Perspectives

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3:1 Practical Experience

The Automotive Systems Story

The Automotive Systems program at the Main Campus of Wake Tech educates the technicians of the automotive future, and this means ensuring that basic theories and diagnostics apply across the entire program. Says Michael Storey, Associate Professor, "Torque is explained in the first semester and how it is established by the engine and used with fasteners. In each additional semester we revisit torque and how we take advantage of it throughout the gear train, brakes, and suspension." As the program prepares its graduates for entry level positions in the automotive field, it emphasizes the practical over the theory, programming at least three hours of hands-on lab time for every hour of lecture. Because cars are becoming more and more sophisticated, Gerry Egan, Assistant Professor and Instructional Department Head, and his team created an eight-step diagnostic process so students could work gradually through this complex process. Always looking forward to the automotive future but never discarding the educational past, Automotive Systems has created a structured learning process that is efficient and effective.

> *"Whereas teacher expectations place constraints on the form of what is to be learned, the entering capabilities of the student population determine the level of detail with which the competence rules must be specified."*
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> -Joseph Scandura, "Instructional Strategies Based on the Structural Learning Theory"

Structural Learning

Have you ever taken a class where a topic was discussed once, never to be discussed again?

College must never be a place where a "box is checked" for the sake of completion alone. We must create a sense of structure in our practice.

We want to create opportunities for students to learn that "stick" not only throughout their college experience but into their professional lives.

Reinforcing key concepts from a foundational course through a capstone serves to send a strong message – that a skill or knowledge attained is an important one, important enough to be practiced and emphasized over and over.

It All Starts with "the Code"
Electrical Systems

Richard Moore, Professor and Program Director for Electrical Systems, a Skilled Trades program based on the Main Wake Tech Campus, says that structured learning has always been the pedagogical theory for his department, which includes courses in residential and commercial wiring and in photovoltaic systems. "The terms, conceptions, and use of the National Electrical Code (NEC) are critical to all subsequent courses, which is why it is programmed into the first semester of both the AAS and diploma programs. The calculations and material requirements for wiring come directly from the NEC, and students must be more than familiar with the standards as they progress through the practical courses.

Using a structural learning approach means taking the NEC in small amounts initially, as students familiarize themselves with how the code is written and organized. Later on, students apply what they know and understand to their practicum, ensuring that when they seek employment, they will present code-compliant and safe electrical wiring practices to inspectors and homeowners.

Electrical Systems also recognizes that the professional, or employability, skills of their students require constant reinforcement and emphasis. Says Mr. Moore, "The skills introduced early are timely attendance, preparation to work, persistence and diligence through a project, and lifelong learning habits." The electricians of the future are learning their craft in a highly structured and continuous experience.

Math is Never Forgotten
Civil Engineering Technology

Beth Ihnatolya, the Program Director for Civil Engineering Technology & Geomatics/Surveying, says this about structural learning:

"We feel that if skills aren't used frequently, they can be forgotten. In addition, the more they are used, and in a variety of ways, a deeper understanding is developed which can be applied to various situations. This is especially important since these skills will be applied in the workplace and most companies are different from each other meaning that a deeper understand and ability to apply knowledge is imperative."

These engineering technology disciplines are profoundly structural in their philosophy and with their rigorous mathematics component, must program with an "iterative lens," enabling students to learn problem solving in foundational, intermediate, and advanced ways. "We start with the basic math skills and then learn to apply them to engineering type situations. For example, in designing culverts, algebra and geometry are used. In delineating watersheds and calculating runoff, geometry and algebra are used," Ihnatolya and her team say. Students, comfortable with application-based math, excel in technician roles in many types of engineering firms.