

# **Indicators of Attrition and Persistence in Manufacturing Engineering Technologist and Technician Programs**

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# Session Objectives

- Provide overview of the METTE project.
- Present research related to student success by identifying indicators of attrition and persistence.
- Move from basic to applied research.

# METTE Project Overview

- **METTE is** an NSF-funded research project housed in the Wisconsin Center for Education Research at the University of Wisconsin-Madison
- **Our focus is** on STEM programs that prepare postsecondary students to enter employment as manufacturing engineering technologists or technicians (METTE) in the high-technology fields that drive our nation's economy or transfer to baccalaureate programs in related fields of study.
- **Our goal is to** improve student success in these two-year college programs.

# METTE Project Research

- What individual and institutional factors are associated with optimal student outcomes?
- How can key METTE stakeholders use research data and findings to inform strategic program improvement decisions?

# Why Focus on Manufacturing?



# Employment

- Despite the shift to a service economy, manufacturing continues to employ 1 in 8 non-farm workers in Wisconsin.



# Share of the State's Economy



- Manufacturing also continues to account for about 19% of Wisconsin's Gross Domestic Product or the sum of all economic activity in the state.

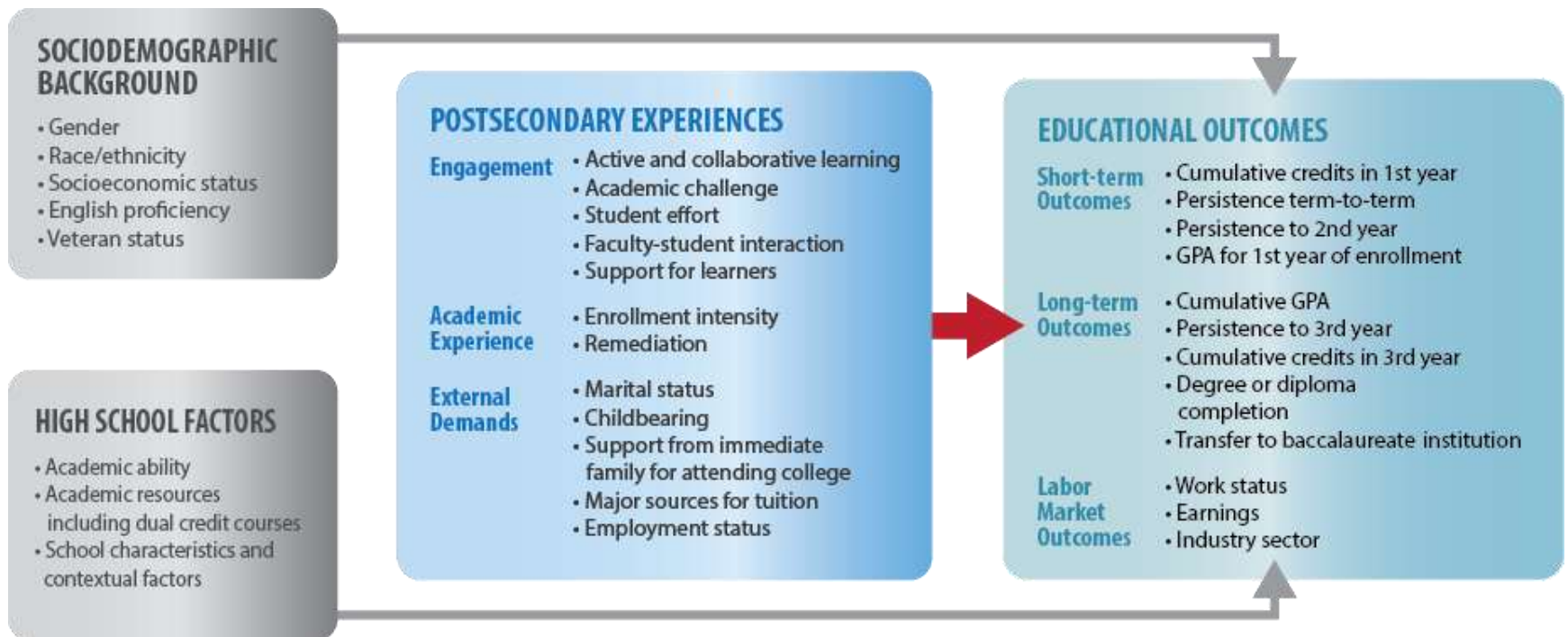
# Content of the Programs

- METTE programs as a whole require more math and applied physics and/or chemistry than any other group of WTCS programs





# METTE Model of Student Success



# METTE Project Database

- Assembled from administrative databases provided by partner agencies:
  - Wisconsin Technical College System
  - Wisconsin Department of Workforce Development
  - Wisconsin Department of Public Instruction
- Includes longitudinal student data:
  - Socio-demographics
  - Course enrollments and outcomes
  - Employment and wages earned in Wisconsin
  - Postsecondary transfer, and
  - High school test scores
- Data for four colleges from the Community College Survey of Student Engagement (CCSSE)

# Research on Student Success



# Fewer than half of U.S. students who begin community college with the goal of earning a degree or certificate succeed six years later

- **Individuals**

- Lower lifetime earnings, greater likelihood of under and unemployment, and longer periods of unemployment
- Incur significant debt to pay for college and have fewer resources to repay this debt than those who graduate

- **Colleges**

- Absorb time, resources and tuition of faculty and postsecondary institutions that could have been used to serve others
- Lower graduation rates and longer time-to-degree ultimately impact funding and political support for higher education

- **Society**

- Lower rates of participation in local, state, and national governance, fewer resources to contribute to community service, greater consumption of public services, higher crime rates, and lower rates of economic growth and productivity

# Research Questions:

## Indicators of Persistence and Attrition

- Are there differences in **student characteristics** such as demographic, educational attainment, work status, and economic background between students who leave and those who persist?
- Can we identify a set of empirically-based indicators of **enrollment behavior, academic achievement, and course-taking behavior** that differentiate **leavers** from **persisters**?

# Key Definitions

- **Persister**—new program admitted student who re-enrolls in the same technical college in the same program in the following year.
- **Leaver**—new program admitted student who is not enrolled in the same technical college in the following year of the study and leaves prior to receiving a degree or diploma from any program at that technical college.
- **Other**—new program admitted student who graduates from the program in the first year or enrolls in a different program in the second year at the same college.

# Sample

- Initial system-wide population of 3,700 students enrolled for the first-time in one of 142 METTE program offerings at a Wisconsin technical college in FY2010.
- Dropping those in “Other” category and those in 26 programs with no matching curriculum yielded a final sample of 2,824, with 1,152 leavers and 1,672 persisters enrolled in one of 116 program offerings in FY2010.

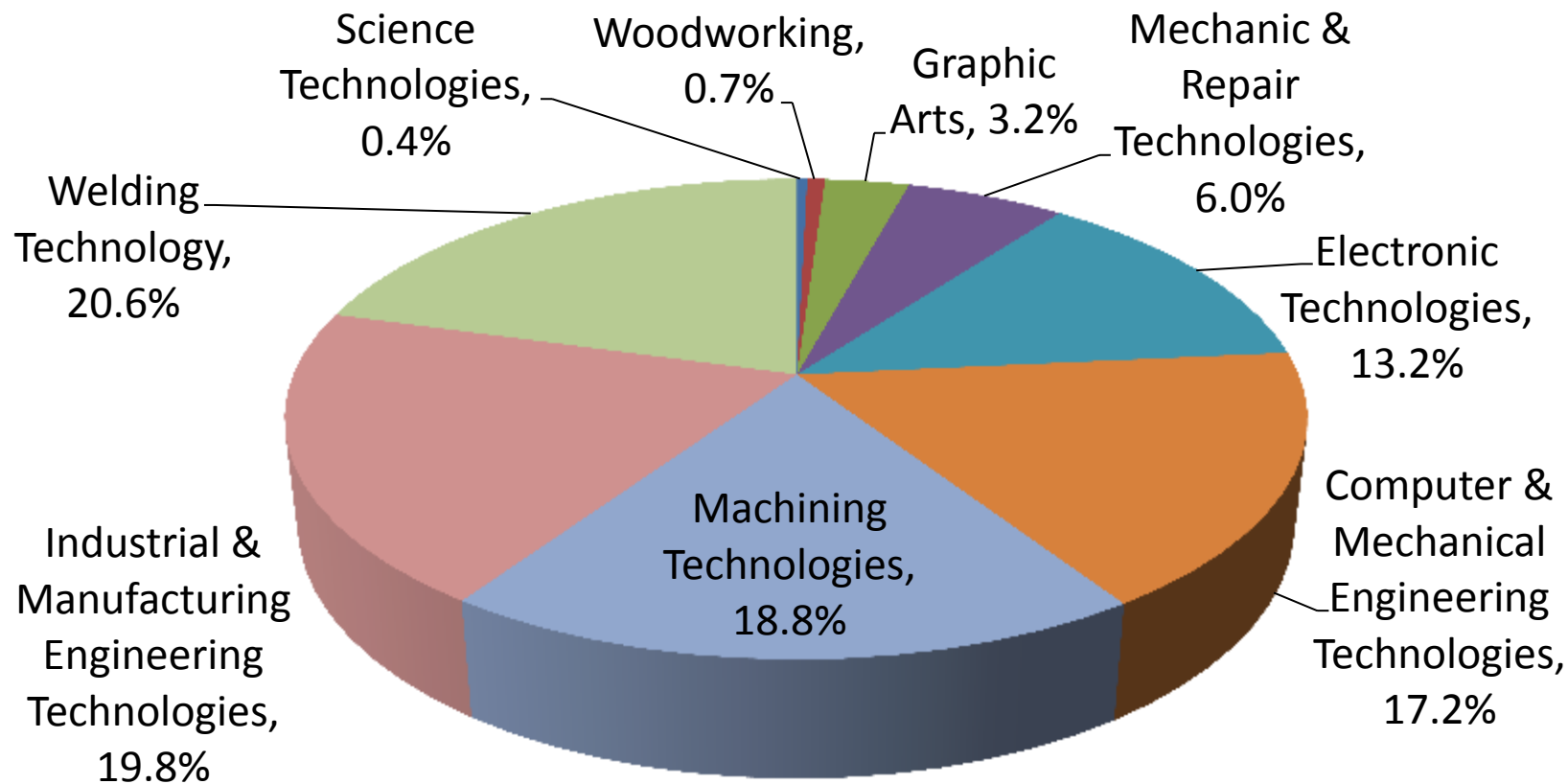
# Final Sample of METTE Program Leavers and Persisters

Program Type	Leavers	Persisters	Grand Total
Associate of Applied Science	559 (37%)	963 (63%)	1,522 (100%)
One-year Technical Diploma	446 (49%)	461 (51%)	907 (100%)
Two-year Technical Diploma	147 (37%)	248 (63%)	395 (100%)
Grand Total	1,152	1,672	2,824

Source: Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

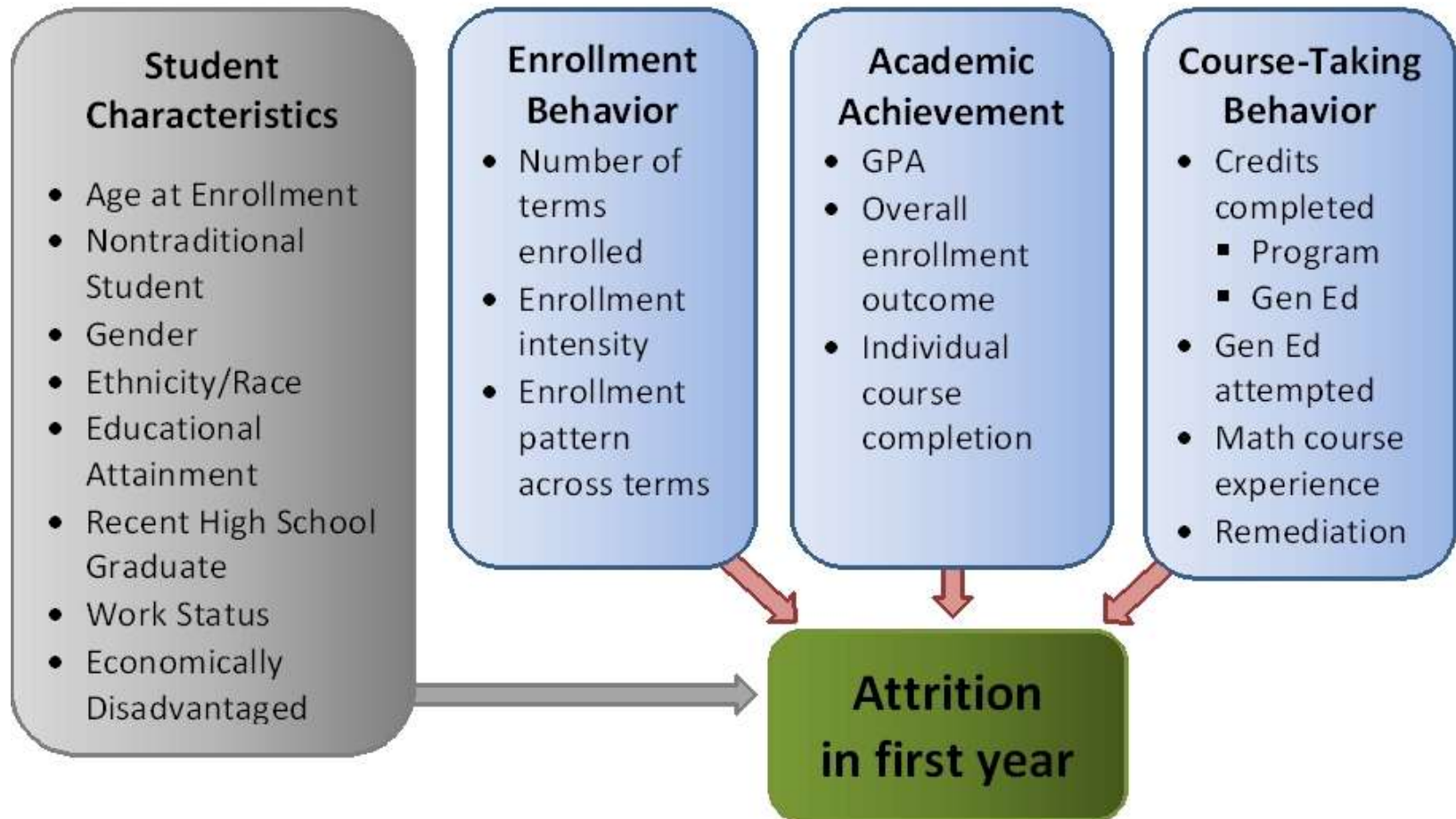


# Distribution of Final Sample by Field of Study



**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Identifying Indicators of Attrition



# Example: Calculating Indicators

## Estimated Likelihood of Attrition or Persistence: Fall Term Grade Point Average

	Associate of Applied Science		One-year Technical Diploma		Two-year Technical Diploma	
	Leaver	Persister	Leaver	Persister	Leaver	Persister
<b>GPA &lt; 2.0 in Fall term</b>	<b>0.67**</b>	0.33	<b>0.77**</b>	0.23	<b>0.74**</b>	0.26
<b>GPA ≥ 2.0 in Fall term</b>	0.21	<b>0.79**</b>	0.38	0.62	0.22	<b>0.78**</b>
<b>Overall</b>	<b>0.37</b>	<b>0.63</b>	<b>0.49</b>	<b>0.51</b>	<b>0.37</b>	<b>0.63</b>

**Note:** \* designates a value significantly different from the overall distribution of leavers and persisters at the .05 level,  
\*\* at the .01 level.

**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Findings

- For students enrolled in METTE programs, none of the individual student characteristics or program categories predict who leaves and who persists.
- However, specific enrollment behaviors, measures of academic achievement, and course-taking behavior do provide strong predictors of who leaves and who persists.
- That is, it is **not who you are** or even the **broad field of study in which you are enrolled**, but **how you behave** that predicts attrition or persistence in WTCS METTE programs.

# Indicators of Attrition in METTE Programs: Enrollment Behaviors

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Not enrolling in any postsecondary courses in any term	X	X	X
Enrolling in only one term	X		X
Enrolling only in Fall term	X	X	X
Dropping course load from full-time in Fall to part-time in Spring			X
Enrolling in only a part-time course load			X

**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Indicators of Attrition in METTE Programs: Academic Achievement

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Attaining a GPA of less than 2.0 in Fall	X	X	X
Attaining a cumulative GPA of less than 2.0 for first year	X	X	X
Not passing two-thirds of courses attempted in Spring term with 2.0 GPA	X	X	X
Not enrolling in Spring term regardless of academic attainment in Fall	X	X	X

**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Indicators of Attrition in METTE Programs: Course-Taking Behaviors

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Completing no credits toward program requirements	X	X	X
Completing only 1 to 6 required program credits	X		
Completing none of the required technical studies credits	X	X	X
Completing none of the required general studies credits	X	X	X
Failing first postsecondary math course, regardless of whether it was the required math	X	X	X
Failing and/or withdrawing from any postsecondary courses	X	X	X

Source: Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Indicators of Persistence in METTE Programs: Enrollment Behaviors

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Enrolling in two or more terms	X		
Enrolling full-time or part-time in Fall and Spring	X		X
Enrolling part-time in Fall and Spring		X	
Enrolling full-time in Spring, but not enrolled in other terms		X	
Enrolling part-time in Fall, full-time in Spring	X	X	
Enrolling part-time in Summer and full-time in Fall and Spring	X	X	X

**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.



# Indicators of Persistence in METTE Programs: Academic Achievement

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Attaining a GPA of less than 2.0 in Fall term	X		X
Attaining a cumulative GPA of less than 2.0 for first year	X		
Passing two-thirds of courses attempted in Spring term with 2.0 GPA	X	X	X
Enrolling in Spring term regardless of academic attainment in Fall term	X	X	X

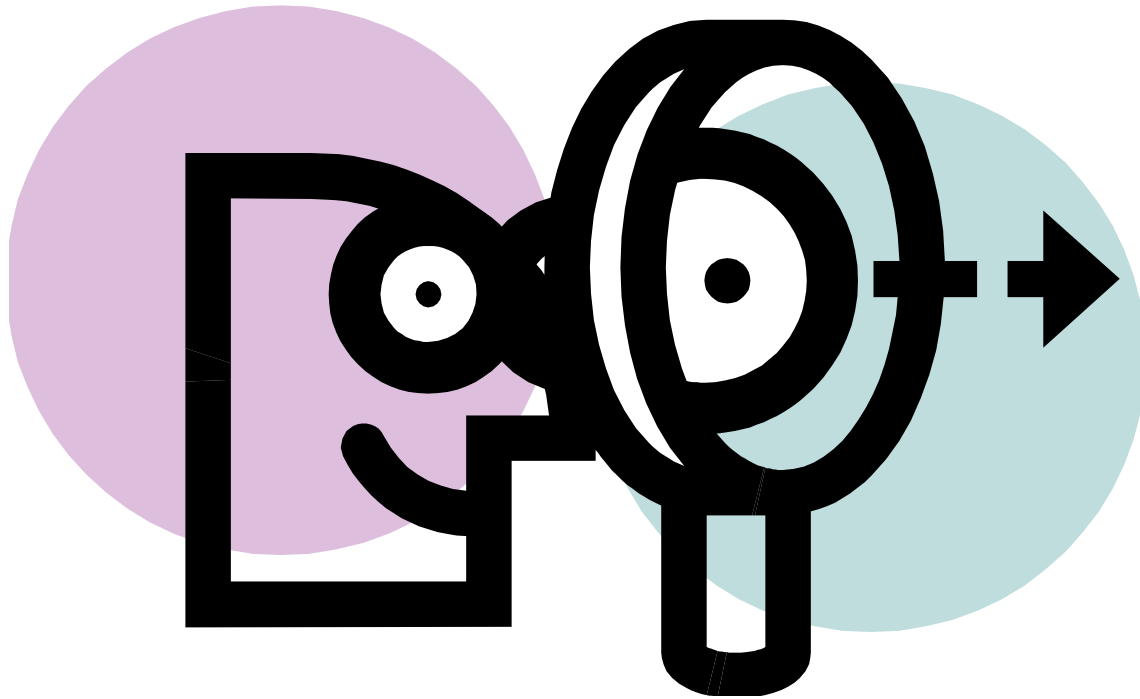
**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

# Indicators of Persistence in METTE Programs: Course-Taking Behaviors

	Associate of Applied Science	One-year Technical Diploma	Two-year Technical Diploma
Completing more than six required program studies) credits	X	X	
Completing between $\frac{1}{4}$ and $\frac{1}{2}$ credits in required the technical studies curriculum	X		X
Completing more than $\frac{1}{2}$ of required technical studies credits		X	
Completing any required general studies	X	X	X
Completing science course	X	X	X
Completing both math and science	X	X	X
Passing first postsecondary math course	X	X	X
Not failing and/or withdrawing from any postsecondary courses	X	X	X

**Source:** Special tabulation, Student Attrition Analysis File based on METTE Project Longitudinal Database.

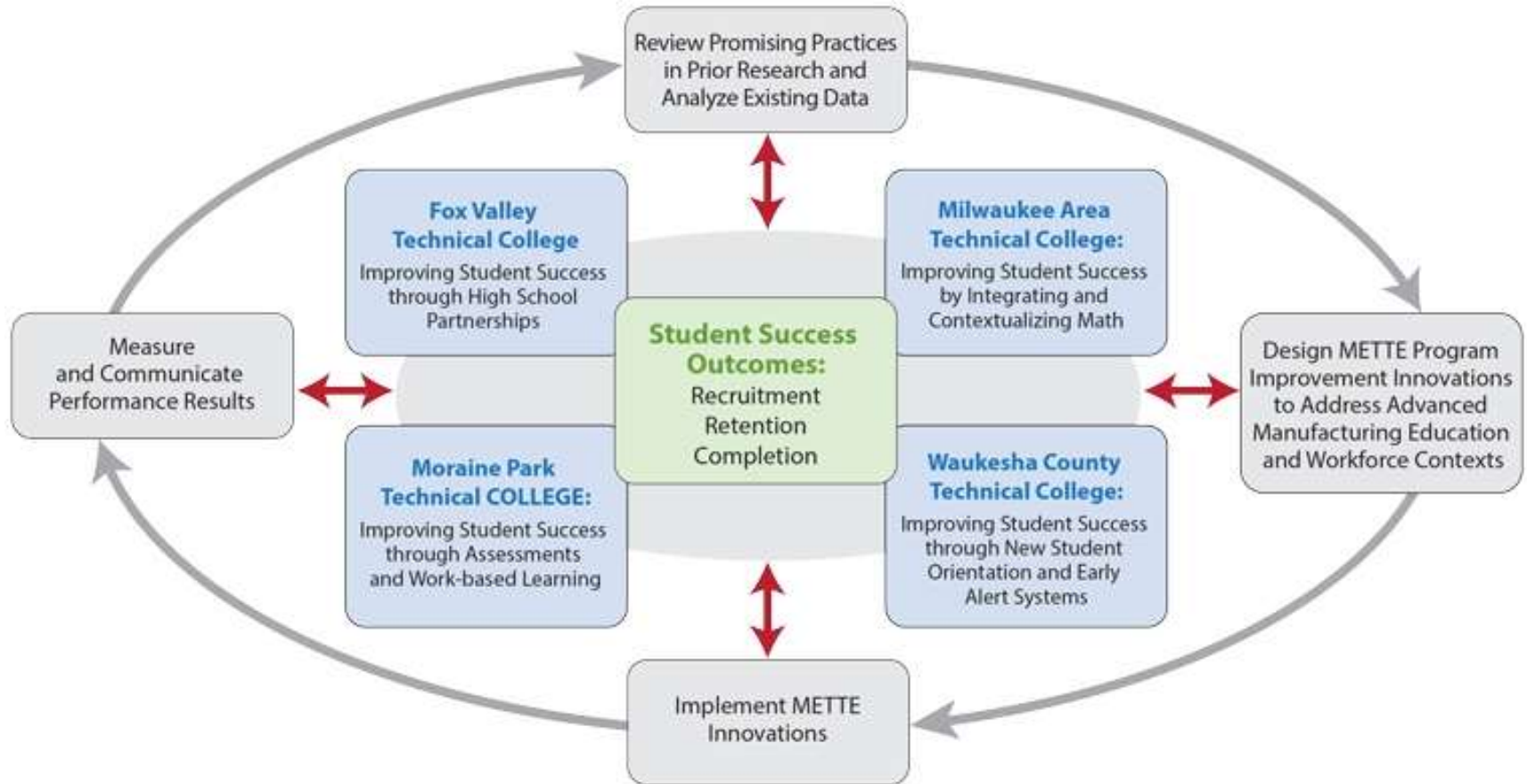
# Moving from Research to Application



# How Could These Indicators Be Used?

- **Inclusion in academic alert system**
- **Changes in advising**
  - Improved assessment and intrusive advising to remediate math deficiencies
  - Include information in orientation and advising to help students understand ideal student behaviors
- **Changes in scheduling and pedagogy**
  - Block scheduling to help part-time students mimic behaviors of full-time students
  - Building stronger ties between general education and technical studies

# Process Improvement Model



# Additional Resources

- **METTE Project website**  
<http://mette.wceruw.org/>
- **The Completion Arch: Measuring Community College Student Success**  
<http://completionarch.collegeboard.org/>
- **Achieving the Dream: Helping more community college students succeed**  
<http://www.achievingthedream.org/>
- **American Association of Community Colleges:**  
*Changing lives, building a workforce: Preparing community college students for jobs and careers*  
[http://aacc.nche.edu/21stCenturyInitiative.](http://aacc.nche.edu/21stCenturyInitiative)

# Acknowledgements

The METTE project staff gratefully acknowledges the active cooperation of the Wisconsin Technical College System Office and its staff whose willingness to share their administrative files and expertise and to coordinate the merging of data files from other partner agencies, including the Wisconsin Department of Public Instruction and the Wisconsin Department of Workforce Development, makes this research possible.

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