

# Research with Practice— Contextualized Math Teaching in Manufacturing

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**<http://mette.wceruw.org/>**



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# Manufacturing Programs at MATC

Program Code	Program Title
10-603-1	Chemical Technician
10-605-1	Electronic Technology/Electronics
10-605-3	Electronics-Computer
10-605-6	Bio-Medical Electronics
10-605-7	Electronic Engineering Technology
10-606-1	Mechanical Design Technology
10-621-1	Welding Technology
10-623-9	Quality Engineering Technology
31-420-1	Machine Tool Operation
31-421-2	Mechanical And Computer Drafting
31-442-1	Welding
31-444-1	CNC Machine Operator/Programmer
32-439-1	Tool & Die Making

# Projects at MATC

- Purpose: to prepare students who fall under the math cutoff scores for full admission.
- Project #1-For Associate Degree METTE program students - a new one-credit companion course to MathGen-110 that contextualizes math learning using examples from manufacturing to support Associate Degree students who are in the prepared-learner level math course

# Projects at MATC (continued)

- Project #2 – For METTE Diploma program students - a program specific math course with support from adult basic education (ABE) and hands-on learning, such as blueprint and shop courses. For example, the “Pathway to Welding” certificate program includes the following courses:
  - WELD-380 – Welding Math – 1 credit with Basic Skills Math
  - WELD-360 – Blueprint Reading for Welders – 2 credits
  - WELD-315 – GAS Metal Arc Welding Practices – 5 credits
  - QETECH – MSSC Safety – 1 credit

# Design of the study

- Research questions
  - Does a contextualized instructional approach to developmental math courses effectively help students improve math skills?
  - In what ways does the contextualized approach shape students' math learning experiences?
- Qualitative approach
- Data collection
  - Interviews with instructors and students
  - Class observation

# Findings

- Math as a complexity for students
  - “There is just too much information. It is like you go to a restaurant, and they give you a big menu. It is hard to pick out something specific, because you have so much. By being so much, it is intimidating.”

# Findings

- Students are motivated to learn
  - “Don’t just give it to me and let me pass a C or D. I don’t want to just pass by the basic knowledge of it. If I don’t understand something, guess what, I want to know.”

# Findings

- Needs for contextualized instruction
  - “If we don’t need this math in everyday in whatever the field we are going to, we don’t need it... Because if we cut something, we need to know why do we have to do this in order to get to this point... A lot of the math classes they don’t actually do that.”



# Findings

- Faculty-student relationship
  - “That is why I say this is like a ‘home room’. This is something every student should have, something where you can go and get your foundations
  - “This is the only class like this [where] you can have that hands-on benefits and the connection with the teacher.”

# Findings

- Create a “warm” atmosphere for learning
  - “This is what [this class] does. It helps you work out what the problem is, whatever the problem is. If I got a problem in welding, I got [the instructor] to help. If I got problems in English, I would go to [the instructor], although I don’t know how much [the instructor] knows about English. But [the instructor] can direct me to the right position.”
  - “[The instructor and I] write [the question] out and we go through it. And we might go through it a couple of times, but we get it. That’s the thing.”

# Findings

## ➤ Contextualization

- **“Trinity: math, blueprint, and workshop.”**
- “Breaking knowledge down to beginners’ level” was the common technique the instructor used to help student understand.
- “I show, you try, and I help.”
- Students also favored the “question-answer, more questions, refine answer, and try it yourself process.”

# Findings

- Impact on students
  - “Sometimes you feel you have already given your best, but it is still not working. That sense is kind of defeating. But if you got 195, how can you lose. When you get math, it gives you a personal up boost. You know, like I can do math. It is not everybody can do math. It is more personal, it is more like the ego boost.”