



Department Chair's Guide to Developing a Project Based Integrated Systems Curriculum

Industry Needed Competencies

A department chair must consider and balance many details in determining competencies that are specified in a technical curriculum. Today, manufacturing technology requires technical graduates to possess a **systems approach** to plant operations and troubleshooting. These systems often consist of multiple and different technologies, traditionally taught separately. Thus the department chair must structure the learning experience to achieve the development of competencies through multiple projects simulating the manufacturing systems environment. This task requires and benefits from a close collaborative relationship with the industries served and by advisory committees that give perspective. A similar collaboration occurring through the Multi-State Advanced Manufacturing Consortium (M-S AMC) has produced 20 industry-vetted courses, containing competencies that can further assist the department chair. These are available through the Resource tab on the national M-S AMC Web Site.

Performance within these curriculum projects becomes the measurement system that validates the achievement of the competencies (which include skills, communication, safety applications, attitude, theory / knowledge elements, use of tools, etc.).

Establishing milestone projects made up of several technologies allows the department chair to develop curriculum competencies using an integrated systems approach. Additionally asking students to come up with multiple solutions to project problems stretches their perspectives and causes them to realize that there are often multiple ways to solve of problem. This process also encourages teamwork and critical thinking, a much needed set of skills in industry.

To this end, a list of considerations is presented that might be summarily contained in a range of projects. These projects can then be assessed through use of rubrics made up of elements of the list below.





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Project Considerations

Skills Demonstrable

- What tasks/skills are required to do the job?
- How & Where should skill be demonstrated?
 - Student observation of a demonstration of the skill required? (Instructor demo, online demo)
 - Student participated or assisted in demonstrating the skill?
 - Student demonstrated the skills unassisted?
 - Student can teach the skill to someone else?

Knowledge Element

- What does the student have to know in theory and in practice to do the task or demonstrate the skill?

Attitude

- What attitude about safety, cleanliness, co-workers, equipment should prevail about this task
- What elements of problem solving need to be taught and demonstrated with regard to this task?
- What goals need to be set in the task to enable the operator to self-regulate?
- Teach and measure the proper strategies such as time management, productivity, problem solving, troubleshooting in order to obtain a powerful performance of this task.
- Teach and measure the student's ability to self-evaluate and determine if the task met their pre-set goals?





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Use of Tools

- What tools/equipment/books/resources/online access/instructor information does the student need to be able to use?
- Teach and measure the ability to use required resources efficiently for this task?

Related Safety

- What safety measures will industry require for specific task/job with regard to the operator (i.e. Personal Protective Equipment)
- What safety measures will industry require for specific task/job with regard to the nearby co-workers?

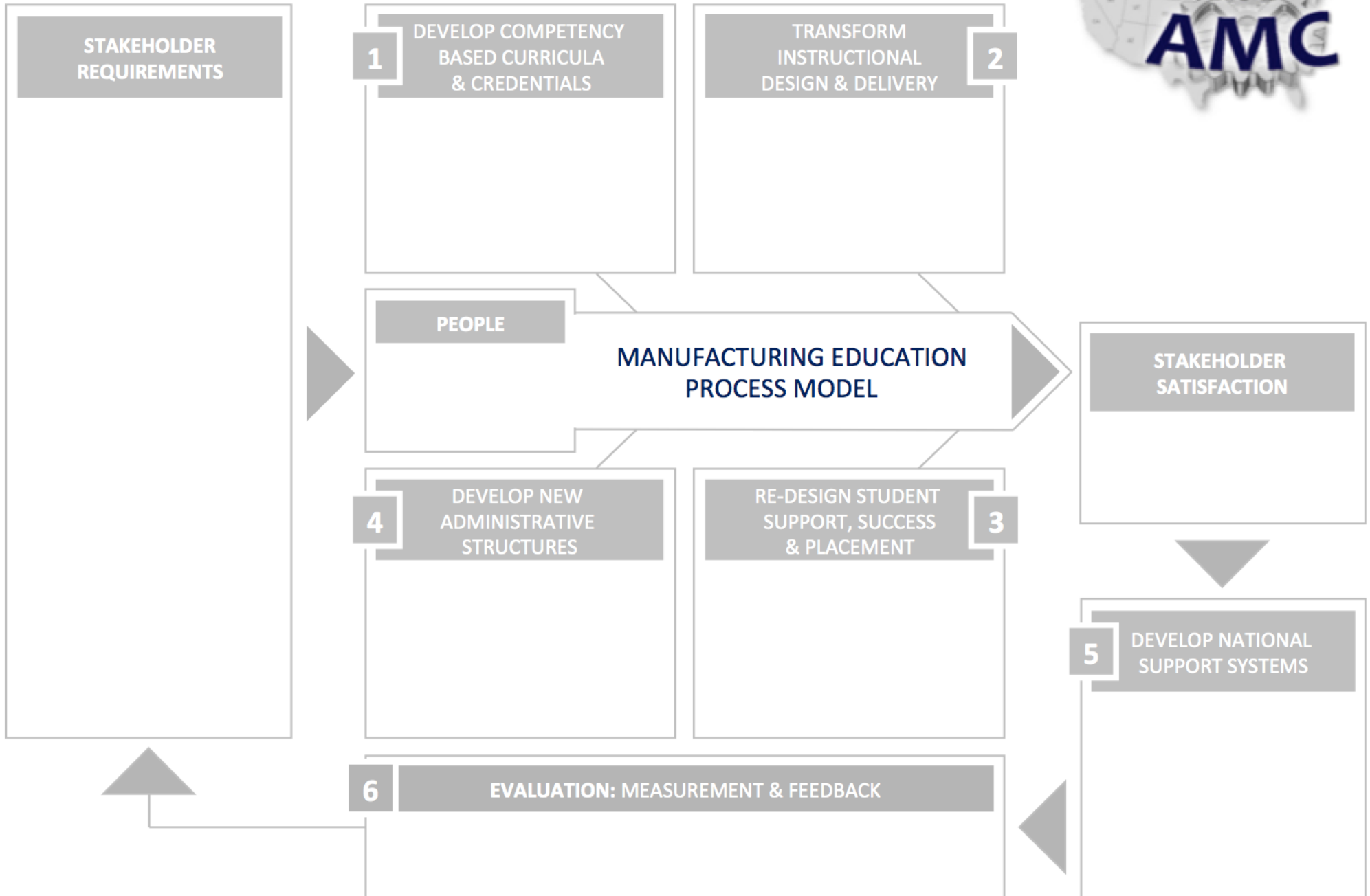
Communication

- What terminology must the student know to communicate effectively with others? (i.e. Operation, Technician, Supervision)

Manufacturing Education Systems' Process Model Template

The next page contains a blank "Manufacturing Education Process Model" that can be a useful tool in the development of a manufacturing course or curriculum.

COLLEGE NAME Manufacturing Education Process Model





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