Dana Center
Mathematics
PATHWAYS

Faculty Development and Equity in an Era of Mathematics Reform

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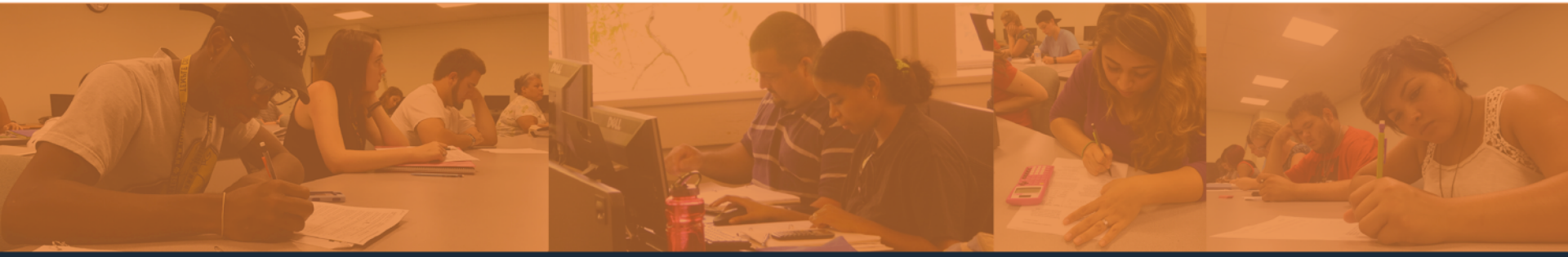


Session Overview

- **Emerging Issues Monograph**
- **Chapters**
  - Faculty Engagement for Creating and Sustaining Mathematics Pathways
  - Math Pathways and Equity: Considering Progress from Multiple Perspectives
  - Math Pathways and Equity: Gateway Course Outcomes
- **Dana Center**
- **Q&A**

The monograph comprises chapters organized along topics that are aligned with the Dana Center Math Pathways (DCMP) theory of change. The DCMP believes that systemic and sustainable change is best achieved through a process that is

faculty-driven,
administrator-supported,
policy-enabled, and
culturally reinforced.

Activity

1. What is the main purpose for faculty development at your campus?
2. Share this with one or two people sitting next to you.
3. Prepare to share with the whole group.

Faculty Engagement for Creating and Sustaining Mathematics Pathways

Co-author: Michael Oehrtman, Ph. D.

Mathematics Professor, Oklahoma State University

The chapter presents processes that sustain faculty engagement:

- data analysis,
- identification of problems and solutions,
- design and implementation of solutions,
- evaluation of progress, and
- understanding of changes accompanying the implementation of mathematics pathways.

Faculty Development

Faculty development related to implementation of mathematics pathways is not about attempts to change people but rather about ***engaging faculty*** early in focused, ongoing conversations, starting with data.

Data showing student success measures that need attention will create urgency.

Data showing increased measures of student success, will facilitate implementation, scaling, and sustainability.

Early faculty engagement and data review

- Many faculty are appropriately skeptical of new approaches and need to see large scale data
- Data illustrate areas where students can be better served and will create urgency to scale
- Data show the number of students who may never make it to their course or continue on to the next course
- Not all data needs to be explored at once

Early, comprehensive, and ongoing faculty conversations

- Involve mathematics faculty, faculty in partner disciplines, advisors, and administrators,
- Include faculty and advisors in neighboring two-year colleges and four-year universities
- Use time to foster broad faculty engagement and build ownership
- Take inventory of specific mathematical competencies required for programs of study (e. g. Texas and Oklahoma)

Early ongoing conversations on math prerequisites, placement, and competencies

- Provide time for dialogue and discussion around mathematical prerequisites and competencies in students' broader pursuits
- Collaborate with partner institutions and share common practices to facilitate transfer, prerequisite, and placement policies
- Share strategic lessons to showcase competencies students will need for subsequent courses in students' programs of study

Professional development focused on advances in the learning sciences

Faculty may become overwhelmed with new curricula pedagogy, assessments, and classroom structure, so support is critical to help adjust to change.

Faculty development that focuses on advances in teaching and learning via the learning science enriches faculty conversations when implementing mathematics pathways.

Professional Development focused on the advances of the Learning Sciences

Engage faculty in conversations about the advances in the learning sciences

Allow time for faculty to incorporate and adapt learning processes in their courses

Include ways for faculty to develop, activate, and support students' development of malleable mindsets

Give attention to the interplay between tasks, intellectual pursuit, goals, interests, and resources students bring to their learning

Key Recommendation – Provide a continuous cycle to engage faulty in program redesign & implementation

1. **Early engagement** of faculty to collect and review data, courses, and programs of study
2. **Ongoing conversations** with comprehensive groups of faculty from other disciplines and partner institutions
3. **Professional development** to discuss data at all levels; identify and clarify math prerequisites, competencies, placement, common practices; and to incorporate advances in the learning sciences
4. **A review** of the impact that change has on student achievement and identification of faculty leaders

Math Pathways and Equity: Considering Progress from Multiple Perspectives

Co-Author: Francesca Fraga Leahy, Ed.M.

Data and Performance Specialist, School Programs

Texas Education Agency

This chapter includes an overview of four perspectives on equity and student success from communities critical to enacting change, and concludes with recommendations for successfully obtaining and maintaining "permission" to support broad scale and continuous improvement of mathematics pathways implementation.

Four Perspectives on Equity and Student Success

- Access
- Outcomes
- Diversity and Inclusion
- Social Justice

Recommendations

I. Identify Dimensions of Equity

II. Consider Equity Implications for Research and Action from Multiple Perspectives

III. Support Stakeholders in Considering Multiple Perspectives

Math Pathways and Equity: Gateway Course Outcomes

Co-Author: Francesca Fraga Leahy, Ed.M.
Data and Performance Specialist, School Programs
Texas Education Agency

This chapter examines emerging issues related to equity and mathematics pathways from multiple perspectives on student success in the mathematics community.

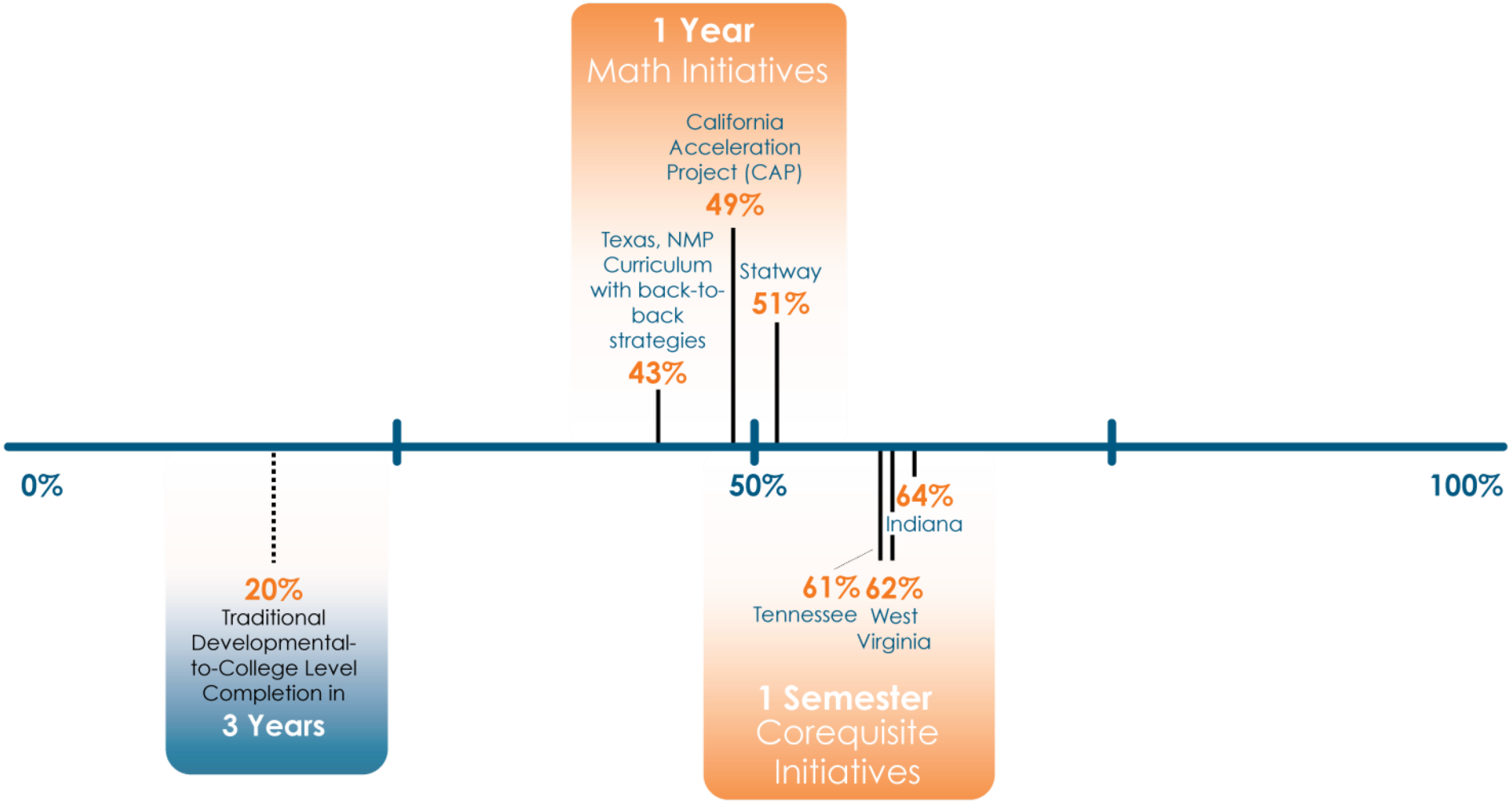
Findings from qualitative and quantitative analyses provide a picture of where mathematics pathways efforts are progressing towards achieving equity goals.

Finally, common questions are surfaced and various approaches to addressing those issues are offered for consideration in the field.

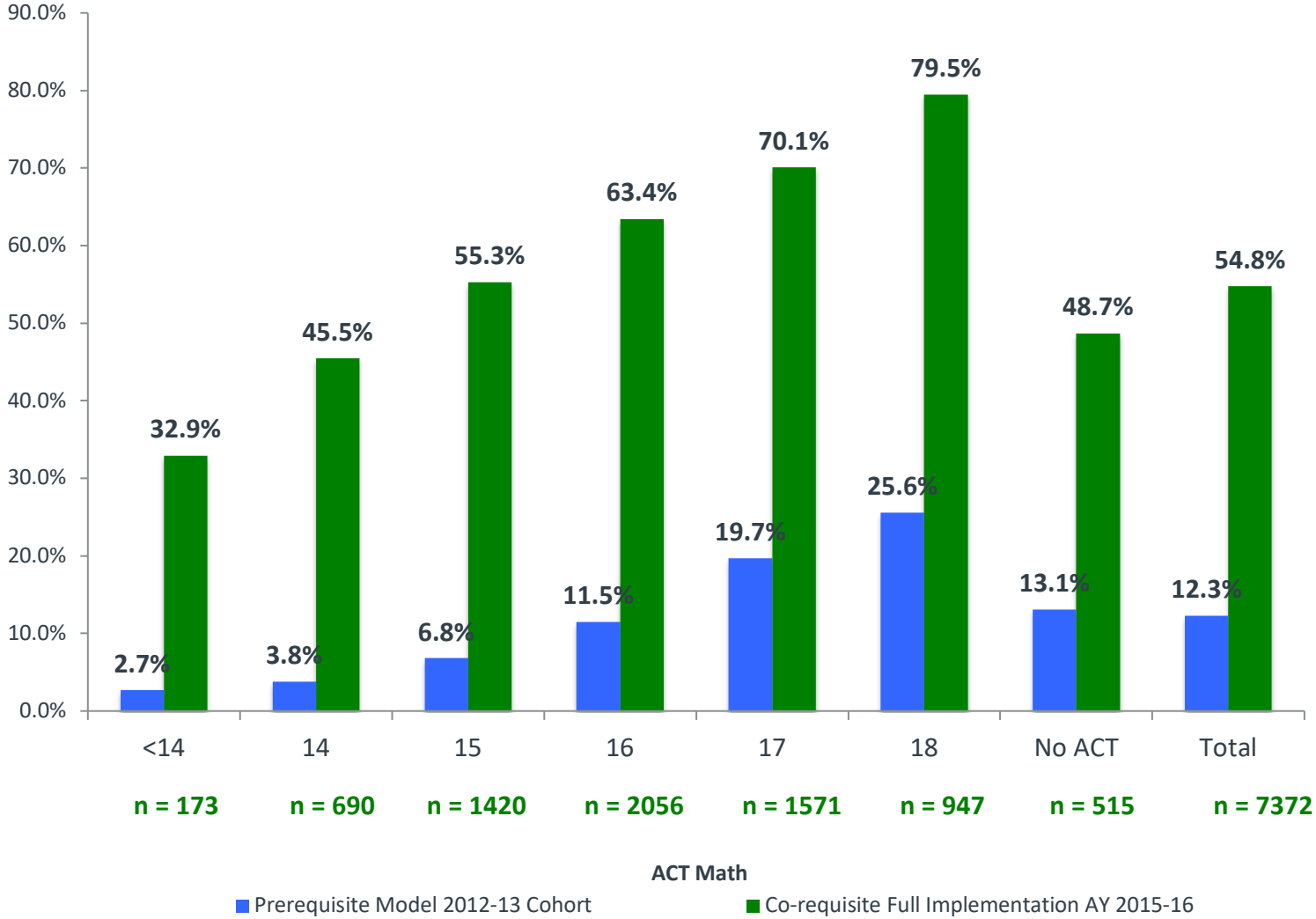
Mathematics Pathways Approaches and Student Success Outcomes

- Carnegie's Quantway™ and Statway
- California Acceleration Project (CAP)
- Dana Center Mathematics Pathways (DCMP)
- Co-Requisite Models

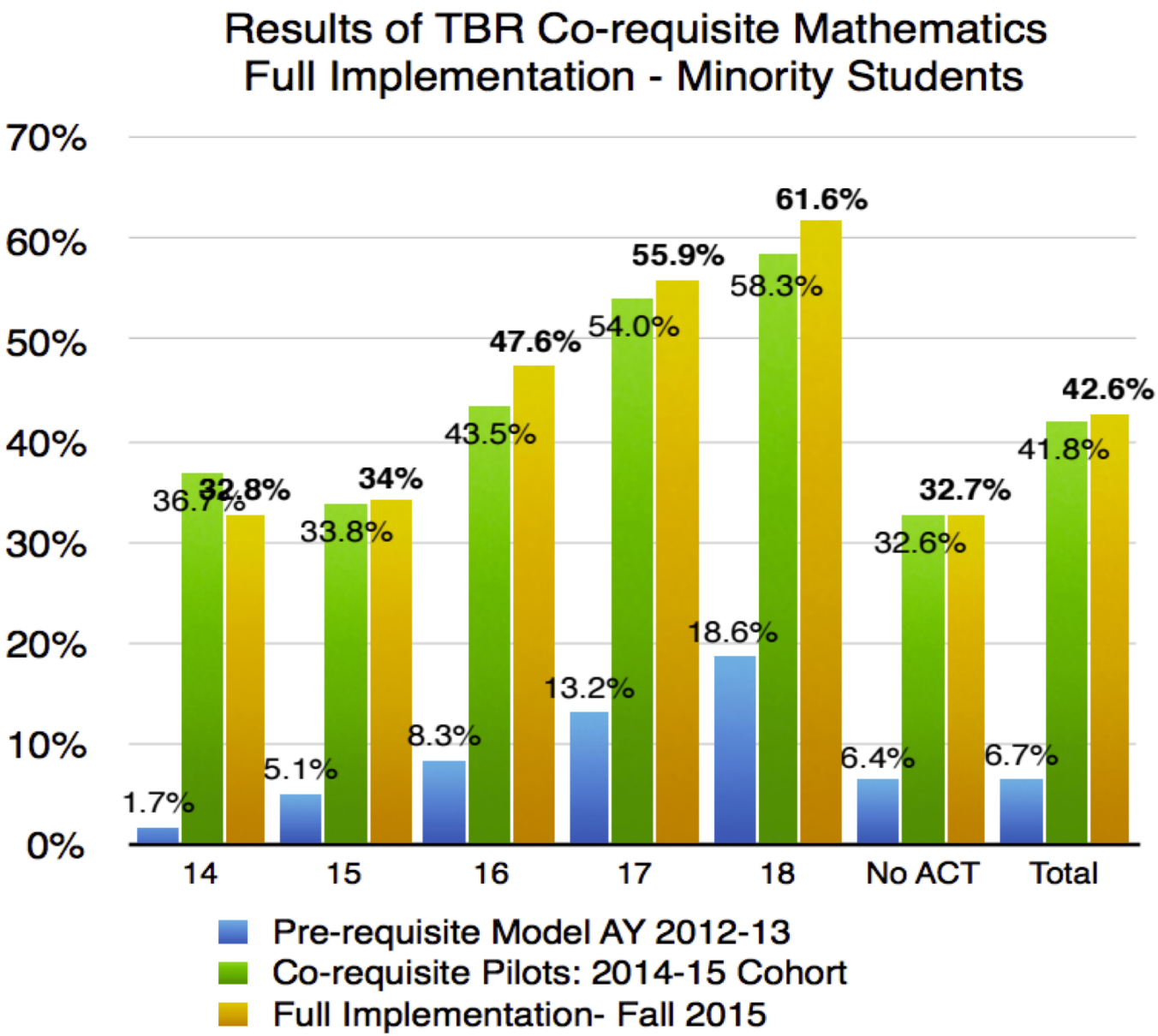
Evidence of Math Pathways Success



Tennessee Community Colleges
Gateway Math Success in One Year



Tennessee Board of Regents Brief #3: *Co-requisite Remediation Full Implementation 2015-16*



Source: Tennessee Board of Regents.

California Acceleration Project (CAP) Results for Students of Color

- African American CAP students have the same odds of completing the mathematics pathways as their White counterparts (Hayward & Willet, 2014)

- College of the Canyons students in the statistics pathway in CAP (including African Americans) are three times as likely as their peers in the traditional developmental sequence to complete their credit-level [transferable]mathematics course within two years (Hern & Brezina, 2016).

Recommendations

- **Conduct additional research**
- **Analyze unintended consequences of attending to particular dimensions of equity**
- **Identify/address questions about equity and mathematics pathways that reflect various perspectives on equity and the purpose of math education**

Equity/Mathematics Pathways Takeaways

- **Math Pathways gains in student success can help close achievement gap**
- **Achievement gaps continue to persist**

Equity Activity

What are the top 3 obstacles to eliminating achievement gaps in math on your campus?

Dana Center Contact Information

- **General information about the Dana Center**
  www.utdanacenter.org

- **DCMP Resource Site**
  www.dcmathpathways.org

- **To receive monthly updates about the DCMP, contact us at**
  dcmathpathways@austin.utexas.edu

About the Dana Center

The Charles A. Dana Center at The University of Texas at Austin works with our nation's education systems to ensure that every student leaves school prepared for success in postsecondary education and the contemporary workplace.

Our work, based on research and two decades of experience, focuses on K–16 mathematics and science education with an emphasis on strategies for improving student engagement, motivation, persistence, and achievement.

We develop innovative curricula, tools, protocols, and instructional supports and deliver powerful instructional and leadership development.

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The University of Texas at Austin
Charles A. Dana Center

Q & A

Thank you.

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