

How To Develop Curriculum

After determining your statement of aims and beliefs about learning, follow the steps of the **Systematic Curriculum & Instructional Development Model** (Norton, DACUM Handbook, 1997) below to develop a high-quality, flexible curriculum.

1. **Curriculum analysis**
 - a. Needs and job analyses
 - b. Task verification & selection for materials
 - c. Standard task analysis (identification of performance steps and decisions, essential knowledge, industry standards, etc., needed to develop accurate and relevant teaching and learning materials)
 - d. Literacy task analysis (necessary skill set—communication, mathematics, science, computer, and decision-making)
2. **Curriculum design** (based on step 1)
 - a. Develop learning objectives
 - b. Develop performance measures
 - c. Determine educational approach
 - d. Develop educational plan
3. **Instructional development**
 - a. Develop a competency profile (for competency-based programs) or a curriculum guide (for traditional programs)
 - b. Develop learning guides/modules (for competency-based programs) or lesson plans (for traditional programs)
 - c. Develop supporting media
 - d. Pilot test and revise the materials
4. **Implementation**
 - a. Bring together resources for implementation
 - b. Implement the program
 - c. Conduct formative (in-course) evaluation of student and instructor performance
 - d. Document effect of the program (student achievement and instructor performance)
5. **Program evaluation**
 - a. Conduct summative evaluation
 - b. Analyze and interpret information

Lessons Learned

- Development of quality materials can take four to five years
- Materials development timelines should include development, verification of materials by appropriate experts, and pilot and field testing
- Design teams should include a range of expertise, e.g., instructional and assessment designers and faculty and industry content experts
- All materials should include specific subject matter and competencies, learning activities, and traditional and alternative assessments
- Because materials need regular updating, they need to be flexible and funds, perhaps from royalties, need to be earmarked to support this
- Extensive (more than two days) professional development is needed to implement materials faithfully
- Projects should report on materials development processes in order to encourage accountability and use of best practices
- The materials development process as well as the quality of the materials should be evaluated, emphasizing student outcomes



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Advanced Technological Education (ATE) Program

Developing High Quality Educational Materials



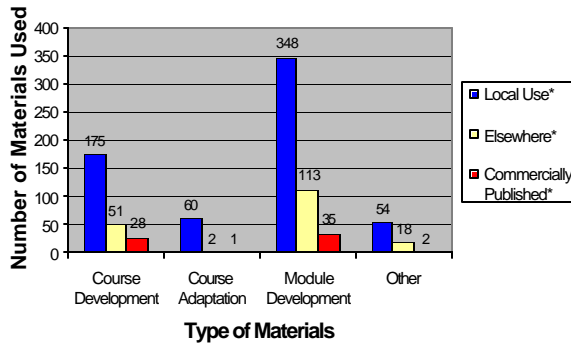
Gloria Rogers

Additional information about materials development and the ATE program evaluation is available on-line at <http://ate.wmich.edu>.

Survey 2001 Results

Large numbers of instructional materials developed by ATE projects (n=52) are being used in various settings. Approximately 80% of the materials targeted the associate degree level, and the materials represented 16 disciplines. These materials have been validated in three fundamental ways.

Use of Materials Developed by ATE Projects



* Categories of use are not mutually exclusive.

Use of Validation Practices by ATE Projects to Assure Quality Materials

Materials Validation Practice	Freq. of Use**	
	Each or Most Time(s)	Less than Half the Time
1. Involving industry in development		
Initial industry verification of materials	79%	10%
Industry - and student-based standards	88%	6%
2. Testing materials during development		
Pilot test	82%	8%
Field test internally	86%	4%
Field test externally	48%	33%
3. Comparing student knowledge and skills to		
Industry standards	54%	23%
Educational standards	50%	32%
Non-technical skill standards	44%	36%
Other non-project students	42%	33%
Performance in the workforce	34%	34%

** when applicable

Framework for High Quality Materials Development

In the ATE program, materials development includes both the materials and the processes used to create them. Materials can be courses, modules, process models, and/or other instructional or assessment units. Materials reflect the decisions made throughout the development process. The comprehensive development process includes conceptualization, design, and field testing.

High Quality Materials

- 1. Result from formal needs analyses** Needs are identified in conjunction with industry partners for whom the technician education is targeted through analyzing strengths and weaknesses of the current curriculum and/or anticipating future needs for technical preparation. Needs are then translated into learning goals.
- 2. Are industry verified** Materials reflect industry practice, anticipate needs of industry, and contain competencies reviewed and validated by industry partners.
- 3. Have clear learning goals and objectives** Materials contain clearly articulated learning goals and list the evidence to be used to show achievement of the goals.
- 4. Are part of a systematic curriculum development process** Where and how materials fit within a complete curriculum is carefully considered.
- 5. Support and identify appropriate instructional strategies** Materials acknowledge the complex relationships among materials, pedagogy, and assessment through their careful alignment.
- 6. Are piloted and field tested** Materials are validated for understanding, appropriateness for multiple users, and effectiveness in promoting learning locally and at selected test sites before publication and general dissemination.
- 7. Are continuously revised based on evaluation and research evidence** Evaluation findings regularly guide the creation and revision of materials. Industry helps validate the outcomes of the materials. Teacher understanding of and student learning from the materials is researched.

