

## You Teach, Why do Students not Learn? Part II

Try this one question  
evaluation of the applied  
academics of your program.  
“If each of the four wheels  
supporting a 4000 pound  
vehicle is inflated to 30 pounds  
of air pressure, how can they  
support the weight of the vehicle?” Give this question to your  
students and see how many give you the correct explanation.



ATech used the question on a pre-employment exam for a few years. We had less than 5% answer the question correctly and there was no correlation as to the level of education they had completed - high school, post-secondary, vo-tech, associate degree, or four year degree.

One of the most critical points in building a successful “discovery” activity is to ensure that the student has the necessary tools/understanding to perform the activity. In the tire pressure example, the automotive teachers of our potential employees would all have guaranteed that their students could answer that question but it had been missed in the education/training process.

From the last Newsletter article about pi, what if the student could not read a measuring tape? A truly innovative student would probably just make marks on the tape, transfer the distances to a piece of paper, and then make a relative comparison of the lengths. You would be amazed if you had a student that was that creative, wouldn't you? But they are out there. Most are just too embarrassed because of the failures of some previous teachers. It is easier to act as if they have no idea.

For those teachers who, for whatever the reason, can not give up their lecture sessions, there is “Directed Group Discovery”. While not as effective as individual Discovery, it is much better than the standard lecture approach. “Directed Group Discovery” will work with any size group but it is easier to keep everyone involved with smaller groups (5 - 10). Remember, “Discovery” is about asking questions, make as few statements as possible.

High school physics is one of the most difficult and feared subjects in the entire high school experience, right? Why? Because of how it is taught. Physics is a subject that every person of high school age has a wealth of understanding from their life experiences. What do new automotive technology students already know about automotive technology? There are hundreds of laws from basic physics they understand. For example, ask the class to show how they warm their hands on a cold winter day. They will all exhale (open mouth) into the



hands. Now ask them to demonstrate how they cool a spoonful of hot soup. They will pucker their lips and blow. They know that increasing the pressure of hot air (approximately 85 - 90 degrees from their body), forcing it through a restriction (their lips) makes it cooler when it strikes an object. They can feel the effect on their hands! Does this bring any automotive applications to mind? How about an a/c orifice and Bournelli's Laws? They already understand one of Bournelli's Laws! This “teachin” stuff is too easy!



This is a great place to add an item to the student's “never forget” memory. Ask the class why they sweat during physical exertion. “It cools their body through evaporation of the moisture.” The evaporator of the air conditioning system cools the surrounding air through evaporation of the refrigerant. Once you tie the evaporator to their body's sweating and cooling, they will never forget what the evaporator does.

Here is another great question for group discussion, “Why do hot-air hand dryers always feel cold when you initially place your wet hands in the air stream?” It doesn't matter if they have been operating for 10 minutes, they will still feel cold.

What other things do they understand? Inertia, momentum, acceleration, deceleration, pound per square inch, .... You add to the list. Those previous five items can all be brought into discussion by one simple in-class demonstration. Bring a hammer and two pieces of 2 x 4 with a spike nail started in each one to the class. Ask someone in the class to show how we can force the nail into the wood. When they start to swing the hammer, stop them and ask what they are doing?

Why don't they just set the hammer head on the nail? Why are they swinging the hammer? They know from experience that swinging the hammer makes it function as if it were heavier! The amount of weight needed to force the nail into the wood can be determined by placing weights on the nail until it starts to move into the wood, for example 50 pounds. Now, we have to determine why swinging the hammer makes a 16 ounce hammer appear to be the 50 pounds of weight needed to force the nail into the wood.

How do we determine the hammer velocity? Set a digital camera on 1/100 of a second, place a yardstick vertically in the background, and take some pictures of the hammer as someone drives the nail. Adjust the shutter speed as needed. Also take a picture that shows the hammer striking the nail. We need to determine a typical deceleration time - the time the hammer



## You Teach, Part II cont'd

meets the nail head until it stops as it drives the nail into the wood. The hammer smear in the picture against the yardstick will give a good indication of the velocity. This is better done before class as it may take a few pictures to get the ones you want to project. Have the class determine the velocity of the hammer head from the pictures.

We now have all the information we need to calculate the hammer's apparent weight gain. The energy level of the hammer is equal to its weight multiplied by its velocity. For example, 1 pound hammer head by 20 feet per second equals 20 pounds. But 20 pounds is not enough weight to force the nail into the wood as was determined previously. What is missing is the time of deceleration. Obviously it takes force to stop a moving object. The shorter the time, the greater the force. Multiply your deceleration time in secs by 32 and divide into the energy level. If our deceleration time is .01 second then  $20/(32 \times .01) = 62.5$  pounds. I have taken some liberties in our formula discussion but any basic physics textbook will give you the exact formulas you need. Is this a lot of work? Yes, the first time you prepare it but if you want to build on what they already know, it is required. Notice that this was a "Directed Group Discovery" process. We asked questions, performed measurements, and made observations. In short, we made the students active participants in the "Discovery" process. Teach this way and you can ask your graduates about the subject years later and they will still remember it. They own it, it wasn't just loaned to them until the exam! That is what "Structured Skill Development" and "Discovery" is all about.

Why did I bring two boards/nails to class? We do the same process with the other board/nail but find the weight to force the nail into the wood is many times greater, even though it is the same size nail and same type of wood? What could cause the difference? The two nails are pulled from the wood and we find that one has been blunted; the tapered end has been removed! The students already know that the tapered (sharpened) end makes it easier to drive the nail into the wood. The same reason we sharpen knives, right? This demonstration can lead to a lengthy discussion of pounds per square inch, apparent weight amplification, and women's high heel shoes. Women's High Heel Shoes?? It hasn't been too many years ago that some homeowners and public places that had soft tile or hardwood floors would not allow women with "stiletto" heels to walk on their floors. Why?

Once you start preparing and teaching this way, you will look forward to each school day. Why, because you know learning is taking place and that makes the job enjoyable.

Your assignment for the next newsletter is to think of the things your beginning students already know about electricity. Remember they need to be relevant to the subject. For example, students know what resistance is but do they know what electrical resistance is? I will

use the best ones in the next newsletter. Email them to me at [newsletters@atechtraining.com](mailto:newsletters@atechtraining.com)



## “Invitational” Instructor Workshops Win National Award

The ATech/AIPC Invitational Workshops have been an outstanding success. They have generated rave reviews from the public school, original equipment manufacturers, and industrial attendees. At this point, the waiting list has grown to approximately two years. Don't let that waiting list size stop you from requesting to attend as individuals on the waiting list are selected for invitation based on the mix of high school, post secondary, and industry instructors that we hope to achieve. We also invite administrators. You can apply by sending an email to [workshops@atechtraining.com](mailto:workshops@atechtraining.com). Be sure to include a mailing address, phone numbers, and any other contact information we need to reach you. Some people have missed out on an invitation because we did not have correct or sufficient information to send them an invitation.

Approximately six months ago, it was decided by ATech that the program should be submitted for the annual Automotive Training Managers Council Award of Excellence. The application process required hours of work as it was very thorough as to the program's theory, delivery, and evaluation. All parts of the program had to be extensively documented. Selection of the Workshop for an ATMC Training Excellence Award was made by ATMC in late November. The announcement and presentation of the plaque was made at the AIPC Awards Dinner in Las Vegas in December.



# Computer Based Troubleshooting Skill Development

## ATech 3631 - Part 3

The ATech 3631 is primarily intended for the Dealership or Aftermarket shop owner who wants to improve his/her technician's performance. It is also a convenient and effective way to evaluate the skill level of a job applicant. Though the product is intended for the working technician, many schools have found it to be extremely effective within the school environment.

Since the product's initial release, additional features have been added. Anyone who purchased the original version will be upgraded to the latest version at no charge. The features

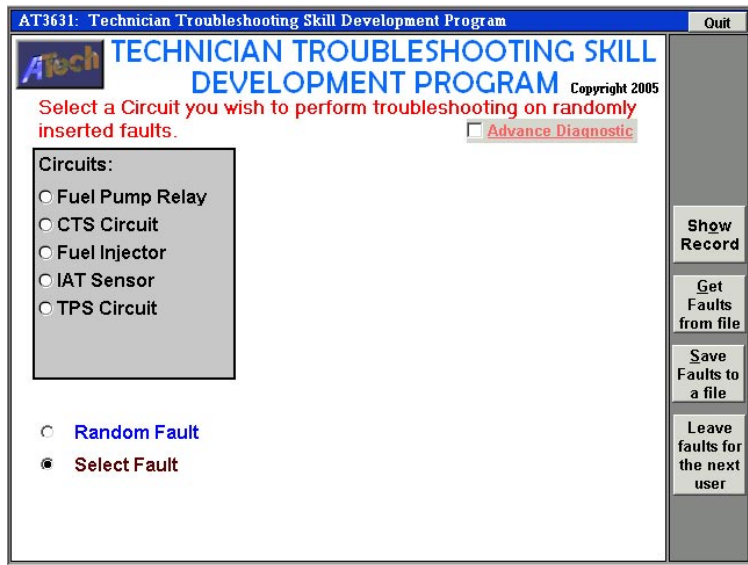


Figure 1 - Random or Selected Fault Screen

which have been added are manual multiple fault insertion and local record storage. The initial access screen to the fault



Figure 2 - Leaving Faults for the Next User

selection mode and record viewing is shown in Figure 1. This screen also allows selection of up to five faults in the same or different circuits to be left for the next user or fault files can be created and saved for future use.

The fault selection screen to leave faults for the next user is shown in Figure 2. As shown in the figure, the circuit to be faulted can be selected, including the type of fault (shorts, opens, high resistance), and the fault location in the circuit. Over 65 faults are included with these five circuits, ranging from the simple to the very difficult. Advanced mode, which does not allow measurements inside component connectors, can be selected for individual faults as desired.

Figure 3 shows a similar screen for fault selection, but this one is used to create a selection of up to five faults which will be saved to a fault file for future use. If a Dealership manager wants to create a fault file to use for job applicants and another to test the development of the Dealership techs, it can be easily done with the 3631.

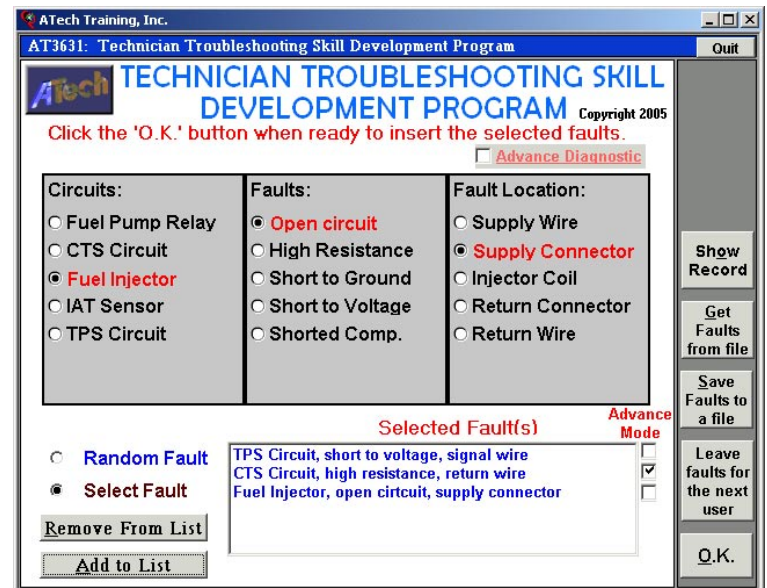


Figure 3 - Fault File Creation Screen

Instructors in the public and private school systems can utilize the fault file system to challenge top performing students and provide needed troubleshooting practice to all their students. ATech has found that very experienced technicians have difficulty solving many of the more difficult problems so if your students can become proficient at troubleshooting all of the circuit problems in the 3631, they will be among the top troubleshooters in the profession.

Another application of the 3631 that will find wide use is as a test station for skill competitions. The 3600 hardware troubleshooting training system has been used for 3 or 4 years by State Vica organizations to test the skill of competitors. The 3631 is even easier to use in that capacity as it only requires a

# ATech 3631 - Part 3 cont'd

computer. No additional parts or pieces are needed.

Once a fault file has been created and saved, it will appear in the list of fault files available to be used. As shown in Figure 4, when the file is selected, its included faults will

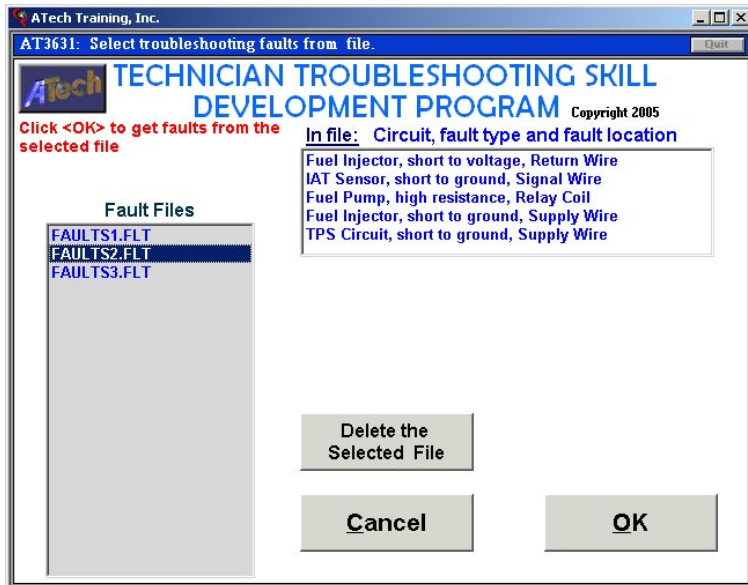


Figure 4 - Fault File Selection Screen

be shown in the file contents window. This screen is reached by the “Get Faults from file” button on the initial fault screen. Fault files can be named with more descriptive titles such as “job applicant test” or “level 1 technician.

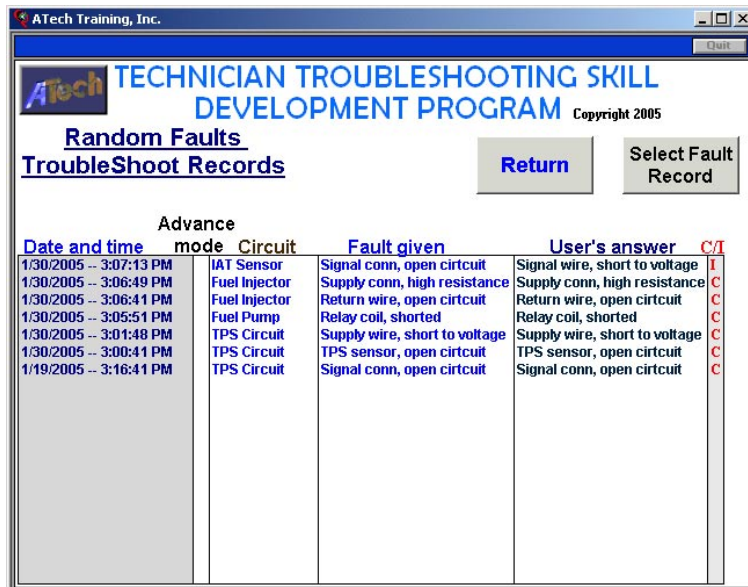


Figure 5 - Random Faults Record Screen

Figure 5 is the record of two troubleshooting sessions. These were done in the random faults mode (computer selects and inserts random faults). One on the 19th and the other on 30th. Records are date and time stamped to distinguish one from the other. As shown in the figure, the circuit, fault that was given, user’s answer, and correct or incorrect is recorded. A demo version of the 3631 without record keeping is available for download from [www.atechtraining.com](http://www.atechtraining.com).

# SEMA Scholarships Available

Interested in a career in the speciality automotive industry? If you have a passion for cars and trucks, the speciality automotive market is looking for you! Scholarship assistance is available to those pursuing careers in the \$29 billion dollar specialty equipment industry. Career path opportunities include: Accounting, Administration, Advertising/PR, Design/ Graphics, Engineering, Information Technology, Manufacturing, Photo/Journalism, Race Car Driver/Crew, Sales/Marketing, Technicians, and Transportation. The 5,200 SEMA-member firms range from large Fortune 500 Manufacturers to small local retailers. It is a vibrant, exciting industry that is on a solid growth curve. Scholarships are available for graduate studies, 4 and 2 year degrees, and vocational/technical certificates. To find out more about SEMA Scholarships, and to download an application visit us at [www.sema.org/](http://www.sema.org/) scholarships or call 909/396-0289.



# ATech Achieves CASE Certification



**ATech Training Inc.**

It is with great pride that ATech announces its certification by ASE™ as a Continuing Automotive Service Education Training Provider, "CASE™". In January 2005, ATech became the only training equipment design/manufacturer in the world that is also CASE™ certified by ASE™. The certification process was lengthy and required extensive self evaluation with subsequent documentation.

Dick Sproul and Don Askew, two representatives of NATEF™, visited ATech to perform an on-site evaluation of the Invitational Workshop program. They visited both the ATech manufacturing facility and the Belterra Riverboat Resort where the Workshops are held. Many thanks to these two gentlemen for their constructive comments and assistance in helping ATech achieve this highly acclaimed certification.

"We are extremely proud of this achievement in that it not only illustrates ATech's commitment to quality training programs but also ATech's continuing support for ASE™ and NATEF™", Gene Brown - ATech Vice President.

## OEMs Choose ATech for Training Equipment

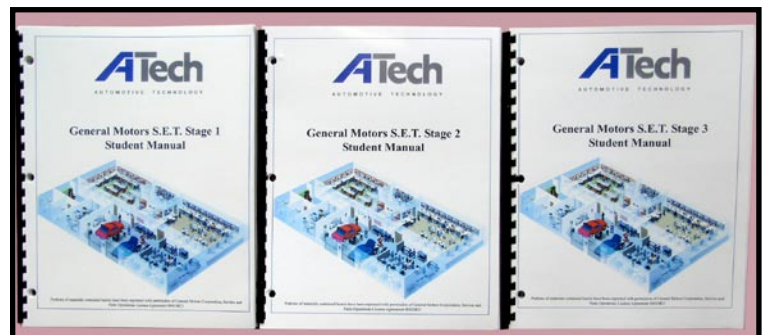
Three new OEMs chose ATech for their training equipment in the last six months, Ferrari, Volkswagen of America, and American Honda. "When the highest performance companies in the world choose your products and compliment you on the quality and delivery, you know you are doing it right", Fred Hines - President, ATech Training Inc.



## General Motors and ATech Sign S.E.T. Agreement for 2005

In the spring of 2004, General Motors stopped publishing the original manuals for the General Motors Special Electronics Training Program (S.E.T.). The hardware for this training system was originally designed and copyrighted by ATech. Since that time, the General Motors/ATech Specialized Electronic Training (S.E.T.) program has become both a National and International standard.

Due to the large number of ATech customers who have purchased the training system over the last 12 years, ATech licensed the printing of the manuals in 2004 from GM. In January 2005, the license agreement was resigned. If you need student manuals, instructor guides, or any of the training system hardware, contact ATech.



Stages 1, 2, and 3 Manuals

# NACAT 2005 Conference Spokane, Washington



Spokane Community College is honored to host the 2005 North American Council of Automotive Teachers conference, Fueling Up for the Future, July 18–July 22, 2005. Spokane, Washington is the heart of the Inland Empire. Situated approximately 280 miles east of Seattle across the spectacular Cascade mountain range, it sits within a region that encompasses eastern Washington, western Montana and northern Idaho.

Named after the Native American tribe who has long inhabited the area, Spokane means “Children of the Sun.” Sunshine (and heat!) abounds in the summer, encouraging time spent at any one of many wonderful parks, lakes, and golf courses. For a relaxing outing, wander through the orchards in Greenbluff, or perhaps sample a glass of wine at one of several wineries in the area. There are a multitude of activities from which to choose. Go to “Activities” on the site menu to view other suggestions.

The SCC automotive program is considered to be one of the leaders in the industry training students for a rewarding career in the automotive field. We look forward to having your presence in our city and in helping to make NACAT 2005 a memorable event!

<http://ol.scc.spokane.edu/nacat2005/>



CARS is the annual “get-together” for members of the Automotive Service Association. It occurs each year in November in Las Vegas concurrently with AAPEX and SEMA. The trade show and seminars are excellent. If you are an automotive educator in the public school system, membership dues are very reasonable. Check it out at [www.asashop.org](http://www.asashop.org).



**One aisle in the trade show - great fun**



**Toyota Hybrid Seminar**



# AIPC 2004 Awards Program Winners

## National Winner

### Post Secondary - Mfg. Affiliated Category

Sinclair Community College  
Dayton, Ohio



Bill Haas - Automotive Service Association, Dr. Jeanne Jacobs - Sinclair Vice President for Instruction, Gene Pierce - AIPC, Stephen Ash - Sinclair Automotive Dept. Chair, Michael Garblick - Sinclair Automotive Professor, Mary Hutchinson - NATEF

## National Winner

### Secondary Category

Warwick Area Career and Technical Center  
Warwick, Rhode Island



Bill Haas - Automotive Service Association, David Tibbetts - Warwick Automotive Teacher, Gene Pierce - AIPC, Mary Hutchinson - NATEF

## National Winner

### Post Secondary - Generic Category

North Iowa Area Community College  
Mason City, Iowa



Bill Haas - Automotive Service Association, John Sjolinder - NIACC Ind. Tech. Chair, Rob Heimbuch - NIACC Automotive Instructor, Gene Pierce - AIPC, Jack Rhode - NIACC Automotive Instructor, Mary Hutchinson - NATEF, Greg Arrowood - NIACC Automotive Instructor

## Post Secondary Generic Runners Up

Delaware Technical and Community College  
Georgetown, DE

Riverland Community College  
Alberta Lee, MN

## Post Secondary - Mfg. Aff. Runners Up

Atlantic Technical Center  
Coconut Creek, FL

KirkWood Community College  
Cedar Rapids, IA

## Secondary Category Runners Up

Miami Valley Career Technology Center  
Clayton, OH

St. Croix Vocational School  
St. Croix, U.S. Virgin Islands

[www.autoipc.org](http://www.autoipc.org)

# Aipc



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