



Lansing Community College

From Art to Part

A Continuous Line of Teaching

Prepare Students for Today's Shop Environment by Seamlessly Linking CAM Programming to CNC Machining

At Michigan's Lansing Community College (LCC) Mark McComb, CAD/CAM Instructor and Jeff Tarr, CNC Machining Instructor teach the two ends of the art to part manufacturing process. McComb focuses on product design and cutter path creation. Tarr is responsible for developing flawless NC programs, ensuring productive and safe CNC machine operation, and producing high quality parts. The two men use the Internet-based, Virtual Training Environment for CNC (VTE-CNC), powered by Immerse2Learn.com to create a continuous line of teaching.

Increased Productivity

McComb and Tarr credit the Internet-based Learning System with dramatically boosting their productivity. "With VTE-CNC," says McComb, "I can teach the same material in 96 contact hours that once required 288 hours. We've consolidated three courses into one because we're more time-efficient."

- Students spend much less time waiting to use machines.
- Students use the machines more productively when they're on them.
- Tightly link CAD/CAM to CNC machining instruction, so students can transition fast from automated to manual programming, CNC control interface, and general machining operations.
- Learning can be customized to meet changing industry demand.

"Our student's basic instinct is to get through our program, find a job, and start earning a good quality of life," McComb states. This won't be hard, because there are more than 200 machinist jobs vacant in the five-county area around Lansing, Michigan. Some students receive offers prior to graduation.

Total Training Solution

VTE-CNC's complete system consists of software with tutorials and quizzes and virtual CNC control panel and 3D machining centers that help teach machine tool operation. Students can access the materials 7/24 on line in school or at home, learn at their own pace,

and back up to review or repeat as much as they wish.

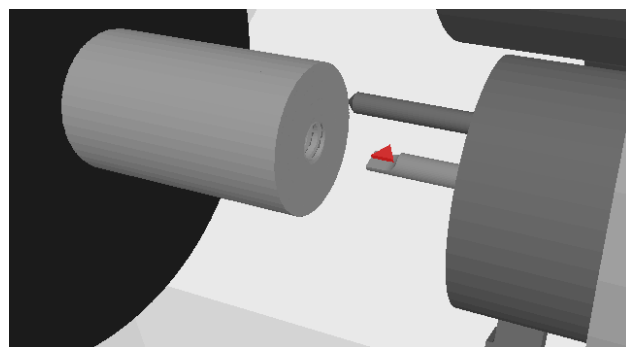
"With VTE-CNC, students come to class enthusiastic and better prepared," says Tarr, "The virtual training environment is more interactive than a textbook. "Students can read about the subject, view an operation on interactive video, play it forwards and backwards, take it apart, and see how it works.



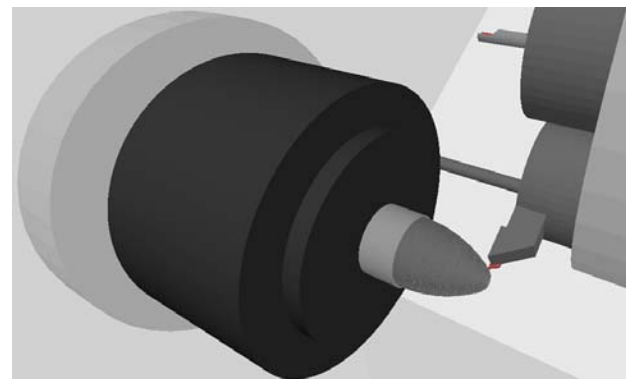
Mark McComb, Computer Aided Design and Manufacturing Instructor

"With VTE-CNC, students come to class enthusiastic and better prepared. In the first year, we realized our return on investment."

- Jeff Tarr



Egg design and machine project: threading process. Simulated with virtual CNC panel and 3D machines in VTE-CNC.



Egg design and machine project: contour roughing and finishing. Simulated with virtual CNC panel and 3D machines in VTE-CNC.

"Today's young people are computer oriented," he continues. "They work comfortably with the fast-paced VTE-CNC materials, which provide a tremendous amount of information. I've had instructors tell me that they taught more in thirty minutes to students prepared with VTE-CNC than they did in three contact hours before using the virtual training environment."

VTE-CNC has tools that allow instructors to customize the system to meet a variety of training needs. When students required more information about Cartesian Coordinates, the



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3D spatial system, McComb inserted a Power Point presentation as an additional "learning resource." VTE-CNC also lets Tarr pick and choose the learning modules he wants to use. "If I'm teaching lathe," he states, "I can activate the appropriate learning modules to deliver a controlled and focused lathe class."

250% Throughput Increase with Virtual Training

Students use VTE-CNC to edit the CAD/CAM generated or manually written part programs. "If the code they've written will crash the machining center, the software tells them," says Tarr, "and they correct it in a truly virtual environment." Once the program is visualized in a 3D interactive environment, students move to a machining center and make parts with it.

In the past, students edited programs on a machine tool and sometimes monopolized it for an entire class period while others had to learn by observing. "I wasted valuable instruction time managing student access and answering the same CNC operation questions for each individual," says Tarr.

LCC has five mills and five lathes in its advanced manufacturing program, says McComb. "Before we had VTE-CNC, we could teach ten students at once on those machines, but nowadays our capacity is 25. Based on our increased throughput, I guess you'd say the payback is 2.5 to 1."

Once they have demonstrated that they are ready in VTE-CNC, up to ten students can work on the mills and lathes while the others learn with virtual CNC panels and 3D machines. VTE-CNC reproduces the controls of a Haas CNC machine and the steps it takes to make a part. Students access it on line, practice machining in a virtual environment, and even make a virtual part before they work with a real machine tool. McComb can project any image from VTE-CNC in class, so a roomful of students can observe a virtual machine at work instead of crowding around a real one. Virtual preparation means more self-confident students, McComb reports. Machine tools can be frightening to a beginner, because they work so fast and make chips and noise. Students who have worked on VTE-CNC virtual control panels and machines know what the controls look like and are better prepared for everything that will happen in the real world.

Local manufacturers need advanced CNC training for new hires and current employees who wish to upgrade their skills, but industry wants to keep its machines—and its people—working. This has created an opportunity for LCC. "We use our online curriculum and VTE-CNC for the first level of training," says McComb, "and can deliver custom instructor-led training." Once trainees complete their virtual preparation, they get hands-on experience on LCC's machines—or on the job.

"In the first year, we realized our return on investment with the VTE-CNC training system." Says Tarr. "Immerse2Learn.com has always been very responsive to our product support needs."



After proving their knowledge in VTE-CNC, some of Mark McComb and Jeff Tarr's students are ready to advance to real CNC panels and machines.