The fourth step to develop a CNC training course (step 1 is in issue 4, step 2 is in issue 5, step 3 is in issue 6)

Constantly strive to improve

While you deliver your new course for the first time, you'll likely find certain areas to be lacking. There is, of course, always room for improvement. If you are an experienced instructor, the easiest way to find areas in need of improvement is to judge your comfort level as you present the course. If you are not comfortable and confident with your delivery of a given topic, the course materials related to the topic (visuals, lecture, lab, etc.) probably need to be improved.

Unfortunately, new instructors will have difficulty judging quality of presentation in this way. Nothing will feel totally comfortable, regardless of how good the presentation materials are. And even experienced instructors may have similar problems the very first time a new presentation is delivered.

A better way to determine quality of presentation is to gauge the students' response to your course materials. But even this method may not be failsafe. Each class you teach will, of course, have a new set of students, meaning the average aptitude of students in your first class will affect your ability to judge the quality of presentations. (Remember, students with high aptitude make it easy for instructors to teach!) This means your need to improve will be on-going.

If *but one student* is struggling with course materials at any point in the course, it should be taken as a warning signal. If several students are

PowerPoint Tips

Editor's note

Microsoft PowerPoint is fast becoming the software product of choice for professional presenters. Each issue of *Instructor Notes* will include PowerPoint Tips to help you improve your slide show development skills.

The Microsoft website

PowerPoint users have a vast array of tools and resources available with the standard PowerPoint product. In addition to drawing, text, and presentation tools, a variety of templates, clip art, and other helpful resources are included right on the CD-rom disk that accompanies the product. Frankly speaking, this may be more than enough for the average presenter.

But any presenter should be aware of the additional functions and features available to them through the Microsoft website (www.microsoft.com). To get information more specific to PowerPoint, click *Office* under Product Families from the navigation menu.

Templates – From the Office page, click *Templates* from the right navigation menu. There are a variety of templates available. Of specific interest to instructors will be the choice for *Publications and Education*. If you click the link *For Teachers*, you'll be rewarded with a series of templates, including certificates, class schedules, notebook dividers, and many others (some not related to PowerPoint).

Clip art – Again, a great deal of clip art comes right on the CD-rom accompanying PowerPoint. But an almost unlimited supply is available from the Microsoft website. From the Office page, click *Clip Art* from the right navigation menu. What's really nice about this clip art is that you can easily search for a piece of clip art. Simply type a your search criteria under *Search For* (like "teaching") and you'll be shown thumbnails for the art you can download. This is about the

fastest method I've found for locating appropriate artwork for presentations.

In addition to easily searching for clip art, you can choose from several categories (including academic).

Updates – Click *updates* from the Office page. Serious Office and PowerPoint users will want to confirm that they're using the most recent version of their software on a regular basis. If, for example, you haven't installed Service Pack 1, It's likely that you're not working with the most recent version. (The site will even automatically detect whether this update is required. To do so, from the *Products Updates* page, click the link for *Use automatic detection to find the latest Office product updates for this computer*.)

How-to Articles – From the Office page, click the link for *How-to Articles* from the right navigation menu. Next choose PowerPoint (you can get articles for all Office products). You'll be able to choose from a variety of topics, including automating tasks, graphics, presentation design, slide formatting, special effects, among others. Included for each topic is a variety of articles you should find of interest.

Tips and Tricks – From the Office page, click *Get more tips and tricks* from the right navigation menu. A variety of helpful hints will be shown.

Teaching with our curriculums?

Recent developments…

- *Machining center curriculum has been updated.* If you are using this curriculum and have not received the free update, please call us.

- *Curriculum update information now on our website.* This page includes corrections to known problems, update information, and other important information about our curriculums.

Add-ins – I think of Microsoft add-ins as like afterthoughts for the product. A user probably suggested something of value that Microsoft deemed worthy of providing, but not as part of the full version. Probably Microsoft feels that the feature being *added-in* will not be of interest to everyone.

You'll want to find out what add-ins are available (check back on a regular basis). You may find something that will be helpful with your presentations.

To see the list of available add-ins, from the office page, first click *downloads* from the left navigation menu. Next click the link for *PowerPoint*. From the page that comes up, set the version to match your version of PowerPoint, and then check only the box for *add-ins and extras*. When you click *Update list*, you'll be shown the current list of add-ins available for your version of PowerPoint. At the time of publication for this issue, there are three add-ins for PowerPoint 2000, including *Office Sounds* (sound clips you can insert in your presentations), *Photo album* (makes it easier to get pictures from your hard drive), and *Advanced animation techniques tutorial* (to help you develop more impressive animations).

Check it out – You're sure to find more in the Microsoft website than we've discussed in this short article. Obviously, websites change from day to day, meaning some of what we've shown will not be available forever. Additionally, Microsoft is constantly adding new items, so you'll want to check for new features, and updates on a regular basis. In any event, you should find this site to be quite helpful and informative!

End

Publicize your school

We maintain a **schools forum** on our website (www.cncci.com). It's free – and it's a great way to let potential students know about your CNC-related courses!

Simply fill in an online form that asks for some general information about your CNC courses, lab equipment, and degree information. About half the schools currently listed are using our CNC curriculums to help them teach CNC courses!

The 4th step… *(continued from pg 1)* struggling, the warning signal is amplified. If everyone is struggling, it should be obvious that this is an portion of the course that must be improved.

Create or improve analogies

One great way to help students understand even complex material is to provide analogies to everyday life. If appropriate, the analogy will help students understand difficult topics by relating them to something they already understand. And since students are struggling, you'll have to develop additional presentation materials anyway – an analogy should be your first choice. We consider analogies to be so important that we include an analogy-related article in every issue of this newsletter.

More and/or better practice

While students may understand the principles behind complex topics, they may not be able to demonstrate their understanding (yet). The topic is simply so new to them that they cannot translate what they know to correct responses in the exercises you've provided. They may simply need more time in practice. As you develop the new or improved exercises, be sure to target the area in need of improvement.

I have found, for example, that entry level turning center students have difficulty understanding the concept of diameter programming. When faced with the task of calculating the coordinates related to chamfers and radii, they commonly make mistakes (since chamfers and radii are specified as radial dimensions and must be doubled to determine diameter values). I can talk until I'm blue in the face, but until they've done enough practice, they really won't catch on to this important point.

Demonstrations

When developing a new curriculum, it can be difficult – if not impossible – to predict how quickly students will catch on to a given topic. One (almost) sure-fire way to ensure comprehension is to show the concept in action. And an appropriate demonstration will do just that.

When it comes to tool length compensation on machining centers, for example, you may have to go out to the machine and show what happens when tool length compensation is instated. Manipulating tool length compensation offset values will help you easily show students what happens when tool length compensation is instated. You can, for example, show what will happen if the setup person forgets to enter a tool length compensation value for a given tool (and the offset value is zero). Since a crash will occur in this case (assuming tool length is stored as the offset value), this demonstration should make a long-lasting impression!

Full comprehension must be achieved!

Remember that many of the topics you're teaching involve a degree of danger. For these areas, you must confirm that students fully understand. At the very least, they must understand the potential danger related to the task/s you are presenting. Full mastery of such techniques must be achieved by everyone who will be expected to perform these tasks when the course is finished.

End

Favorite analogies

You can't have enough analogies in your basket of teaching tools. Analogies make it easier for students to understand complex topics by relating things to them that are familiar and easier-to-understand. In these discussions (which will be included in each issue of *Instructor Notes*), we will relate a few favorites. Note that these analogies are commonly incorporated right into the slide shows included with our curriculums.

The importance of preparation

You cannot overstress the importance of being prepared to tackle the various tasks related to CNC usage. A programmer, for instance, must be appropriately prepared to write the CNC program. Preparation steps for a programmer include developing a sequence of machining operations (process), marking up the print to include program zero and clamps & obstructions, doing the math needed for positioning coordinates, and checking to make sure tooling is available and appropriate.

In similar fashion, a setup person must be prepared to make the upcoming setup – and a CNC operator must be prepared to run out the production run. Truly, any CNC-related task will be done easier and quicker if the person performing the task is appropriately prepared.

An ill prepared speaker will be likely to make mistakes…

…so will an ill-prepared programmer!

In our CNC curriculums, this is part of key concept number two. During this discussion, we relate a simple analogy. As a presenter, you may find this analogy to be of particular interest.

I begin the analogy by saying, "You've all had to make a speech at some point in your life. Possibly during speech class in high school – or maybe you've had to stand up in front of a church group. In any event, you know how important it is to be *prepared* to give your speech.

"You probably started by coming up with some kind of outline. Maybe you created a series of note cards to be used during the speech. It's likely that you practiced the speech several times by yourself before actually delivering it to your audience.

"If you ever tried to give a speech without appropriate preparation, you know that you can look pretty silly in front of your audience. You'll obviously lose credibility very quickly if you stammer and stutter throughout the presentation. Worse, ill-prepared speakers are likely to make mistakes. Maybe you'll forget to include an important topic – or maybe you'll state inaccuracies if you haven't prepared to give the speech.

"In similar fashion, an ill-prepared CNC programmer is likely to make mistakes when writing the CNC program. And in addition to looking pretty silly, an ill-prepared programmer will be a dangerous programmer!

Point out that, frankly speaking, the real work related to programming is done in the preparation stages. While entry level students may not yet agree, explain that experienced programmers will agree that actually writing the program is actually the *easiest* part of the programming process. The real work lies in the preparation.

Relate that of particular importance is developing the machining process to be used by the program. With a good process, even a poorly formatted program can eventually be made to work. But with a poor/bad process, even a perfectly written CNC program will fail – even if it does exactly what the programmer expects it to.

Point out that this process will also act as the set of note cards, keeping the programmer on track when writing the program – making them less likely to forget a machining operation (again, you can look pretty silly if you forget to drill a hole before you tap it!).
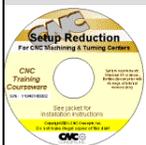
Explain that doing the math prior to programming will keep the programmer from having to make calculations while programming. Calculations that should be done up front include coordinate calculations, feeds, and speeds. If mistakes *are* made, this preparation will also allow the programmer to go back and find out *how* the mistake was make – so they can avoid the mistake in the future.

End

What are your best analogies?

If you'd like to share a favorite analogy, just let us know and we'll publish it in a future issue of *Instructor Notes!*

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Instructor Notes Newsletter Enclosed!

Tips for teaching CNC courses from CNC Concepts, Inc.

Machining Center Course!

CNC Instructors!

If you're using one of our proven curriculums to teach CNC machine tool usage, be sure your students know that your course is also available on a reasonably priced CD-rom disk. They'll already have the manual and workbook, so they'll only have to purchase the courseware ($149.00 for six hour presentation).

As a CNC instructor, *you* may want to make this courseware available for students that miss a lesson or want to review material you present.

Do you feel at all weak in your CNC skills?
With our CNC curriculums, we provide audio guidance for each lesson to help instructors know how to present our courses. This is sufficient for instructors that are quite familiar

see below

New computer based training course! CD-ROM disk: over 6 hours!
CNC Machining Center Programming, Setup, and Operation
Affordable courseware for CNC machining centers!

A very popular CNC machine type!
CNC machining centers are among the most popular types of CNC machine tools. Most companies that have any CNC machines have at least one. Unfortunately, companies are finding it more and more difficult to find and hire qualified CNC people. Many are realizing that they must provide extensive training to new hires and provide at least some continuing training to established employees.

A proven method
This affordable courseware makes it possible to train CNC people from scratch. While we assume the student has some basic machining practice experience, we assume nothing about their previous CNC skills. Using our proven *key concepts approach*, we bring students up to speed gradually – constantly building upon previously presented information – and we stress the reasons *why* things are done as importantly as *how* they're done. Six of the ten key concepts are most related to programming, and four are related to setup and operation.

24 lessons!
We further divide the key concepts into twenty-four lessons. Lessons range from under five minutes to just over twenty minutes in length (total course presentation time is just over six hours on one CD-rom).

The most popular control!
All examples are shown in the format for the most popular control in the industry – the Fanuc control. Note that many control manufacturers claim to be Fanuc-compatible.

What you get!
The CD-rom disk is jam-packed with over six hours of information about CNC machining centers. By itself, it makes formidable training tool. It's price is $149.00.

When purchased with the workbook answer combination ($30.00), you'll be able to confirm that you truly understand the material (24 exercises, one for each lesson).

When purchased with the optional student manual ($60.00), you'll have a way to easily review information after you finish the course.

If all items are purchased (total: $239.00), we include a one-year subscription to our newsletter, The Optional Stop.

CNC
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The price for unlimited training? … $149.00 (courseware only)
Companion manual: $60.00, workbook/answer combination: $30.00
Contact CNC Concepts, Inc. (847-639-8847) to order!

New computer based training course! CD-ROM disk: 5.8 hours!
CNC Turning Center Programming, Setup, and Operation
Affordable courseware for CNC turning centers!

A very popular CNC machine type!
CNC turning centers are among the most popular types of CNC machine tools. Most companies that have any CNC machines have at least one. Unfortunately, companies are finding it more and more difficult to find and hire qualified CNC people. Many are realizing that they must provide extensive training to new hires and provide at least some continuing training to established employees.

A proven method
This affordable courseware makes it possible to train CNC people from scratch. While we assume the student has some basic machining practice experience, we assume nothing about their previous CNC skills. Using our proven *key concepts approach*, we bring students up to speed gradually – constantly building upon previously presented information – and we stress the reasons *why* things are done as importantly as *how* they're done. Six of the ten key concepts are most related to programming, and four are related to setup and operation.

28 lessons!
We further divide the key concepts into twenty-eight lessons. Lessons range from under five minutes to just over twenty minutes in length (total course presentation time is five hours fifty-two minutes on one CD-rom).

The most popular control!
All examples are shown in the format for the most popular control in the industry – the Fanuc control. Note that many control manufacturers claim to be Fanuc-compatible.

What you get!
The CD-rom disk is jam-packed with 5 hours, 52 minutes of information about CNC turning centers. By itself, it makes formidable training tool. It's price is $149.00.

When purchased with the workbook answer combination ($30.00), you'll be able to confirm that you truly understand the material (28 exercises, one for each lesson).

When purchased with the optional student manual ($60.00), you'll have a way to easily review information after you finish the course.

If all items are purchased, we include a one-year subscription to our newsletter, The Optional Stop.

CNC
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The price for unlimited training? … $149.00 (courseware only)
Companion manual: $60.00, workbook/answer combination: $30.00

Turning Center Course!

with CNC. For those instructors that may feel a little weak with their CNC skills, or for those who may be trying to teach a different machine type, these concise courses let you bone up on subject matter as quickly as possible.

Each course follows its companion curriculum to the letter (ten key concepts, number of lessons, presentation method, graphics, etc). In fact, we use the same manual and workbook in the courseware that you use with our curriculums! So if you're already using our curriculums, all you need is the courseware.