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Improving Alignment Between Postsecondary and Secondary Education: *The Texas College and Career Readiness Initiative*

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AERA Symposium, Denver, Colorado ***April 30, 2010***

Symposium Focus

Primary topics covered in the Symposium:

- Texas as an example of a comprehensive approach to aligning secondary and postsecondary systems
- The major activities of the Texas College and Career Readiness Initiative (TCCRI)
- The research conducted on the TCCRI by EPIC
- Findings from the research
- Example materials being developed to facilitate alignment
- Policy lessons for other states

Who is the Texas Higher Education Coordinating Board (THECB)?

Created by the Texas Legislature in 1965 to:

- Promote quality education across the state
- Develop roles and missions of public institutions of higher education (IHEs)
- Encourage and develop technical and vocational education programs
- Develop and promulgate a basic core of general academic courses
- Advocate for IHEs and their students

Who is the Educational Policy Improvement Center (EPIC)?

- **Nonprofit research center** founded in 2002 by Dr. David T. Conley, CEO, and Principal Investigator
- **Mission:** to help policymakers and educators use educational policy to improve schooling and student learning
- **Area of expertise:** improving college and career readiness, particularly for first generation college attenders
- **Research areas:** College readiness definition and standards, high school-to-college alignment tools and strategies, course document analysis, large-scale assessment models, and other policy initiatives designed to improve secondary-postsecondary alignment.

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What is College and Career Readiness?

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Definition of College and Career Readiness

- **The level of preparation a student needs in order to enroll and succeed—without remediation—in credit-bearing general education courses**
- **"Succeed" is defined as completing entry-level courses at a level of understanding and proficiency sufficient to:**
  - Succeed in a sequent course in the subject area
  - Apply course knowledge to another subject area

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The Four Dimensions

Key Cognitive Strategies

- Problem formulation, research, interpretation, communication, precision and accuracy.

Key Content Knowledge

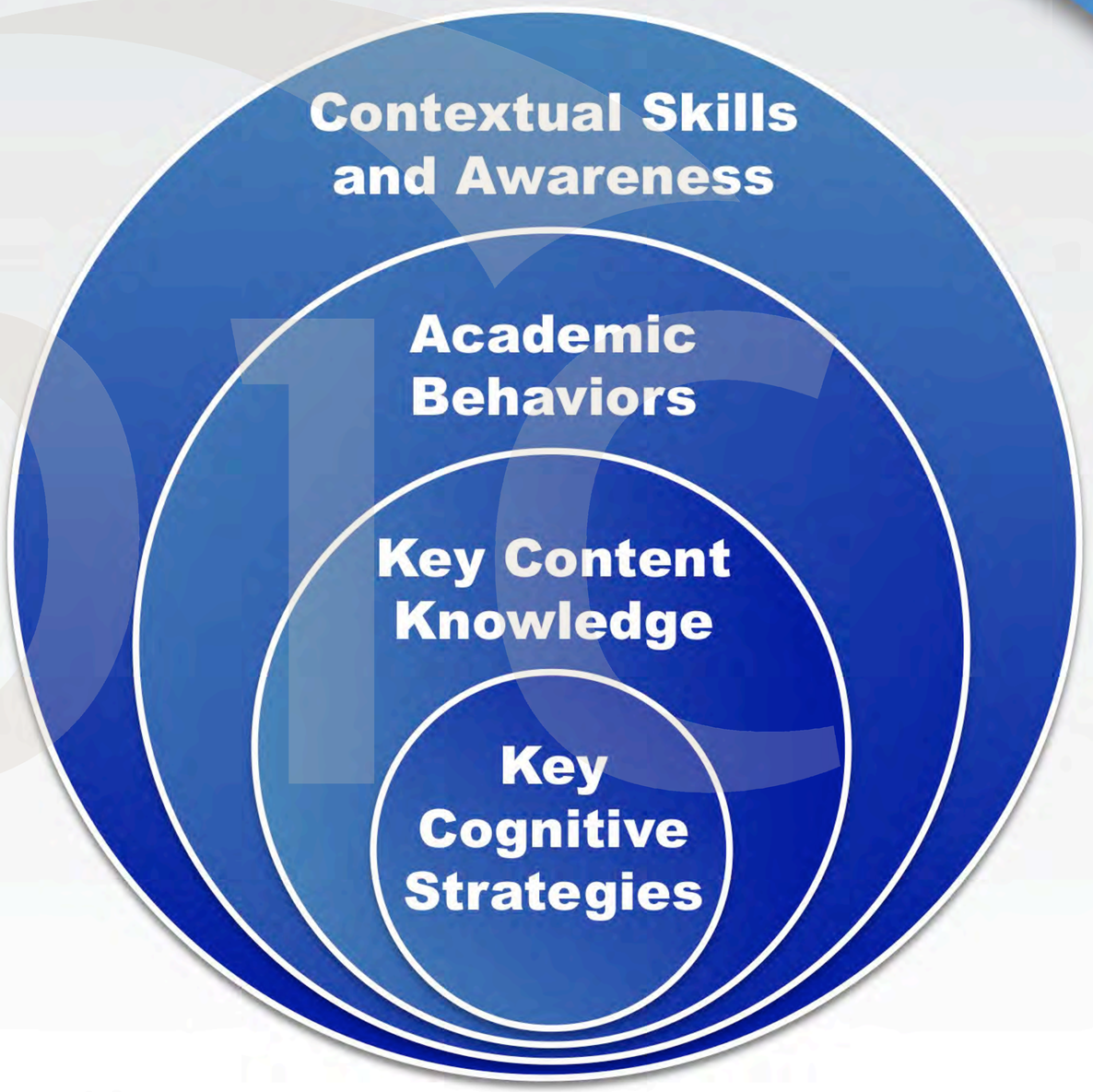
- Key foundational content and "big ideas" from core subjects.

Academic Behaviors

- Self-management skills: time management, study skills, goal setting, self-awareness, and persistence.

Contextual Skills and Awareness

- Admissions requirements, college types and missions, affording college, college culture, and relations with professors.



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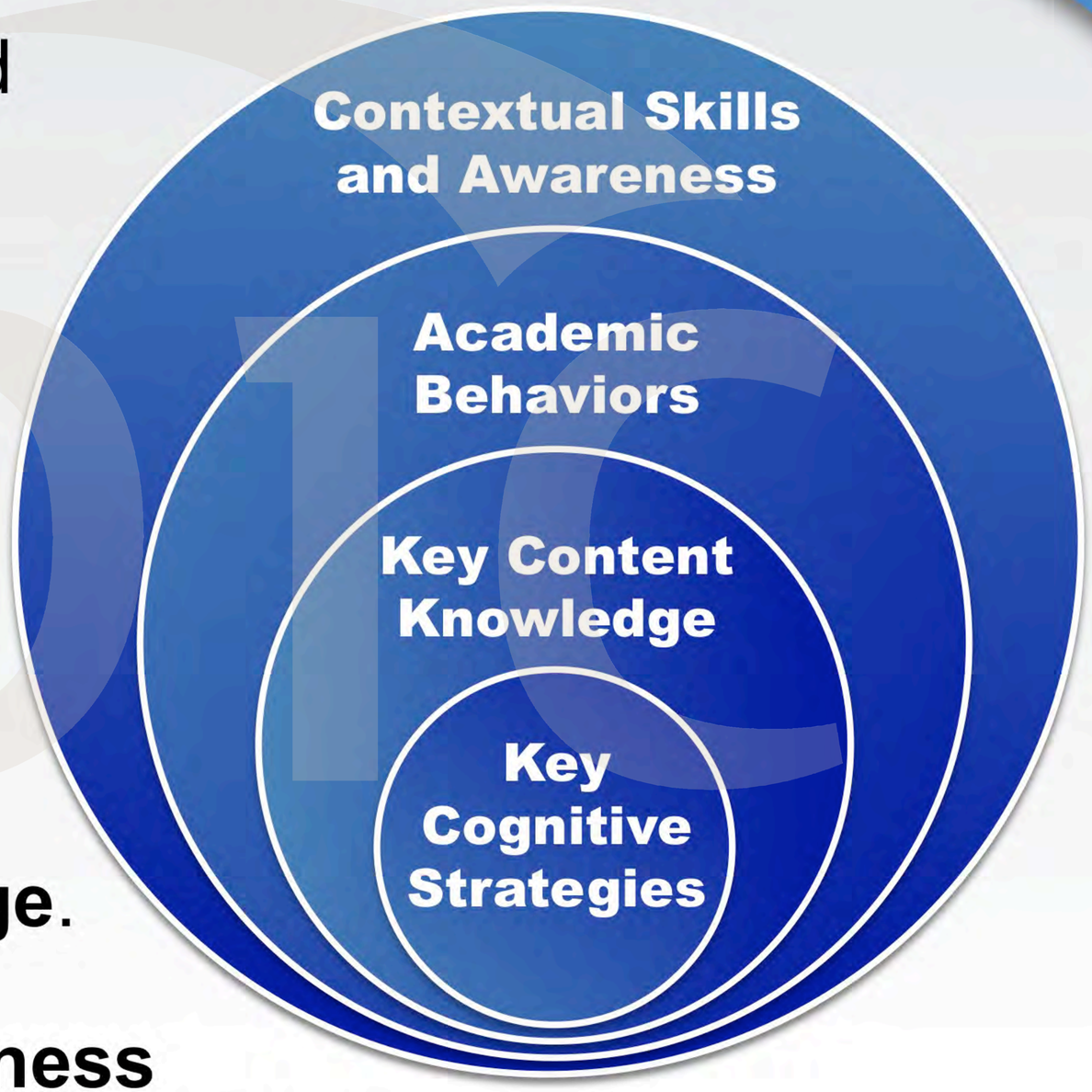
The Four Dimensions

Key Cognitive Strategies and **Key Content Knowledge** should be thought of as co-equal and interdependent.

- Students can only develop their cognitive capabilities in the context of challenging, appropriate content.



Academic Behaviors can be as important to success as **content knowledge**.

Contextual Skills and Awareness ("College Knowledge") is information often not available to students who would be first-in-family to attend college.

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The Texas College and Career Readiness Initiative

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Texas College and Career Readiness Initiative: THECB Project Timeline

Standards Development
February 2007-April 2008

4 VTs: ELA, math science and social studies

Standards Validation
January 2008-July 2009

Comparison of CCRS to current practice in entry-level college courses and placement exams

Implementation Materials
November 2008-January 2010

Development of Reference Course Profiles and College Readiness Assignments

Field Test
September 2009-January 2011

Field testing of College Readiness Assignments and Rubrics in senior HS classes

Purpose

- The TCCRI will enable students, parents, faculty and administrators in Texas to have a clearer understanding of what it takes to be ready to learn beyond high school and will help high school educators, students, and parents make better decisions about the educational activities that will lead to college and career readiness.

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Context of the TCCRI

No state has a comparably comprehensive policy framework to achieve secondary-postsecondary alignment

- Texas has made college and career readiness a key state goal
- The state has a long history of statewide improvement initiatives
- Significant funding has been devoted to these efforts
- While the state may not be a national model in many ways, it is nevertheless an outstanding example of how state policy can frame and initiate secondary-postsecondary alignment

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Texas College and Career Readiness Initiative (TCCRI)

Three-year initiative sponsored by THECB and TEA to improve alignment between secondary and postsecondary education

Notable in particular by the fact that it is led by the postsecondary system and requires significant involvement (and eventually change) by postsecondary institutions

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Texas College and Career Readiness Initiative (TCCRI)

Phase I: Developing College and Career Readiness Standards (joint TEA/THECB)

Phase II: Validating College and Career Readiness Standards

- Validating the College and Career Readiness Standards (THECB)
- CCRS/TEKS Gap Analyses (TEA)

Phase III: Reference Courses and College Readiness Assignments

- Developing Reference Courses and College Readiness Assignments (THECB)
- Designing professional development, instructional strategies, and online student materials (TEA)

Phase IV: Field Testing the College Readiness Assignments (THECB)

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Additional components of TCCRI in which EPIC participated

Career and Technical Education Alignment Analysis

- Analysis between Cross-Disciplinary Standards and 9 entry-level postsecondary CTE courses
- Development of CTE Reference Courses

Texas Test Alignment Project

- Alignment analysis between CCRS and common postsecondary entrance tests

Texas CCRS Regional Meetings

- 14 Regional Meetings were conducted in October/November of 2008 to coordinate vertical alignment between secondary and postsecondary faculty.
- THECB sponsored Regional Meetings during Fall 2009

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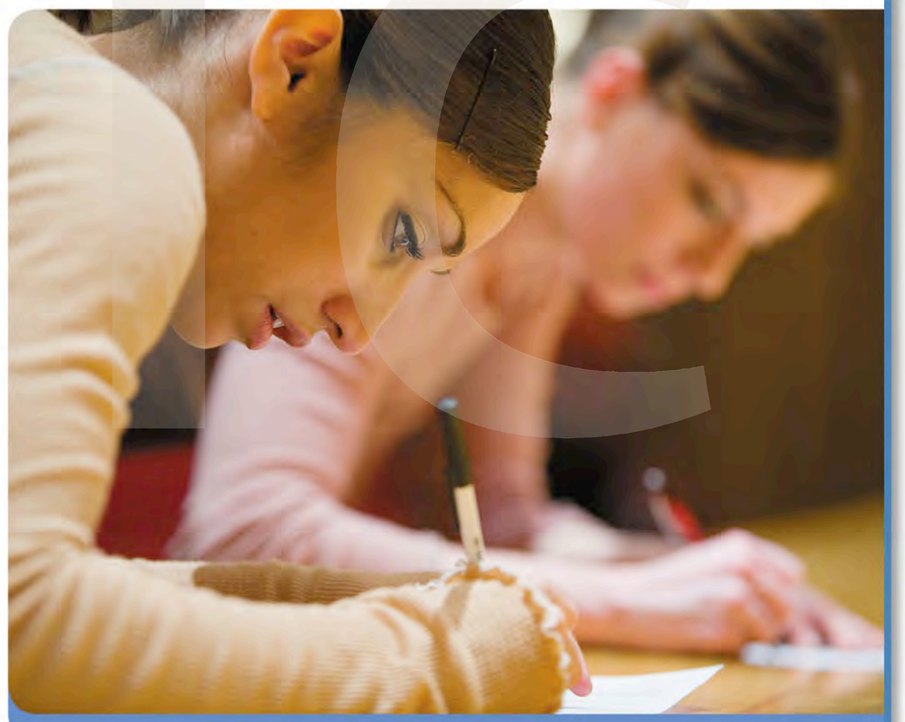
Creating the Texas College and Career Readiness Standards

Texas College and Career Readiness Standards



Phase I:
Developing the CCRS
(Completed January 2008)

College Readiness Standards (CCRS) mandated by HB1, sponsored by TEA and THECB, developed by Vertical Teams (secondary and postsecondary faculty)

- **Four meetings** February-August 2007
  - Homework and refinements between meetings
- **Draft presented** to THECB October 25, 2007
- **Public comment** from October to December 10, 2007
  - Supporting technical analyses
- **Adopted** by THECB in January 2008
- **Sent** to the Commissioner of Education and State Board of Education for incorporation into the TEKS in April 2008

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Structure of the CCRS

Hierarchical structure

- Represents the structure of the discipline and subject areas within the discipline
- Emphasizes that college readiness is about understanding the organizing concepts of the subject area along with specific skills

Three levels plus examples

- **Key Content:** organizing structure of the subject area
- **Organizing Components:** conceptual topics
- **Performance Expectations:** general goals
- **Performance Indicators:** example student performances*

•Not part of CCRS, but included as possible examples of student performance;
•not a definitive list of all possible performances

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Cross-Disciplinary Standards

- These standards represent **cognitive strategies and skills that span the subject areas** and that instructors believe are critical to success in postsecondary education

- These standards should always be **considered in the context of challenging content**, and never be viewed as skills to be taught separate from appropriate content

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Validating the Texas College and Career Readiness Standards

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Validating the CCRS: General Education Courses

Course Nominations: 108 TX two- and four-year postsecondary institutions agreed to collect course nominations that best represented the CCRS

Course Submissions: 813* instructors completed a course profile, uploaded a syllabus, and compared the CCRS to their course

Alignment Analysis: 930 syllabi were submitted to determine how the CCRS compare to common practice and identify the common components of entry-level courses

*Note: many instructors submitted for more than 1 course

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Specific Entry-Level Courses Analyzed

ELA	Mathematics	Science	Social Studies
Composition I	College Algebra	Biology for Science Majors I	American Government I OR Federal Government
Composition II	Math for Business & Social Sciences I	Biology for Non-Majors I	American Government II OR Texas Government
World Literature	Elementary Statistical Methods	Anatomy and Physiology I	U.S. History I
		Intro to Chemistry I	U.S. History II
		General Chemistry	General Psychology
		College Physics I	
		Elementary Physics I	

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Course Submissions by Region and Institution Type (partial and complete)

	Community College	4 Year Public University	Technical College	Private College	Total
Central	58	33	3	1	95
Gulf Coast	93	63	0	0	156
High Plains	35	21	0	0	56
Metroplex	126	54	0	0	180
Northwest	44	16	3	0	63
South	87	69	14	1	171
Southeast	11	29	31	0	71
Upper East	58	16	4	6	84
Upper Rio Grande	17	10	0	0	27
West	30	27	0	0	57
Total	559 (58%)	338 (35%)	55 (6%)	8 (1%)	960

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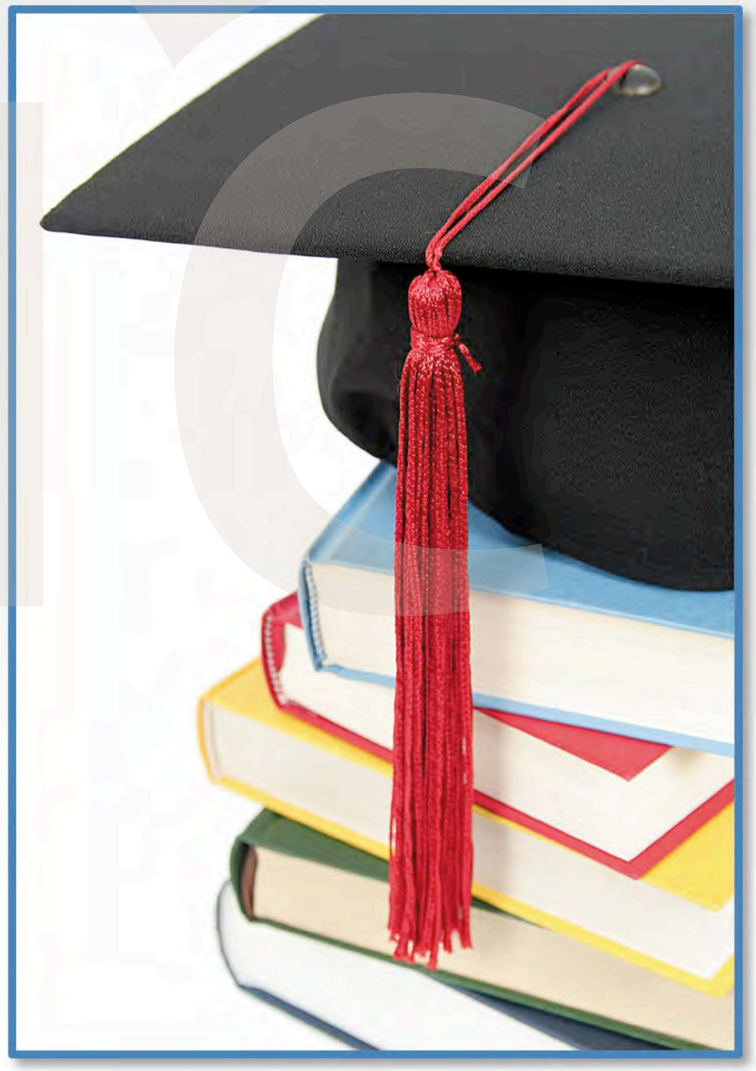
What does it mean to be "Aligned"?

- **Modal faculty response for a standard was "Most Necessary" or "More Necessary" in preparing students to succeed in course.**

- **This represents a score of 4 or 5 on a 5-point scale.**



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To what degree are the CCRS aligned with what is taught in Texas entry-level college courses?

Subject area	% of standards aligned	% adjusted alignment[1]
ENGLISH (120 standards)	**97%**	
MATHEMATICS (169 standards)	**87%**	**93%**
SCIENCE (137 standards)	**86%**	**98%**
SOCIAL STUDIES (127 standards)	**99%**	
CROSS-DISCIPLINARY[2] (58 standards)	**100%**	
Cross-Disciplinary--All English	98%	
Cross-Disciplinary--All Math	91%	
Cross-Disciplinary--All Science	100%	
Cross-Disciplinary--All Social Studies	98%	

1. Adjusted by excluding Geometry, Earth and Environmental Science standards due to being unrepresented in data collection.

2. Faculty from all courses examined the cross-disciplinary standards

Validating the CCRS: Career and Technical Education

How do the cross-disciplinary standards compare to what is currently taught in a range of entry-level Career and Technical Education courses?

Key differences:

- The Phase II Report compared courses in four subject areas to the CCRS, including content and cross-disciplinary skills
- This report compares a representative sample of Career and Technical Education courses to the cross-disciplinary standards only
- Only includes two-year institutions of higher education

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Overview of Participation

Course Nominations:

- EPIC received 211 course nominations from College Readiness Special Advisors at community and technical colleges that had consulted department heads at their postsecondary institutions to obtain nominations of entry-level CTE college courses that best represented the CCRS.

Course Submissions:

- Instructors at 47 institutions completed 157 course submissions, which included completing a course profile, comparing the CRS to the knowledge and skills necessary to succeed in their course, responding to a set of additional open-ended questions about their course and uploading sample course documents.

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Course Submission by Region and Institution Type

Region	Community College	Technical College	Total
Central	27	0	27
Gulf Coast	20	0	20
High Plains	5	0	5
Metroplex	35	0	35
Northwest	5	0	5
South	12	4	16
Southeast	7	8	15
Upper East	13	2	15
Upper Rio Grande	4	0	4
West	15	0	15
Total	143	14	157

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Career and Technical Education (CTE) Alignment Analysis

CTE Courses analyzed:

- Introduction to Computers (ITSC 1301)
- Introduction to Computers (ITSC 1401)
- Computer Applications I (POFI 1301)
- Basic CAD (DFTG 1309)
- Technical Drafting (DFTG 1405)
- Principles of Management (BMGT 1303)
- Introduction to Accounting I (ACNT 1303)
- Business English (POFT 1301)
- Principles of Marketing (MRKG 1311)

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Alignment Analysis Results

To what degree are the CCRS cross-disciplinary skills aligned with what is necessary to be prepared to succeed in entry-level CTE college courses in Texas?

Course Title	Aligned	Inconsistently Aligned	Not Aligned	Multi-Modal
ACNT 1303 Introduction to Accounting I	67%	10%	10%	12%
BMGT 1303 Principles of Management	74%	22%	0%	3%
DFTG 1309 Basic CAD	71%	14%	7%	9%
DFTG 1405 Technical Drafting	78%	17%	0%	5%
ITSC 1301 Introduction to Computers	88%	5%	3%	3%
ITSC 1401 Introduction to Computers	62%	21%	2%	16%
MRKG 1311 Principles of Marketing	95%	3%	0%	2%
POFI 1301 Computer Applications I	64%	28%	0%	9%
POFT 1301 Business English	55%	7%	26%	12%

Alignment Analysis Results

To what degree are the Texas CCRS aligned with what is both necessary to succeed or is taught in entry-level CTE college courses in Texas?

Course Title	% of Cross-Disciplinary Standards Necessary or Taught
ACNT 1303 Introduction to Accounting I	81%
BMGT 1303 Principles of Management	84%
DFTG 1309 Basic CAD	84%
DFTG 1405 Technical Drafting	100%
ITSC 1301 Introduction to Computers	97%
ITSC 1401 Introduction to Computers	84%
MRKG 1311 Principles of Marketing	98%
POFI 1301 Computer Applications I	76%
POFT 1301 Business English	66%

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Highly Aligned Cross-Disciplinary Standards
(Top five Organizing Components)

Rank	Cross Disciplinary Standard	Total Responses	Total "Most" Responses	Total "More" Responses	Total Aligned Responses ("Most" or "More")	% Aligned Responses
1.	I.E. Work habits	138	72	59	131	95%
2.	I.D. Academic behaviors	137	56	67	123	90%
3.	I.F. Academic integrity	139	69	49	118	85%
4.	II.E. Technology	152	63	54	117	77%
5.	II.A. Reading across the curriculum	150	37	75	112	75%

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Highly Aligned Cross-Disciplinary Standards
(Top five Performance Expectations)

Rank	Cross Disciplinary Standard	Total Responses	Total "Most" Responses	Total "More" Responses	Total Aligned Responses ("Most" or "More")	% Aligned Responses
1.	I.E.1. Work independently.	145	75	59	134	92%
2.	I.D.2. Use study habits necessary to manage academic pursuits and requirements.	144	63	66	129	90%
3.	I.D.4. Persevere to complete and master tasks.	144	80	49	129	90%
4.	II.A.4. Identify the key information and supporting details.	153	54	82	136	89%
5.	I.F.4. Understand and adhere to ethical codes of conduct.	145	83	44	127	88%

Conclusions

- The **College and Career Readiness Standards were validated** as reflecting expectations for readiness in a cross-section of representative entry-level college courses from all levels of the state's postsecondary system
- This alignment analysis confirms that **every cross-disciplinary skill is highly aligned** with at least one CTE course studied, with variations in expectations for student preparation among CTE courses
- The snapshot of the 9 CTE courses analyzed **does not reflect the full range of knowledge and skills necessary** for success in any entire CTE program or career pathway, but does suggest areas where high schools could improve preparation for students planning to enroll in CTE programs

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Implementing the Texas College and Career Readiness Standards

CCRS Implementation Materials: Reference Course Profiles

Definition:

- Composite entry-level college courses that align with current practice and CCRS

Development:

- Design teams consisting of postsecondary content experts examined entry-level college course documents submitted by Texas faculty
- Documents were modified, combined, and edited to represent one composite course per course title

Reference Course Profiles

Purpose:

- Help high school faculty understand what is expected of their students upon entering college
- Resource for postsecondary faculty that serves as a point of comparison
- Point of reference for College Readiness Assignments

Components:

- Reference course profiles that increase transparency of entry-level college courses
- Sample assignments, assessments, and scoring rubrics
- Materials are representative of current practice in entry-level college courses in Texas and of the CCRS

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Reference Course Profiles

Career and Technical Education

- Accounting 1303, POFI 1301, ITSC 1301/1401, Business English 1301, Management 1303, Drafting 1309, Marketing 1311, Drafting 1405

Communication

- English 1301, English 1302

Humanities

- English 2332

Mathematics

- Math 1314, Math 1324, Math 1342

Natural Sciences

- Biology 1406, Biology 1408, Biology 2401, Chemistry 1405, Chemistry 1412, Physics 1401, Physics 1405

Social/Behavioral Sciences

- Government 2301, Government 2302, History 1301, History 1302, Psychology 2301

Sample Reference Course Profile

Reference Course Profile: Principles of Marketing

MRKG 1311

This course is an introduction to: marketing functions; identification of consumer and organizational needs; economic, psychological, sociological, and global issues related to marketing; and description and analysis of marketing research.*

Prerequisites and Prior Knowledge

For the purpose of this Reference Course Profile, the required prior knowledge and skills students need to be successful in the course is explicitly stated to help both secondary and postsecondary faculty in establishing goals and expectations for their students. The knowledge and skills reflected in the outline in this section are pulled directly from the Texas College and Career Readiness Standards (TCCRS), written and validated by Texas faculty. The TCCRS are available online at: http://www.thecb.state.tx.us/collegereadiness/CRS.pdf

Students should have the following prior knowledge and skills to be successful:

1. Analyze a situation to identify a problem to be solved.
2. Use study habits necessary to manage academic pursuits and requirements.
3. Persevere to complete and master tasks.
4. Work independently.
5. Work collaboratively.
6. Understand and adhere to ethical codes of conduct.
7. Write clearly and coherently using standard writing conventions.
8. Compose and revise drafts.
9. Design and present an effective product.
10. Use technology to gather information.
11. Use technology appropriately.

In addition, students should have the following College and Career Readiness Standards skills. Only the specific standards and performance expectations pertinent to the course are listed below.

Cross-Disciplinary Standards

I. Key Cognitive Skills

A. Intellectual Curiosity

* *From the course description appearing in the WORKFORCE EDUCATION COURSE MANUAL, 2008-2009. http://www.thecb.state.tx.us/aar/undergraduateed/workforceed/wecm/*

A. Reasoning
C. Problem Solving
D. Academic Behaviors
E. Work Habits
F. Academic Integrity

II. Foundational Skills

A. Reading Across the Curriculum
B. Writing Across the Curriculum
C. Research Across the Curriculum
D. Use of Data
E. Technology

Course Objectives

Course objectives include the course-specific skills and knowledge that students will possess upon completion of the course. They assist postsecondary faculty in clarifying the goals of their courses and provide a clear picture of the expectations students will encounter once they begin college. This sample list of objectives, based on the WECM's End-of Course Objectives, was adapted from syllabi submitted in 2008 by Texas college faculty.

The student should be able to:

1. Understand how marketing is related to other business functions and its importance to the success of the business entity.
2. Explain the four elements of the marketing mix.
3. Identify and explain the factors in the external marketing environment.
4. Explain the acronym SWOT.
5. Understand the steps in the consumer decision-making process.
6. Prepare an outline for a marketing plan and conduct market research utilizing secondary data.
7. Understand the process of market segmentation and target marketing.
8. Explain the term "marketing strategy."
9. Develop and demonstrate writing and editing skills.
10. Analyze information for accuracy, reasonableness of data, and appropriate presentation.
11. Discuss and apply ethical principles to marketing.

CCRS Implementation Materials: College Readiness Assignments

Purpose:

- Available for secondary and postsecondary faculty to use to provide instructional opportunities and feedback aligned with college readiness.
- Improve alignment between the secondary and postsecondary educational systems through increased transparency (i.e. performance and expectations).
- To be used by TEA in the development of College Preparation Courses.

The College Readiness Assignments (CRA) Components

Performance Assignments:

- Rich classroom-embedded tasks
- Content mapped to CCRS
- Require demonstration of key cognitive strategies
- Task difficulty driven by validated CCRS and the entry-level college Reference Course Profiles
- Scaffolding

Scoring Elements:

- Holistic scoring guides for each cross-disciplinary organizing component
- Student self-assessment for academic behaviors

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Who are CRA Vertical Team (VT) Members and what is their function?

- **Teams of secondary and postsecondary faculty** from throughout Texas
- **Composition of the College Readiness Assignments (CRA) Vertical Teams includes:** four members each for Chemistry, Biology, Physics, Government, and History; and six members for Math and English/Language Arts
- **Charged with creating CRA** for the purpose of increasing student preparation for college success

The Process

1. Define performance outcomes
2. Define task parameters and task quality
3. Draft tasks using backward planning
4. Review and revise tasks
5. Pilot tasks and collect student work
6. Develop scoring rubrics and exemplars
7. Revise tasks as needed to improve task quality

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Why Longer, Classroom-Embedded Tasks?

- Can incorporate all the aspects of problem solving
- Gives students experience persisting with a challenging task
- Are challenging to a wide range of students
- Are rich and thought provoking, lead to other questions
- provide detailed diagnostic feedback to students and teachers
- Help students develop time management, study skills
- Offer opportunities for multiple revisions

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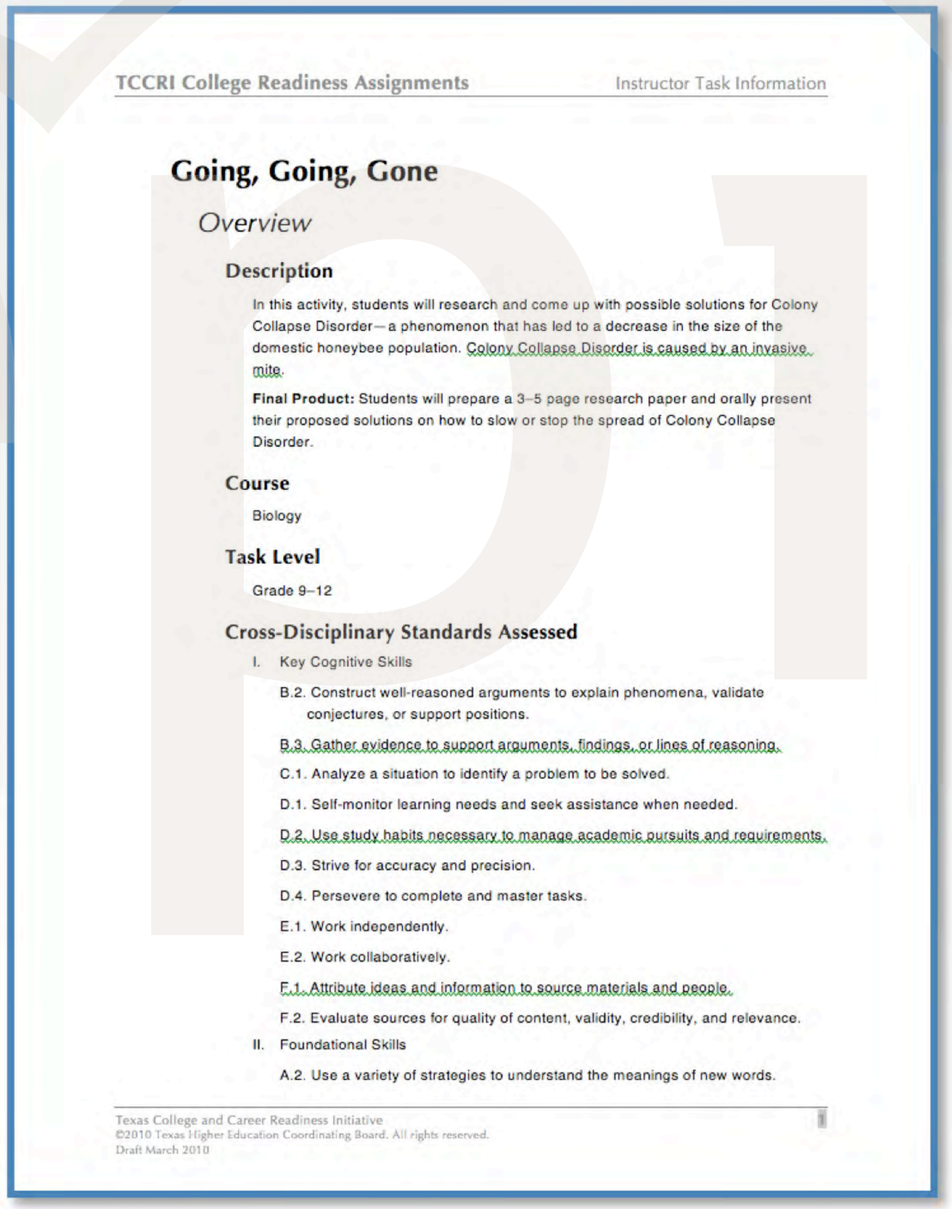
Sample College Readiness Assignment



Going, Going, Gone

Overview

Description

In this activity, students will research and come up with possible solutions for Colony Collapse Disorder—a phenomenon that has led to a decrease in the size of the domestic honeybee population. Colony Collapse Disorder is caused by an invasive mite.

Final Product: Students will prepare a 3–5 page research paper and orally present their proposed solutions on how to slow or stop the spread of Colony Collapse Disorder.

Course

Biology

Task Level

Grade 9–12

Cross-Disciplinary Standards Assessed

I. Key Cognitive Skills

B.2. Construct well-reasoned arguments to explain phenomena, validate conjectures, or support positions.

B.3. Gather evidence to support arguments, findings, or lines of reasoning.

C.1. Analyze a situation to identify a problem to be solved.

D.1. Self-monitor learning needs and seek assistance when needed.

D.2. Use study habits necessary to manage academic pursuits and requirements.

D.3. Strive for accuracy and precision.

D.4. Persevere to complete and master tasks.

E.1. Work independently.

E.2. Work collaboratively.

F.1. Attribute ideas and information to source materials and people.

F.2. Evaluate sources for quality of content, validity, credibility, and relevance.

II. Foundational Skills

A.2. Use a variety of strategies to understand the meanings of new words.

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Measuring College and Career Readiness

To what extent do college admissions and placement tests assess the Texas College and Career Readiness Standards?

Objectives

How aligned are the tests to the Texas College and Career Readiness Standards (CCRS)?

Are any areas of CCRS not assessed by the tests?

How do the placement and admissions tests compare to the CCRS in terms of rigor and cognitive demand?

- How rigorous and cognitively demanding are the standards?
- How rigorous and cognitively demanding are the tests?

Methodology

The College Board, Pearson Educational Measurement and ACT provided over 2,500 test items

- ACT, ACCUPLACER, ASSET, COMPASS, SAT, THEA

Post-secondary content-area experts recruited and trained in alignment process

- Six math and six ELA

Experts reviewed items and standards and provided the following:

- Rigor and cognitive demand ratings for the standards
- Rigor and cognitive demand ratings for the test items
- Performance expectations assessed by each test item

Cognitive Demand

Cognitive Demand – the level of information processing and the degree of conscious thought needed to succeed on a test item or a standard

- **Retrieval:** Recognizing, recalling, and executing
- **Comprehension:** Integrating and symbolizing
- **Analysis:** Matching, classifying, analyzing errors, generalizing, and specifying
- **Knowledge utilization:** Decision making, problem solving, experimenting, and investigating

Marzano, R. J. (2001). Designing a new taxonomy of educational objectives. Thousand Oaks, CA: Corwin Press.

Rigor

Rigor – the relative challenge of an item or a performance expectation in terms of college level academic expectations.

- *Below* the level at which an entry-level college student should perform
- *At* the level at which an entry-level college student should perform
- *Above* the level at which an entry-level college student should perform

Alignment

Alignment – the extent of agreement between the tests and the standards and is determined by identifying the standards assessed by each item.

- Categorical concurrence
  - Are there six or more items per performance expectation?
- Depth of knowledge consistency
  - Are the test items of equal or greater rigor and cognitive demand as the performance expectations they assess?
- Range of knowledge
  - Do at least half of the performance expectations within a standard have at least one item from a test assessing it?

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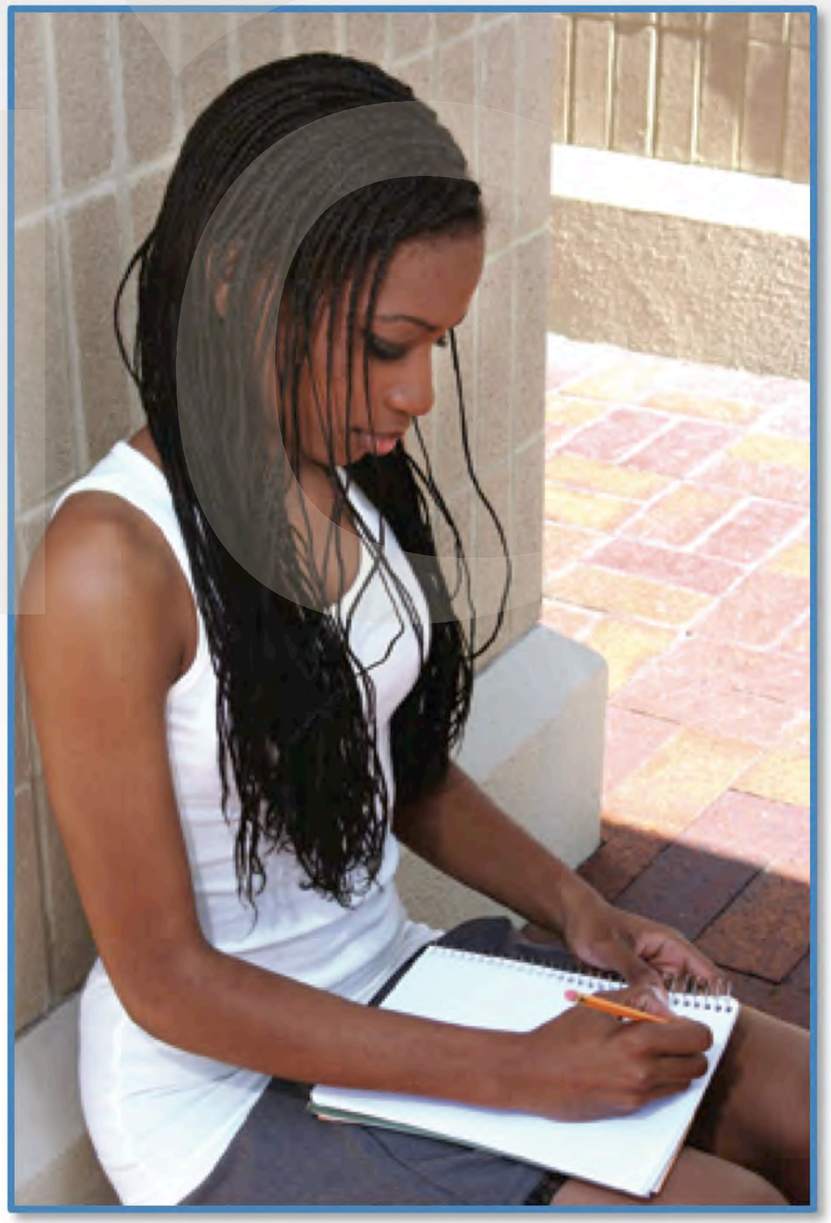
Results

Acceptable reliability observed in cognitive demand ratings:

- Cognitive Demand
  - High reliability for test items (.70-.86)
  - High reliability for standards (.72-.86)
- Rigor
  - Moderate reliability for items (.45-.51)
  - Moderate reliability for standards (.56-.57)
- Reliability was slightly higher in math than ELA



Alignment

- **Some tests provided unique coverage or strengths**
- **Tests showed similar patterns of item coverage**
  - Most assessed standards
    - Algebraic reasoning, problem solving and reasoning, writing
  - Highest alignment in terms of categorical concurrence
    - Algebraic reasoning, numeric reasoning, and functions, writing
    - Test items tended to be high in cognitive demand and rigor in these areas
  - Least assessed standards
    - Probabilistic reasoning and statistical reasoning, research and applied skills
- **Math items aligned to more standards than did ELA items**
  - Suggests item breadth/efficiency

Alignment, continued

Tests were not aligned to cross- disciplinary skills

- None of the tests assessed these skills well:
  - Problem solving and reading across the curriculum in math
  - Reasoning, problem solving, academic behaviors, reading across the curriculum, and writing across the curriculum in ELA

Tests were more aligned to the key cognitive strategies than to the foundational skills

- Both ELA and math

Not all CCRS Assessed

- **Some practical skills may not be measurable on a multiple-choice test**
- **Examples of performance expectations not assessed by any of the items:**
  - Apply knowledge of roots and affixes to infer the meanings of new words
  - Plan a study
  - Formulate a research topic and questions
  - Recognize reliability of statistical results

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Standards Rigor and Cognitive Demand

Standards were at the challenge level expected for defining college-readiness

- Between the "*Below* the level expected…" and "*At* the level…"
- Covered the range of cognitive demand

On average, math standards were less rigorous and cognitively demanding than ELA standards

Standards Rigor and Cognitive Demand, continued

Rigor and cognitive demand were correlated

- Standards highest in average rigor and cognitive demand:
  - Problem solving and reasoning, connections, and key cognitive strategies in math
  - Writing, research, and key cognitive strategies in ELA
- Standards lowest in average rigor and cognitive demand:
  - Numeric reasoning and algebraic reasoning in math
  - Reading in ELA

Test Rigor and Cognitive Demand

The tests were similar in terms of rigor and cognitive demand

- Tests were nearly identical in rigor
  - *Below* the level expected at which a entry-level college student would perform
  - Slightly higher for ELA than for math
- Tests differed slightly in cognitive demand
  - One at "Comprehension" level, others at "Retrieval" level
  - Slightly higher overall for math than for ELA

Rigor and Cognitive Demand Consistency

- **Standards were, on average, slightly more rigorous and cognitively demanding than the test items**
- **Some exceptions:**
  - Test items were more rigorous than the standards:
    - In Math, numeric reasoning, algebraic reasoning, measurement reasoning, functions, communications, and representation
    - In ELA, writing
  - Test items were higher in cognitive demand than the standards:
    - In Math, numeric reasoning, algebraic reasoning, measurement reasoning and probabilistic reasoning, and functions
    - In ELA, none

Summary and Implications

- **Overall, the CCRS were slightly more rigorous and cognitively demanding than test items**
- **Tests were more similar than different:**
  - Similar in their coverage and representation of the standards
  - Identical in rigor, similar in cognitive demand
  - Some had unique strengths and areas of coverage
- **Multiple methods may be needed to assess CCRS**
  - Multiple-choice tests cannot assess all standards
- **Areas of highest alignment include the most cognitively demanding test items**
- **Some standards are not sufficiently assessed:**
  - Foundational skills & key cognitive strategies
  - Statistical and probabilistic reasoning
  - Research

Future Research

- How can we make tests and standards more consistent in terms of the rigor expected by the college and career readiness standards?
- What other methods can be utilized to assess the content necessary for college and career readiness currently not assessed by any admissions or placement tests?

Comments by Discussant

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