction to Agriculture, Food and Natural Resources	Occupations Requiring Postsecondary Education ▶ Agricultural Chemical Dealer ▶ Agricultural Products Buyer-Distributor ▶ Bank/Loan Office ▶ Dairy Herd Supervisor ▶ Entrepreneur ▶ Farm Manager ▶ Farmer-Rancher/Feedlot Operator ▶ Feed/Supply Store Manager ▶ Field Representatives for Bank, Insurance Company or Government Program ▶ Livestock Manager ▶ Sales Manager ▶ Salesperson
	10	English/ Language Arts II	Geometry	Biology	U.S. History		- Introduction to Agricultural Marketing, Business and Entrepreneurship - Accounting	
	11	English/ Language Arts III	Algebra II or other math course	Chemistry or other science course	World History		- Agricultural Business Management	
<i>College Placement Assessments-Academic Career Advice Provided</i>								
	12	English/ Language Arts IV	Statistics or other math course			- Agricultural Economics - Internship in Agribusiness		
<i>Articulation/Dual Credit Transcribed-Postsecondary courses may be taken/moved to the secondary level for articulation/dual credit purposes.</i>								
POSTSECONDARY	Year 13	English Composition	Algebra	Chemistry	American Government	All plans of study need to meet learners' career goals with regard to required degrees, licenses, certifications or journey worker status. Certain local student organization activities may also be important to include.	- Introduction to Agribusiness - Principles of Agribusiness - Agricultural Economics	Occupations Requiring Baccalaureate Degree ▶ Agricultural Commodity Broker ▶ Agricultural Economist ▶ Agricultural Educator ▶ Agricultural Lender ▶ Banker/Loan Officer ▶ Farm Investment Manager ▶ Produce Commission Manager
	Year 14	Speech/ Oral Communication		Biological Science or Botany	American History Geography		- Agricultural Salesmanship - Agricultural Finance - Agricultural Advertising/Merchandising	
	Year 15	Technical Writing	Statistics		Psychology		- Continue Courses in the Area of Specialization	
	Year 16	Continue courses in the area of specialization.					- Complete Agribusiness Systems Major (4-Year Degree Program)	

SAMPLE



- State to develop or approve programs of study.
- All locals must implement a minimum of one program of study.

Why Career Clusters?

- ★ A Vehicle for Educational Reform
- ★ Career Clusters are supported by Carl D. Perkins federal legislation
- ★ Instructional + Guidance Model
- ★ Tool/Framework for Seamless Transition
- ★ Available to All States

How do Career Clusters programs of study support the goals of Perkins?



Dictionary

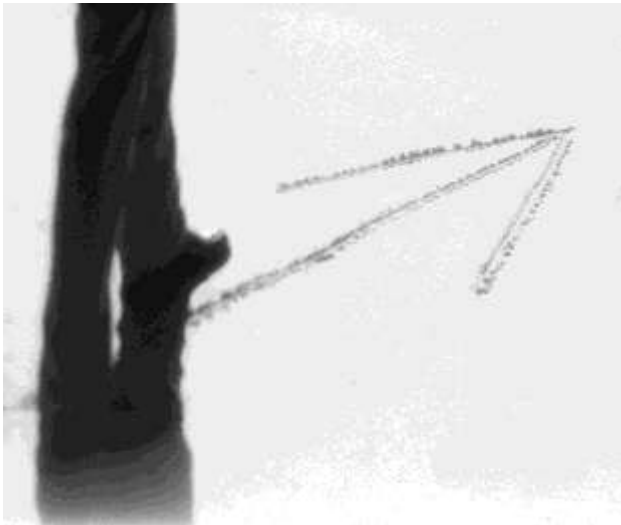
- Are programs of study different than career clusters and career pathways?
 - **Career cluster** – organizer of knowledge and skills needed by a broad industry
 - **Career pathway** – organizer of knowledge and skills statements shared by professions
 - **Program of study** – sequence of instruction that prepares individuals for careers

Alignment of Perkins IV & Programs of Study

- What is a program of study?
 - Incorporate and align **secondary** and **postsecondary** education
 - Include **academic & CTE** content in a coordinated, non-duplicative progression of courses
 - **May** include the opportunity for secondary students to acquire postsecondary credits
 - **Lead to** an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree

Programs of Study Support Perkins' Goals

- Programs of study:
 - A way to transition from VocEd to CTE
 - Can enhance secondary and postsecondary collaboration
 - Link (or lead) to articulation agreements
 - Link (or lead) to high skill, high wage, and high demand occupations



What Career Clusters DO

- ✓ Provide a framework to integrate programs
- ✓ Provide a framework for seamless education
- ✓ Provide MORE career options for learners
- ✓ Provide a framework for addressing the entire world of work
- ✓ Provide a picture of how Knowledge and Skills transfer vertically and horizontally

What Career Clusters

DON'T Do:

- ✓ Do not add yet “another thing”
- ✓ Do not take away current programs
- ✓ Do not limit states in determining course offerings.
- ✓ Do not take away occupational areas
- ✓ Do not track learners into a single job

Implementation

State Implementation

- Multiple Methodologies and Approaches

Marketing

- Marketing Communications
- Marketing Management
- Marketing Research
- Merchandising
- Professional Selling

4

Business Management and Administration

- Administrative Services
- Business Information Management
- Operations Management
- Human Resources Management
- Management

Hospitality and Tourism

- Lodging
- Recreation, Amusements, and Attractions
- Restaurants and Food and Beverage Services
- Travel and Tourism

Law, Public Safety, Corrections, and Security

- Correction Services
- Emergency and Fire Management Services
- Law Enforcement Services
- Legal Services
- Security and Protective Services

Government and Public Administration

- Foreign Service
- Governance
- National Security
- Planning
- Public Management and Administration
- Regulation
- Revenue and Taxation

Finance

- Accounting
- Banking Services
- Business Finance
- Securities and Investments
- Insurance

Human Services

- Consumer Services
- Counseling and Mental Health Services
- Early Childhood Development and Services
- Family and Community Services
- Personal Care Services

Education and Training

- Administration and Administrative Support
- Professional Support Services
- Teaching/Training

Agriculture, Food, and Natural Resources

- Agribusiness Systems
- Animal Systems
- Environmental Service Systems
- Food Products and Processing Systems
- Natural Resources Systems
- Plant Systems
- Power, Structural, and Technical Systems

Arts, A/V Technology, and Communications

- Audio/Video Technology and Film
- Journalism and Broadcasting
- Performing Arts
- Printing Technology
- Telecommunications
- Visual Arts

Information Technology

- Information Support and Services
- Network Systems
- Programming and Software Development
- Web and Digital Communications



Transportation, Distribution, and Logistics

- Facility and Mobile Equipment Maintenance
- Health, Safety and Environmental Management
- Logistics Planning and Management Services
- Sales and Services
- Transportation Operations
- Transportation/Systems Infrastructure Planning, Management, and Regulations
- Warehousing and Distribution Center Operations

Architecture and Construction

- Construction
- Design and Pre-construction
- Maintenance and Operations

Manufacturing

- Health, Safety and Environmental Assurance
- Logistics and Inventory Control
- Manufacturing Production Process Development
- Maintenance, Installation, and Repair
- Production
- Quality Assurance

Science, Technology, Engineering, and Mathematics

- Engineering and Technology
- Science and Math

College and Career Readiness

- Academic/Technical Foundation
- Communication
- Critical Thinking and Problem Solving
- Creativity and Innovation
- Global, Social, and Cultural
- Intellectual Curiosity and Innovation
- Interpersonal and Intrapersonal
- Teamwork and Leadership
- Technology
- Work Environment
- Work Ethic & Responsibility

Human Services and Education

Entrepreneurship • Employment

Health Sciences

- Biotechnology Research and Development
- Diagnostic Services
- Health Informatics
- Supportive Services
- Therapeutic Services

Skilled and Technical Sciences

Entrepreneurship • Employment

Business, Marketing, and Management

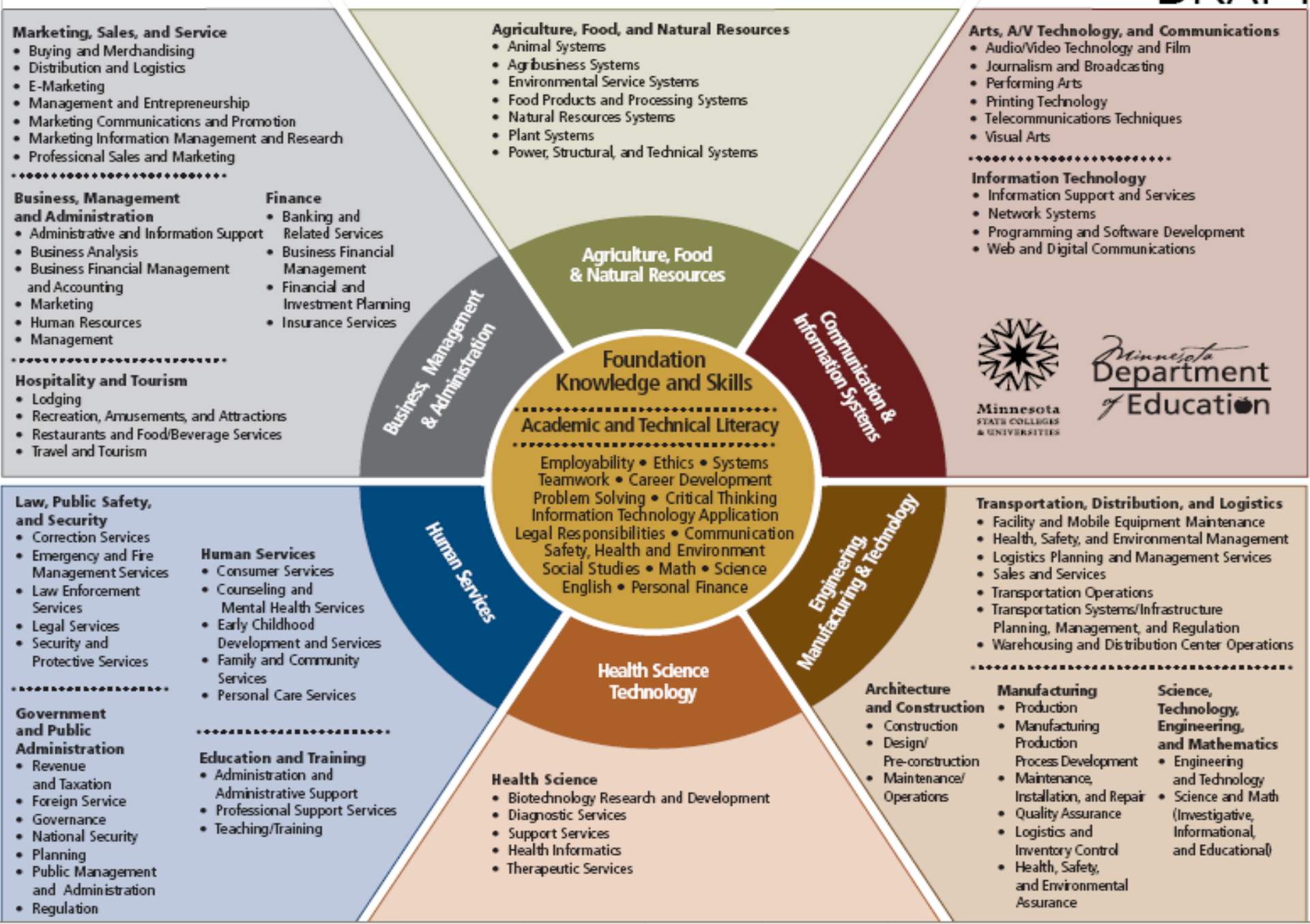
Entrepreneurship • Employment

Agriculture, Food, and Natural Resources

Entrepreneurship • Employment

Communication and Information Systems

Entrepreneurship • Employment



Foundation Knowledge and Skills

Academic • Communications
 Problem Solving • Information Technology
 Systems • Safety, Health and Environment
 Teamwork • Ethics
 Employability and Career Development
 Technical Skills

Idaho's Super Cluster Structure

around the States' 16 Career Clusters



- Video Systems Technician
- Web Page Designer
- Actor
- Composer
- Textile Designer

Arts and Communications

Arts and Communications

Agriculture and Natural Resources

- Food Scientist
- Bioinformatics Specialist
- Veterinarian
- Cartographer
- Water Quality Manager

Agriculture and Natural Resources

Engineering and Industrial Systems

- Health Educator
- Geneticist
- Risk Manager
- Physician
- Dietician

Agriculture and Natural Resources | Engineering and Industrial Systems | Health Sciences

Health Sciences

Health Sciences

Business and Management

- Accountant
- Market Researcher
- Entrepreneur
- Personal Financial Advisor
- Executive Chef

- Analytical Chemist
- Facilities Manager
- Air Traffic Controller
- Construction Engineer
- Communications Analyst

Business and Management | Engineering and Industrial Systems | Health Sciences

Human Resources

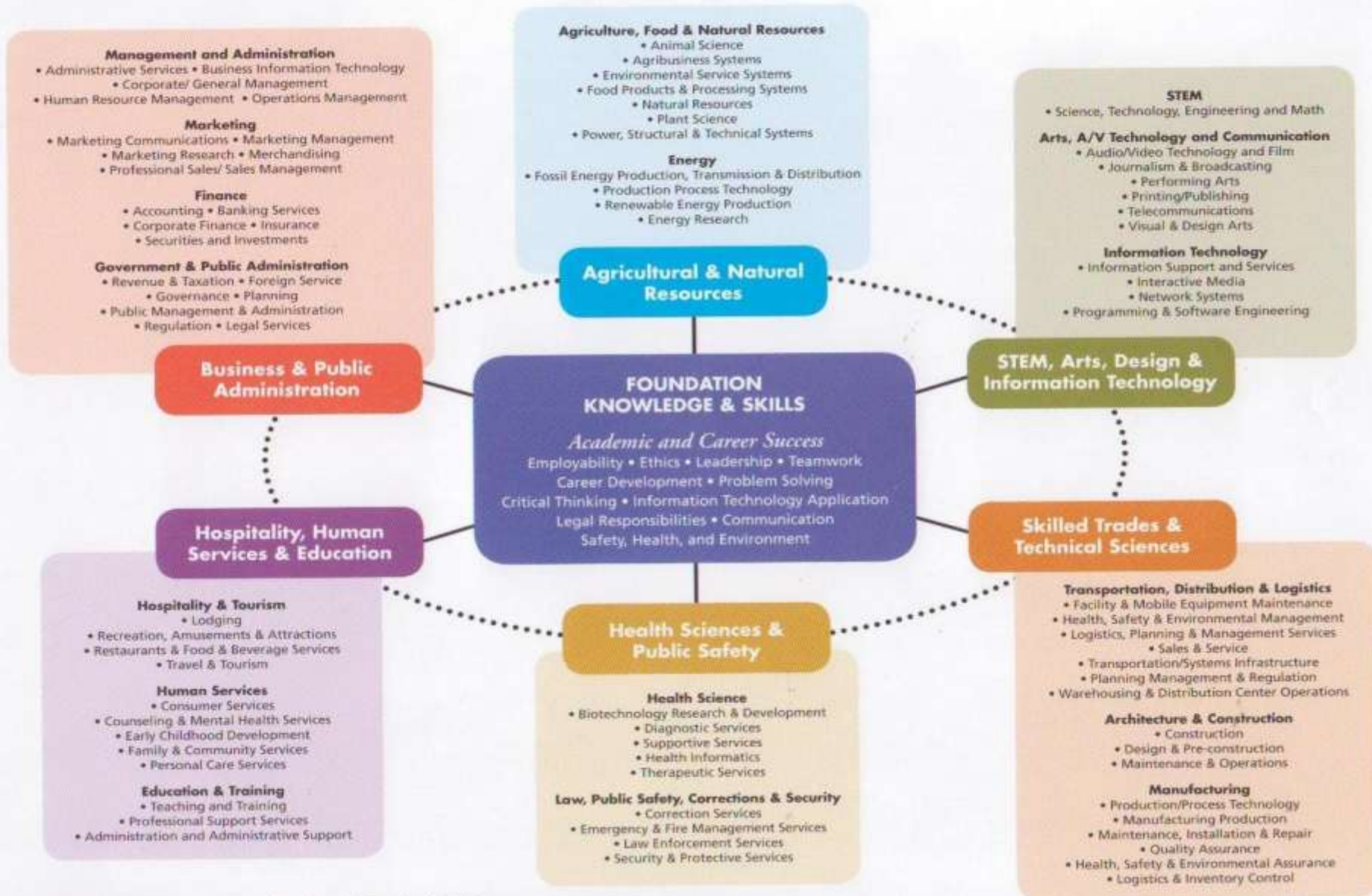
- Teacher
- Career Counselor
- Childcare Director
- Massage Therapist
- Lobbyist

Business and Management | Engineering and Industrial Systems | Health Sciences | Human Resources

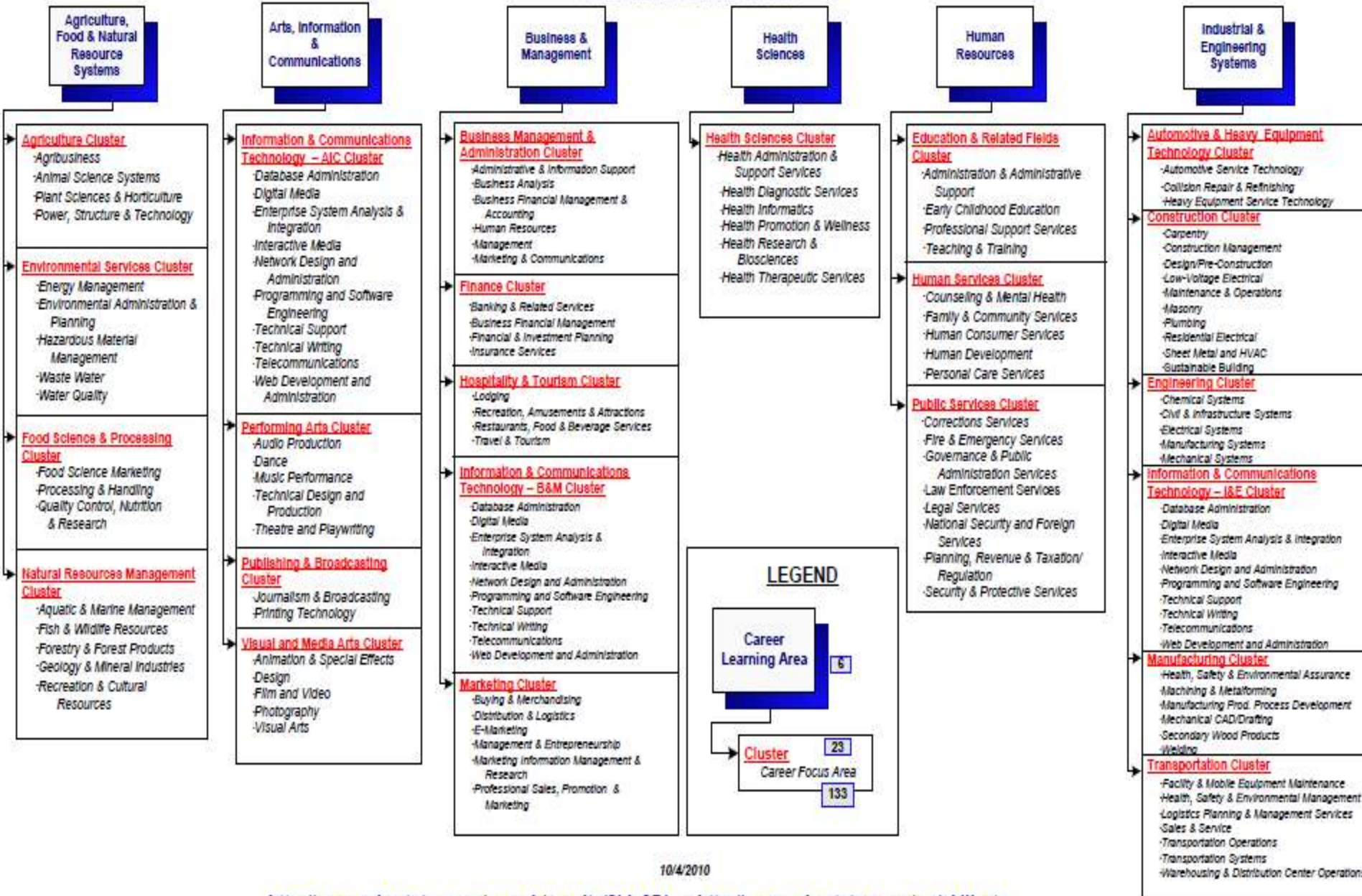
Colorado Career Cluster Model



COLORADO COMMUNITY
COLLEGE SYSTEM



SIX CAREER LEARNING AREAS





Career Clusters™ Knowledge and Skills

NASDTEC's CTE Vision

**Reflect,
Transform,
Lead:**

A New Vision for Career Technical Education

Career Clusters™ and Programs of Study



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	Year 16	Continue courses in the area of specialization.						

- States develop or approve programs of study.
- Recipients must implement a minimum of one program of study for federal funding.

GLOBAL COMPETITIVENESS SUCCESS CAREER READINESS LEADERSHIP EARNING SKILLS OPPORTUNITY LEADERSHIP CHANGE COLLEGE ECONOMIC ENTREPRENEURSHIP LEADING COLLEGE MAKING DIFFERENT CAR READ HIGH OPPORTUNITY ECONOMIC TRAN EXPERIENCE



1999

Career
Clusters
model
adopted



2002

First full
set of
K & S
complete



2006

First
content
review &
revision of
K & S



2008

Revision of
K & S for
presentation
consistency



2011

Begin
another
content
review &
revision of
K & S

Career Clusters™ Knowledge and Skills Revision Process

Spring 2011

Spring 2011

Early 2012

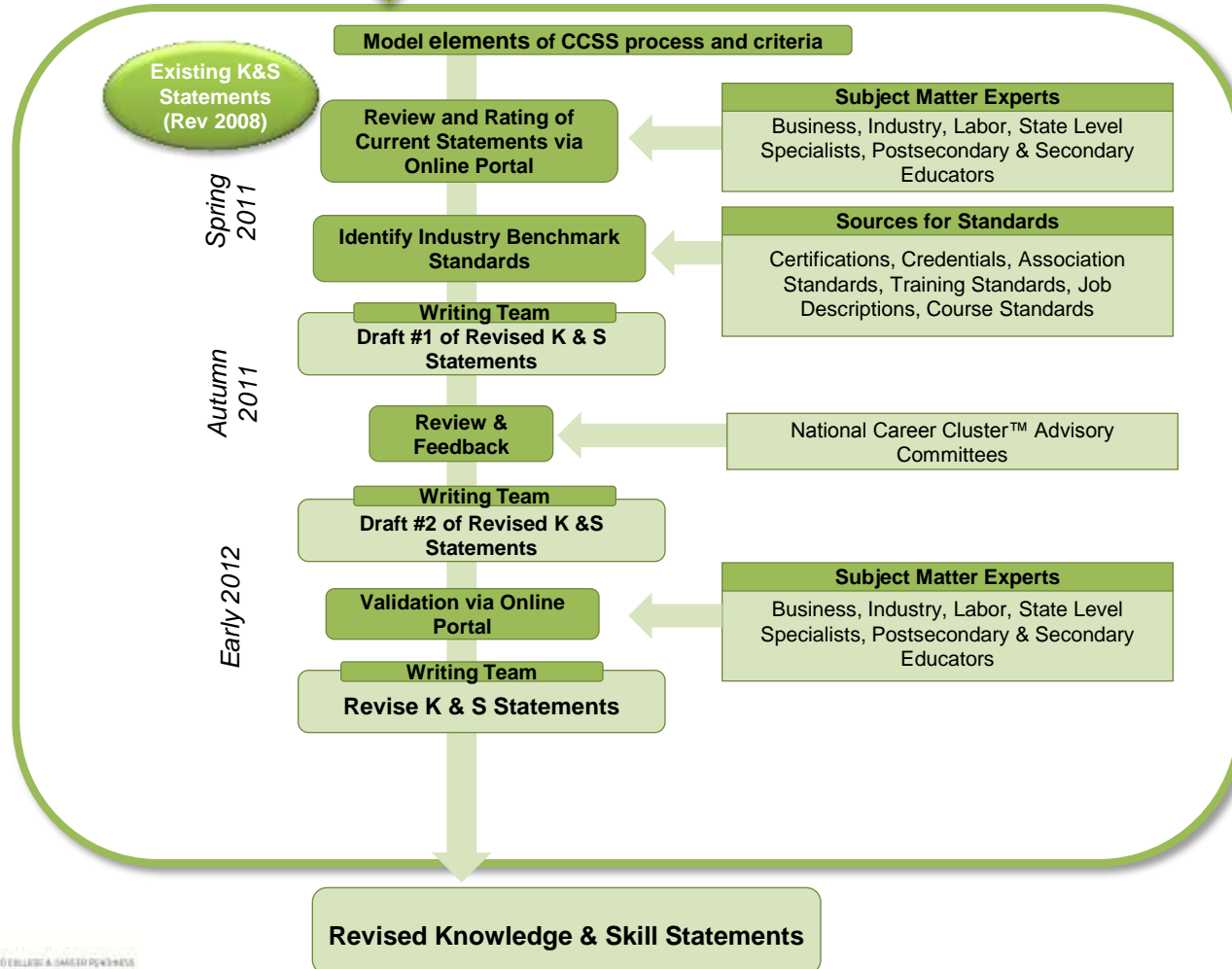
Summer 2012

Ongoing

Knowledge and Skill Statements Revisions

Common Career Technical Core (CCTC) Standards

Adoption by States



Statements Revision



PATHWAYS TO COLLEGE & CAREER READINESS

Career ClustersTM

Basics of K & S Revision Process

- Engaged SMEs (Spring 2011)
 - Online review & rating
 - Identified benchmark standards
- Writing Team (Fall 2011)
 - Analyze input, propose revisions

GLOBAL
COMPETITIVENESS
SUCCESS
CAREER
READINESS
LEADERSHIP
EARNING
SKILLS
SUSTAINABLE
WORKFORCE
OPPORTUNITY
LEARNING
COLLEGE &
ECONOMIC
ENTREPRENEURSHIP
LEADING
MAKING
DIFFERENTIAL
CAREER
READINESS
HIGH-
OPPORTUNITY
STUDENT
SUCCESS
ECONOMY
TRANSPARENCY
EXPERIENCE

Basics of K & S Revision Process

- Conducted online industry validation (January 2012)
- Overall Engagement
 - 1748 Review and Responses
 - 45% Business and Industry
 - 17 % State Curriculum Experts
 - 16% Postsecondary
- Baseline for CCTC (March 2012)

Components of Change Process

Standards for Career Ready Practice

- **12 practices with suggested indicators**
- **Positioned to be applied across the entire continuum of instruction**
- **Modeled after Common Core Standards for Math Practices**

Technical Standards

- Expectations within Career Cluster™ and Pathways that frame a Program of Study
- Based on Validated Knowledge and Skills Statements
- Used to align expectations across states

PATHWAYS TO COLLEGE & CAREER READINESS

Example Career Ready Practices

- Plan education and career path aligned to personal goals
- Communicate clearly and effectively and with reason
- Act as a responsible and contributing citizen and employee

GLOBAL
COMPETITIVENESS
SUCCESS
CAREER
READINESS
LEADERSHIP
EARNING
SKILLS
WORKFORCE
TUNITY
CHANGE
LEARNING
COLLEGE
ECONOMIC
ENTREPRENEURSHIP
LEADING
MAKING
DIFFERENTIAL
CAR
READ
HIGH-
OPPOR
STUDENT
SUCCESS
ENTREPRENEURSHIP
ECONOMY
TRAN
EXPE

Mathematics » Introduction » Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily

Components of Change

Standards for Career Ready Practice

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- Modeled after Common Core Standards for Math Practices

Common Technical Standards

- **Expectations within Career Cluster™ and Pathways that frame a Program of Study**
- **Based on Validated Knowledge and Skills Statements**
- **Used to align expectations across states**

PATHWAYS TO COLLEGE & CAREER READINESS

What About Assessment?

- Learn from and connect to consortium
 - PARCC
 - Smarter Balanced
- CCTC provides opportunity for alignment to existing assessments
 - Certificates / Credentials
 - Technical Skill Assessments
 - State or Curriculum Assessments

Collective intelligence emerges when a group of people work together effectively. Collective intelligence can be additive (each adds his or her part which together form the whole) or it can be synergetic, where the whole is greater than the sum of its parts.

Trudy and Peter Johnson-Lenz

"Groupware: Orchestrating the Emergence of Collective Intelligence" (c. 1980)



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CTE[™]

Setting a New Standard

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Dean Folkers

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