

Improving METTE Student Success through Greater Student Engagement

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Overview

Based at the University of Wisconsin-Madison, the METTE project is funded by a four-year grant with support from the Advanced Technological Education program of the National Science Foundation (NSF) to improve the education of manufacturing technologists and technicians for the high-technology fields that drive our nation's economy.

As one of four partner technical colleges participating in the METTE Project, Moraine Park Technical College sought to improve student success in METTE programs that prepare our postsecondary students to enter employment in manufacturing as entry-level manufacturing or engineering technicians or transfer to baccalaureate programs in fields related to manufacturing.

Manufacturing and Engineering Technician and Technology (METTE) Programs Moraine Park Technical College	
Program Number	Program Description
10-623-8	Process Engineering Technology
10-606-1	Mechanical Design Technology
10-620-2	Mechatronics
10-457-1	Fabrication Technologies
31-457-2	Metal Fabrication
31-442-1	Welding
32-444-2	CNC/Tool and Die Technologies

Importance of Retention

A critical indicator of student success is program completion. National estimates indicate that fewer than half of U.S. students who begin technical or community college with the goal of earning a degree or certificate succeed six years later (U.S. Department of Education, 2009). For students, the consequences of attrition include outlays for tuition and fees, foregone earnings, and greater frequency and longer duration of periods of unemployment (Baum & Payea, 2010). Implementing effective interventions that reduce the likelihood that students leave college early are also critical to reducing costs to colleges and the broader community as well (Belfield & Bailey 2011; Schneider & Yin, 2011).

Student Engagement

Most models of student success posit that active participation by students in the learning process through engagement with college faculty and staff, with other students, and with course material can improve student outcomes such as academic achievement, persistence, and completion

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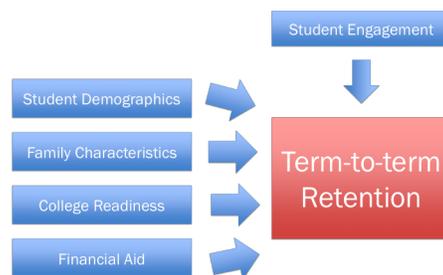
(Fike & Fike, 2008; McClenney, 2007). As part of the METTE project, MPTC chose to focus on evaluating our efforts to improve one aspect for student engagements--active and collaborative learning. In particular, we explored the impact on term-to-term retention of student participation in a college initiative to extend learning outside of the classroom for METTE students.

FACT Initiative

In 2013, Moraine Park Technical College, working with area manufacturers, began an initiative to build stronger connections between area manufacturers and METTE students. This outreach effort is referred to as the Forming Alliances to Cultivate Talent (FACT) Initiative. As part of FACT, students are provided opportunities to participate in plant tours or company tours, attend industry-based Manufacturing Expos, and attend in classroom presentations. FACT also provides performance-based stipends funded by area manufacturers to METTE students for continuous enrollment and high performance (See FACT brochures for student and manufacturers).

Model and Data

Underlying our analyses is a model that assumes that term-to-term retention (re-enrollment from Fall to Spring and Spring to Fall) is a function of student engagement in the learning process, student demographics, family characteristics, college readiness or previous academic preparation, and the receipt of financial aid. These are summarized in the model below.



We measured student engagement by the number of credits completed in the first term, the first term GPA, completion of College 101 (required college orientation course emphasizing learning strategies, goals, and skills needed to be successful in college), completion of an initial required mathematics course, participation in a manufacturing skills lab (provides learner support in math, communications, study skills, and test taking), and participation in FACT initiative activities as described below. We measured college readiness by completion of needed basic education courses and enrollment in basic education courses.

Research and Evaluation Questions

As part of the NSF-funded METTE project, each of the four partner technical colleges established a local network improvement (NIC) team. The NIC team at MPTC included the associate dean of manufacturing, faculty in the colleges METTE programs, program advisors, and an institutional researcher. The NIC team identified five research questions about the FACT initiative and we examined five research questions.

From the point of view of the college:

- Are METTE students who receive a FACT stipend more likely to be retained in the following term than are those who do not receive a stipend?
- Is participation in FACT activities among the factors that are associated with increased term-to-term retention of METTE students?

From the point of view of METTE student participants:

- What kinds of FACT activities do participants find most valuable?
- Is the FACT initiative meeting its program objectives?
- Does participation in FACT activities lead to greater likelihood of retention from one term to the next?

Data

To explore these five research questions, the MPTC NIC team used two sources of data. Our first source of data was the student transcript and administrative data available to the college for the students initially enrolled in a METTE program in Fall 2013 or Fall 2014. These included data on student enrollment and course completion, participation in the FACT initiative, student demographics, family characteristics, academic readiness including entrance placement scores and enrollment in remedial or developmental education, and receipt of various kinds of financial aid. A second source of data for our analyses was responses to a pilot survey of 33 METTE students who had participated in FACT initiative activities.

Findings

Key findings for each of the five research and evaluation questions we explored are described below.

Impact of Receipt of FACT Stipend

To explore whether METTE students who receive a FACT stipend more likely to be retained in the following term than are those who do not receive a stipend, we calculated term-to-term retention rates for METTE students initially enrolled in Fall 2013 or Fall 2014.

Spring Retention of METTE Students							
	Total	Receive FACT Stipend			Did Not Receive FACT Stipend		
	Enrolled Fall Term	Enrolled Fall Term	Retained in Spring	Percentage Retained in Spring	Enrolled Fall Term	Retained in Spring	Percentage Retained in Spring
Fall 2013	274	78	76	97%	196	143	73%
Fall 2014	275	47	44	94%	228	152	67%

Source: MPTC administrative records for Fall 2013 & 2014 METTE students

This data suggests that receipt of a FACT stipend is positively associated with retention. However, because receipt of a stipend is contingent upon obtaining a GPA ≥ 2.75 and continuing enrollment, the positive correlation is not unexpected. A negative correlation, however, would have raised questions about the efficacy of the stipends.

Factors Associated with Retention

To explore whether participation in FACT activities is among the factors that are associated with increased term-to-term retention of METTE students, we used logistic regression analysis. In this case, the dependent variable is the likelihood that a METTE student enrolled in the Fall term was retained in the following Spring term. We explored a number of combinations of independent variables to reduce inter-correlations between our potential set of predictors. Results from our final equation is described in the table below.

Predicting Term-to-Term Retention Logistic Regression Results			
Independent Variables	Significance	B(SE)	Odds Ratio
Completed 12 or more credits in 1 st term	*p < .001	1.722(.265)	5.235
1st term GPA ≥ 2.75	*p < .001	1.601(.254)	4.959
Completed basic education	p < .518	-.324(.499)	0.723
Completed College 101	p < .525	.191(.301)	1.211
Completed required college math	*p < .002	1.030(.301)	2.801
Completed Manufacturing Skills Lab	*p < .001	1.540(.401)	4.666
Completed basic education math	p < .887	-.089(.620)	0.915
Participated in FACT Initiative	*p < .001	1.824(.387)	6.197
Single parent	p < .679	-.168(.407)	0.845
Economically disadvantaged	p < .722	-.182(.510)	0.834
Employed full or part-time	*p < .020	.635(.271)	1.887
Academically disadvantaged	p < .489	-.312(.450)	0.732
Disabled	p < .722	.184(.478)	1.202
Minority	p < .075	-.845(.475)	0.429
Male	p < .156	.711(.501)	2.035
Age 25 or younger	p < .140	-.420(.284)	0.657
Received Pell Grant	p < .516	-.378(.579)	0.686
Received Federal Loan	*p < .002	.918(.282)	2.505

Source: MPTC transcript & administrative records for Fall 2013 & 2014 METTE students

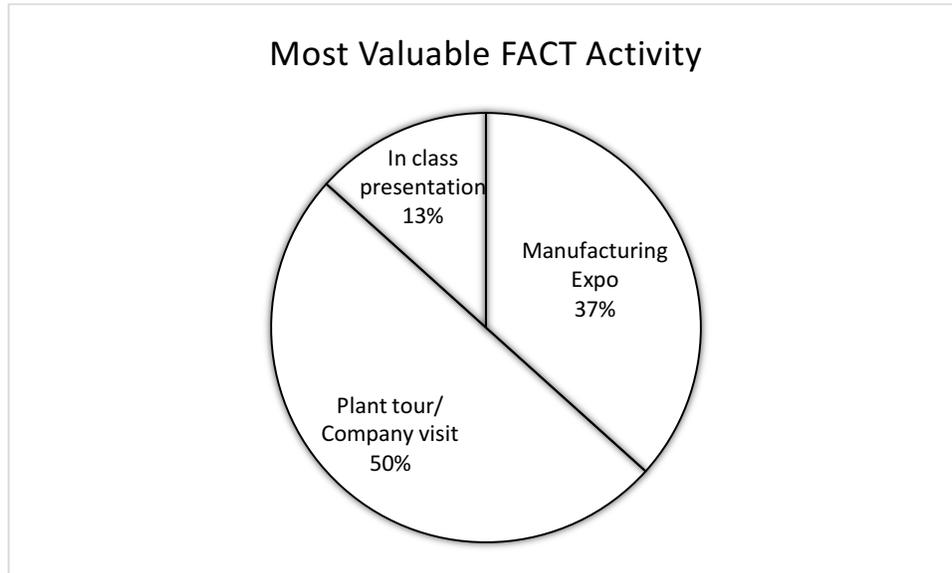
Our analysis indicated the first year students who:

- Completed 12 or more credits in the first semester
- Attained a first semester GPA of 2.75 or greater
- Participated in opportunities to learn about working in jobs related to the student's field of study as part of FACT
- Completed a required math course and
- Completed the manufacturing skills lab if needed

were significantly more likely to continue their education in the following semester than other METTE students. In addition, students who received a federal student loan and those who were employed either full or part-time were also retained at higher rate than were their peers.

Most Valuable FACT Activity

As part of the college's evaluation of FACT, we conducted a pilot survey of students who were FACT participants in the 2013-14 and 2014-15 academic years. A key question we asked students was which FACT activity was most valuable to you in increasing your understanding of the skills and knowledge needed to obtain employment related to your program of study.



Source: FACT Initiative Evaluation Pilot Survey

Our limited sample to 33 students indicated that they valued plant tours/company visits and attending the Manufacturing Expo more than in class presentations by industry representatives.

Meeting FACT Program Objectives

As part of our evaluation of FACT, we asked the pilot survey respondents to consider how much their participation in FACT assisted them in meeting each of ten program objectives.

From the point of view of the survey respondents, FACT activities were best at helping them better understand the technical skills and other skills and knowledge needed in their field. About 75% of the respondents indicated that participation in FACT helped them develop a better understanding of the manufacturing process and 71% indicated that FACT participation reinforced to them area employers' commitment to having the students complete their educational program. More than half the respondents indicated that FACT was meeting all the other program objectives except for connecting what students experienced as part of the FACT activities with the other learning that was occurring in the classroom.

Student Perception of Whether FACT is Meeting Program Objectives	Percent Responding Affirmatively
Better understanding of technical skills needed in field	81%
Learn about other required skills & knowledge needed in field	77%
Better understanding of manufacturing process	75%
Reinforce employers' commitment to completing educational program	71%
Supplement classroom learning	68%
Provide insight about employment prospects	65%
Enhance understanding of classroom material	61%
Clarify student's employment goal	54%
Build connections with employers	50%
Connect FACT activity with classroom learning	45%

Source: FACT Initiative Evaluation Pilot Survey

Impact of FACT Participation on Retention

Statewide estimates developed from a longitudinal database of all METTE students indicates that although about 30% of all beginning METTE students leave school each year prior to program completion, fewer than 10% of those students return in the third year and are even less likely to return to the same program in subsequent years. Therefore, term-to-term retention or continuing enrollment is critical to program completion. A major goal of FACT is to encourage students to complete METTE programs. To evaluate student perception of whether participation in FACT activities led to greater likelihood of retention from one term to the next, we asked survey respondents if various aspects of FACT encouraged them to remain in school.

Student Perception of Impacts on Retention	Percentage Responding Affirmatively
Learning about training-related employment opportunities for program graduates	67%
Learning about skills & knowledge needed to obtain training related job	64%
Learning about other skills & knowledge needed to be successful in labor force	58%
Receiving a FACT stipend	55%

Source: FACT Initiative Evaluation Pilot Survey

Although more than half of all respondents indicated that each of the various aspects of FACT had a positive impact on their continuing enrollment, two-thirds of the respondents indicated that learning about training-related employment for program graduates played a role in encouraging them to remain in school. Thus, while student engagement with employers is best at conveying

information about skills and knowledge needed to be successful in the labor force, it also has a positive effect on retention when students make connections with employers about future employment.

Implications and Next Steps

Nine thousand manufacturers in Wisconsin provide employment to a workforce of more than 460,000 employees. Term-to-term retention is key to successful completion of the technical college programs in manufacturing or engineering technology that lead to entry-level employment as a skilled technician or job advancement in manufacturing.

The results of our analyses suggest that efforts to increase student engagement through building partnerships with area employers can have a positive impact on student success through active and collaborative learning opportunities for manufacturing and engineering technology students.

Our examination of factors associated with increasing term-to-term retention suggests that two-year colleges should:

- Ensure students master academic challenges including basic skills and occupationally supportive math;
- Encourage student engagement within the classroom and with the employer community;
- Provide students access to financial aid; and
- Build strong ties to regional manufacturers that can provide insights into industry training needs and new technology, strengthen the appeal of manufacturing careers, and provide access to the pool of future employees.

Our evaluation of the FACT Initiative at MPTC suggests that while FACT is already having a positive impact on retention, it could have a greater impact on retention and program completion if instructors help students make more explicit connections between what they are learning in the classroom and insights about the labor market, working conditions, and employment prospects that the employer community can provide.

Finally, one way of implementing an ongoing evaluation of the FACT Initiative would be to develop a module within the college's classroom management software that could collect survey data from students enrolled in METTE programs was part of their classroom assignments. Adapting three or four key questions from the pilot survey into a "quiz-like" assignment in key classes unique to each METTE program could provide a simple and cost effective way to collect data on student participation in FACT activities and their perceptions of the usefulness of FACT activities to them, the extent to which FACT is meeting program objectives, and the impact of FACT participation on retention.

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APPENDIX A

FACT Pilot Survey

FACT Initiative Participant Survey

Moraine Park Technical College

Fall 2015

SECTION A: FACT Initiative: Linking Students with Regional Employers

In Fall 2013, Moraine Park began working with regional employers to provide students in our manufacturing and engineering technology programs with more opportunities to learn about working in occupations related to their program of study: through attending the Manufacturing Expo; participating in a plant tour or company visit; and participating in one or more classroom presentations by industry representatives or program alumni. This special effort by the college is called the Forming Alliances to Cultivate Talent (FACT) initiative and is funded through the MPTC Foundation by our industry partners.

1. Did you receive information about the FACT Initiative from any of the following?	Yes	No
a. One of your instructors	<input type="radio"/>	<input type="radio"/>
b. MPCT Foundation staff	<input type="radio"/>	<input type="radio"/>
c. Academic advisor	<input type="radio"/>	<input type="radio"/>
d. Other college staff	<input type="radio"/>	<input type="radio"/>
e. Other students	<input type="radio"/>	<input type="radio"/>

2. Thinking about <u>all your experiences</u> with the FACT Initiative activities, <u>how useful</u> was the information provided by each of the following activities in increasing your understanding of the skills and knowledge need to be successful in the labor market?	Very useful	Somewhat useful	Not very useful	Not at all useful	Did not participate in this activity
a. Manufacturing Expo	<input type="radio"/>				
b. Plant tour/Company visit	<input type="radio"/>				
c. Classroom presentation	<input type="radio"/>				

3. Thinking about <u>all your experiences</u> with the FACT Initiative activities, <u>how much would</u> the following activities have increased your understanding of the information being presented?	Very much	Quite a bit	Little	Very little
a. More preparation in classroom prior to participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. More preparation on my own part prior to participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. More opportunities to discuss what we learned after the activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Some other activity (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Which of the three kinds of FACT Initiative activities was most valuable to you in increasing your understanding of the skills and knowledge needed to obtain employment related to your program of study?

(MARK ONLY ONE)

Manufacturing Expo	Plant tour/ Company visit	Classroom presentation
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Thinking about the activity you identified in Q4 as being of most value to you, indicate how much your participation in the activity:

	Very much	Quite a bit	Little	Very little
a. Helped me better understand the technical skills needed in my field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Helped me learn about other kinds of skills and knowledge needed in my field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Enhanced my understanding of what I have learned in the classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Helped me connect the FACT activity with class discussions or assignments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Provided me with opportunities to learn things I could not have learned in the classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Helped me better gauge my own employment prospects in this field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Helped me in some other way. (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. What were the three most important things you learned from your participation in the FACT initiative?

1. _____
2. _____
3. _____

7. How aware are you of the names of the organizations or companies that provided the funds for the FACT Initiative scholarships?

Very aware	Somewhat aware	Somewhat unaware	Very unaware
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. How likely are you to consider the organizations or companies that provided the funds for the FACT Initiative when you seek employment?

Very likely	Somewhat likely	Somewhat unlikely	Very unlikely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION B: PROGRAM RETENTION

Many students leave school prior to completing their technical college program. A primary goal of Moraine Park’s FACT Initiative is to encourage our students to remain in school until they complete their technical college program while providing opportunities for students to make connections to regional employers.

9. Have you ever considered leaving school prior to completing your program of study?	Yes	No
a. In my first term	<input type="radio"/>	<input type="radio"/>
b. After my first term, but during my first year	<input type="radio"/>	<input type="radio"/>
c. In my second year	<input type="radio"/>	<input type="radio"/>

10. At this point in your education, <u>how likely</u> are you to withdraw from a class or leave school prior to completing your program because of the following issues?	Very likely	Somewhat likely	Somewhat unlikely	Very unlikely
a. Cost of attending school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Other financial issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Change in family obligations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Unprepared academically for the class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Opportunity to work full-time in my field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Class availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Commute to college is too challenging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Some other issue (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. <u>How much</u> have the following aspects of the FACT Initiative encouraged you to remain in school?	Very much	Quite a bit	Little	Very little
a. Receiving a FACT Initiative scholarship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Receiving information about employment opportunities for graduates of my program of study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Receiving information about the skills and knowledge I will need to find a job related to my training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Receiving information about the skills and knowledge needed to be successful in the labor force	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. I have never considered leaving school prior to completing my program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION C: BACKGROUND INFORMATION

SECTION C: BACKGROUND INFORMATION			
12. Thinking back to <u>when you first enrolled</u> in your current program, what was your <u>primary goal</u>?	Primary goal	Secondary goal	Not a goal
a. Preparing to start a career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Career change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Improving existing job skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Preparing for further education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Personal interest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Some other goal (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Now that you have been enrolled in the program for some time, what is your <u>primary goal</u>?	Primary goal	Secondary goal	Not a goal
a. Preparing to start a career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Career change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Improving existing job skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Preparing for further education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Personal interest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Some other goal (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Thinking back to when you <u>were considering enrolling</u> at Moraine Park, which of the following were reasons for <u>choosing your current program</u>?	Primary reason	Secondary reason	Not a reason
a. I was already working in this field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I had worked in this field in the past	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I knew someone working in this field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. I had some job shadowing experience in this field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. I had one or more classes related to this field <u>while</u> I was in high school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I had completed one or more classes related to this field <u>after</u> I left high school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. It sounded like something I would like to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Other reason (PLEASE SPECIFY)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. While you are attending school this term, about how many hours do you spend in a typical 7-day week doing each of the following?

	None	1 – 5	6 – 10	11 – 20	21 – 30	More than 30
a. Preparing for class	<input type="radio"/>					
b. Attending classes including labs	<input type="radio"/>					
c. Other college-related activities	<input type="radio"/>					
d. Caring for family members or other dependents	<input type="radio"/>					
e. Working for pay	<input type="radio"/>					
f. Commuting to college	<input type="radio"/>					
g. Commuting to work	<input type="radio"/>					

THANK YOU FOR PARTICIPATING IN THIS SURVEY.

We value your input. It will help us to evaluate the impact the FACT Initiative is having on students in the manufacturing and engineering technology programs and to improve this initiative to better serve our students.