How To Measure A Training Class

Training Application Notes

Purpose

This document discusses how to mathematically measure the results of a training class using self-assessment and certification. It explains why self-assessment and certification are preferable to other forms of evaluation, and it explains how to:

- Set up an analysis spreadsheet for your results data
- Interpret the results data to see how you can improve your training classes

NOTE: For more information on self-assessment scoring, refer to Application Note, "How to Perform Self-Assessment," MOITAN004. For more information on certification, refer to Application Note, "How To Do Certification," MOITAN001. For more information on Job Task Analysis, refer to Application Note, "What Is Job Task Analysis?", MOITAN 006.

Overview

Why Self-Assessment and Certification?

In business, you must evaluate performance to determine what works, what doesn't, and what can be improved. This analysis is essential for ensuring continuous business profitability, and the performance of training classes is no exception to this rule. Most organizations realize this. The problem is, most organizations use the "smiley sheet" approach.

The smiley sheet (see Appendix A) is better than nothing, but it is definitely lacking as a method of evaluation. This is because it relies on subjective opinion, not quantitative results. More specifically, problems with the smiley sheet include:

- It focuses primarily on whether or not students enjoyed a class — rather than if they are able to do anything as a result of the training. This means that personal chemistry between the instructor and the students will skew the results. For example, students will tend to give "nice" instructors better scores.

- It is not directly linked to the Course Description. This means it provides no visibility as to what actually happened in class as compared to what was expected.

- It is conducted only at the end of a class. This means it gives no insight into what students could do before the training started versus what they could do after.

- It is not connected to certification.

Performance Based Training
"Typical" Training Class Evaluation
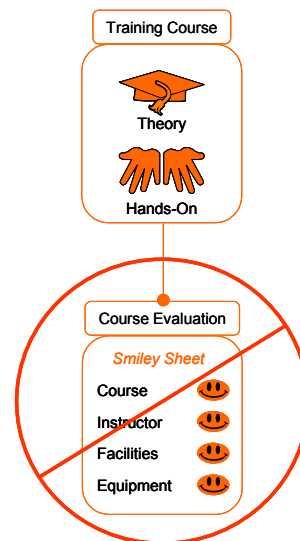Quick Key

Figure 1: On the surface, the "smiley sheet" evaluation assesses course quality. But in reality, it relies solely on students' reactions to being in a class, with a particular teacher, and only determines if the course was conducted in a manner pleasing to the students. It doesn't determine what, if anything, the students learned — which is what we really want to know.

In this application note, we will discuss how to improve the results of a training class by using self-assessment and certification. Self-assessment and certification are easy to do and produce fantastic results. They focus your training evaluation efforts on what students can do, measuring training in terms of both what the students believe they can do and what the instructors observe the students as being able to do. In this way, they allow you to make use of student feedback *and* to mathematically measure the results of your training classes.

Specifically, self-assessment and certification allow:

- Students to determine what training they need and what training they don't, which in turn allows managers to optimize the time their personnel spend in training.

- Managers and instructors to understand the skill set of attending students before a class begins.

- Students to determine when they are ready for certification, which improves their sense of self-efficacy and the likelihood they will actually use what they learn on the job.

- Instructors to provide documented records of students' accomplishments during training and what was actually taught in a class.

- Managers to have full visibility into the impact of overloading classes or having insufficient practice equipment and the training cycle times needed to get new hires up and running.

- Instructional systems designers to evaluate the effectiveness of the course material they produce.

- Students and managers to track if the skills learned in class are being used.

In the following sections of this document, we will discuss how to set up a spreadsheet for compiling your training performance data and analyzing it, as well as how to interpret and apply the results of your analysis.

Guidelines

Setting Up a Class Analysis Spreadsheet and Entering Data

Class analysis is the process of making meaning out of your performance data, which is collected through self-assessment and certification evaluation.

Before setting up a Class Analysis spreadsheet and calculating the results, you go through the normal instructional design process to complete a Needs Analysis, a Job Task Analysis, and a curriculum plan. You also, of course, develop the courseware, including the Course Description.

Note that developing a curriculum plan essentially entails the division of the Job Task Analysis into courses. Note also that the Course Description should list the tasks to be taught and that this list of tasks should match those listed in the Job Task Analysis, the self-assessment, and the Class Analysis spreadsheet as well.

To set up and use a Class Analysis spreadsheet, you basically:

1. Enter the Job Task and associated information into analysis spreadsheets. There should be two spreadsheets for each course — one for pre-class data and one for post-class data.

2. Set up the analysis formulas.

3. Run the classes. For each class:

    a. Collect pre-class self-assessment and certification data and enter it into the appropriate spreadsheet, at the beginning of the class.

    b. Conduct the class.

    c. Collect post-class self-assessment and certification data and enter it into the appropriate spreadsheet, at the end of the class.

4. Examine the compiled results.

5. Improve the class based on the results.

Figure 2 shows where doing Class Analysis happens within the training process. In the following section, we will examine each component of the spreadsheet and discuss what information it contains.

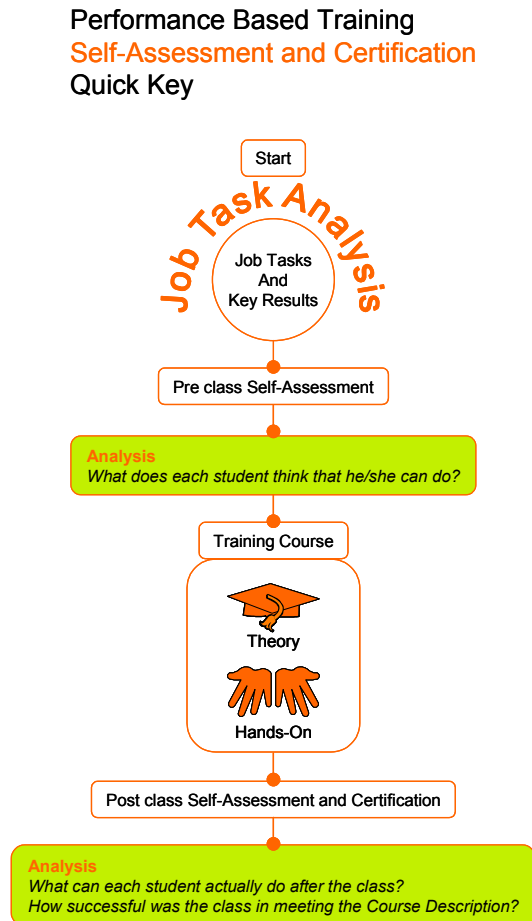NOTE: Spreadsheet formulas are given in Appendix B, at the end of this Application Note.

Performance Based Training
Self-Assessment and Certification
Quick Key

Figure 2: Self-assessment data is collected twice in the training process — before a class begins, to determine the starting skill set of the attending students, and after the class ends, to determine if and how the students added to their skill set.

Spreadsheet Explanation

An example Class Analysis spreadsheet is shown in Figure 3. All totals should be set up so that they are automatically calculated. The various component areas of the spreadsheet are discussed in the following sub-sections.

"Set Up" Data

This area contains the list of Job Tasks advertised in the Course Description. It indicates each task's sequence number, level of difficulty, and preferred certification method. The abbreviations for the certification methods are shown in the Certification Method Key at the bottom of the spreadsheet.

You should note that the Key Results are not listed in this area, as they are part of the Self-Assessment form the students use to score themselves.

Student Data

This area lists the results of the Student Self-Assessment. The scores are entered and color coded in accordance with the Self-Assessment Score Key.

You should note that certification is a completely separate activity from self-assessment and that the score "C" is only entered after a student has scored a 4 or 5 in the course of performing self-assessment (which indicates that the *student* feels that he/she can complete the task).

Tasks Not Taught

This area calculates, for each student, the total number of tasks which were *not* taught, but which were listed as part of the Course Description.

Summary Student Scores

This area calculates how many of each score a student received — i.e., how many 0s, 1s, 2s, 3s, 4s, and 5s/Cs were tallied for each student.

You should note that the Total Score Count in this area acts as a check to ensure that the total number of scores counted equals the total number of tasks listed.

You should also note that the counts for 5 and C scores are tallied together, as both scores indicate that a student is capable of performing the tasks in question.

Instructor Certified Tasks

This area totals the number of certifications that were accomplished during the class.

You should note that certification means a student scored a four or a five and that the instructor independently verified that the student was able to perform the task.

Summary Class Scores

This area calculates the percentage of tasks that each student was able to perform and the average percentage of tasks the class, as a whole, was able to perform. This area also calculates the number of weeks each student has been "on the job."

This area is an excellent, mathematical indication of the success of a class with regard to the goal stated by the Course Description. It shows whether the students feel that they can do the tasks and whether the instructor agrees with them. And it shows progress against time, from which can be extrapolated the amount of on-the-job experience that a person requires, in general, to become proficient in a group of Job Tasks.
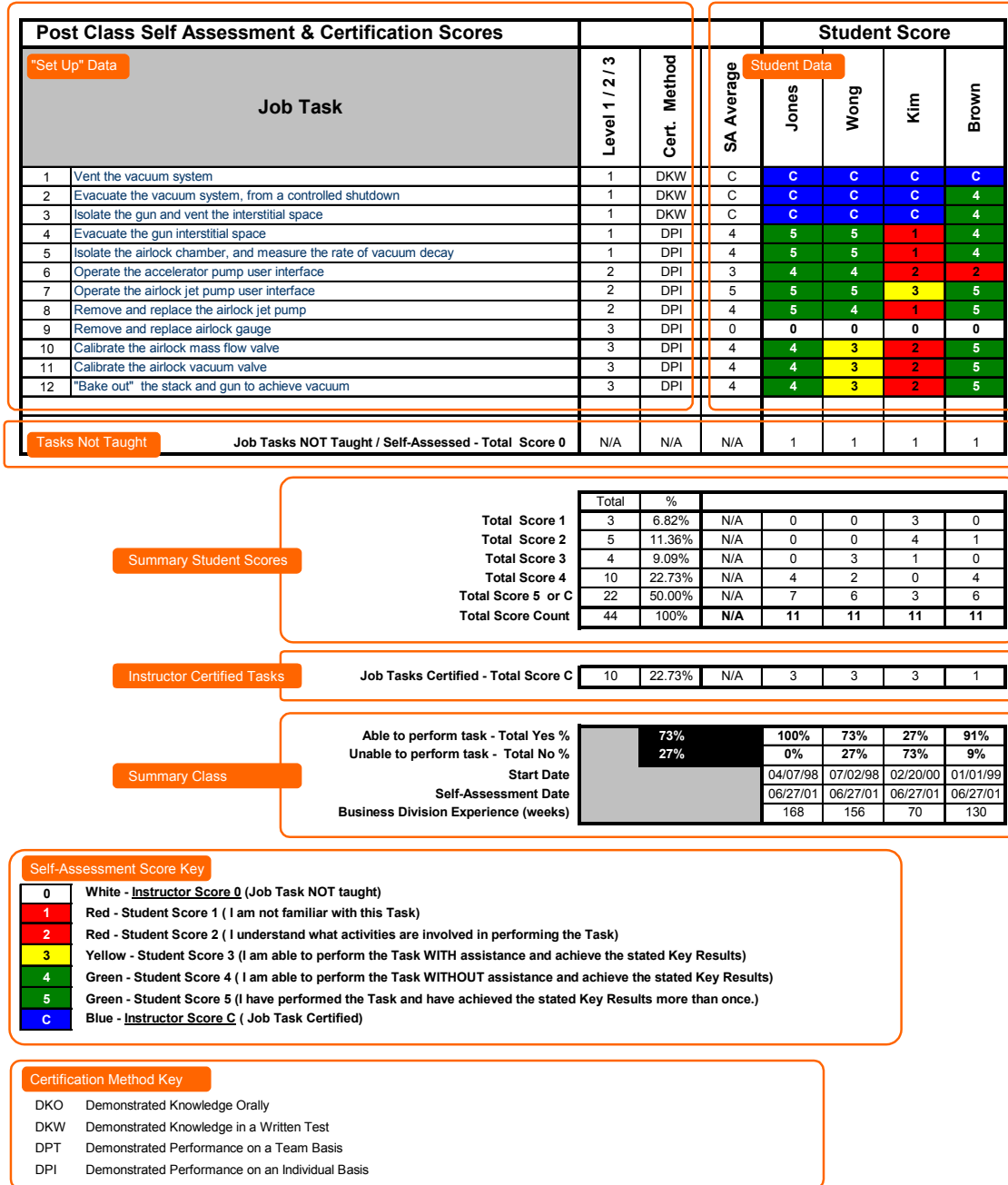
Post Class Self Assessment & Certification Scores

"Set Up" Data / Job Task	Level 1 / 2 / 3	Cert. Method	SA Average	Jones	Wong	Kim	Brown
1 Vent the vacuum system	1	DKW	C	C	C	C	C
2 Evacuate the vacuum system, from a controlled shutdown	1	DKW	C	C	C	C	4
3 Isolate the gun and vent the interstitial space	1	DKW	C	C	C	C	4
4 Evacuate the gun interstitial space	1	DPI	4	5	5	1	4
5 Isolate the airlock chamber, and measure the rate of vacuum decay	1	DPI	4	5	5	1	4
6 Operate the accelerator pump user interface	2	DPI	3	4	4	2	2
7 Operate the airlock jet pump user interface	2	DPI	5	5	5	3	5
8 Remove and replace the airlock jet pump	2	DPI	4	5	4	1	5
9 Remove and replace airlock gauge	3	DPI	0	0	0	0	0
10 Calibrate the airlock mass flow valve	3	DPI	4	4	3	2	5
11 Calibrate the airlock vacuum valve	3	DPI	4	4	3	2	5
12 "Bake out" the stack and gun to achieve vacuum	3	DPI	4	4	3	2	5

Student Score — column headers: SA Average, Jones, Wong, Kim, Brown

Tasks Not Taught

Job Tasks NOT Taught / Self-Assessed - Total Score 0	N/A	N/A	N/A	1	1	1	1

Summary Student Scores

	Total	%		Jones	Wong	Kim	Brown
Total Score 1	3	6.82%	N/A	0	0	3	0
Total Score 2	5	11.36%	N/A	0	0	4	1
Total Score 3	4	9.09%	N/A	0	3	1	0
Total Score 4	10	22.73%	N/A	4	2	0	4
Total Score 5 or C	22	50.00%	N/A	7	6	3	6
Total Score Count	44	100%	N/A	11	11	11	11

Instructor Certified Tasks

Job Tasks Certified - Total Score C	10	22.73%	N/A	3	3	3	1

Summary Class

			Jones	Wong	Kim	Brown
Able to perform task - Total Yes %		73%	100%	73%	27%	91%
Unable to perform task - Total No %		27%	0%	27%	73%	9%
Start Date			04/07/98	07/02/98	02/20/00	01/01/99
Self-Assessment Date			06/27/01	06/27/01	06/27/01	06/27/01
Business Division Experience (weeks)			168	156	70	130

Self-Assessment Score Key

0	White - **Instructor Score 0** (Job Task NOT taught)
1	Red - Student Score 1 (I am not familiar with this Task)
2	Red - Student Score 2 (I understand what activities are involved in performing the Task)
3	Yellow - Student Score 3 (I am able to perform the Task WITH assistance and achieve the stated Key Results)
4	Green - Student Score 4 (I am able to perform the Task WITHOUT assistance and achieve the stated Key Results)
5	Green - Student Score 5 (I have performed the Task and have achieved the stated Key Results more than once.)
C	Blue - **Instructor Score C** (Job Task Certified)

Certification Method Key

DKO	Demonstrated Knowledge Orally
DKW	Demonstrated Knowledge in a Written Test
DPT	Demonstrated Performance on a Team Basis
DPI	Demonstrated Performance on an Individual Basis

Figure 3: This figures shows an example of a Class Analysis spreadsheet with post-class self-assessment data. The "Set Up" Data area lists the Job Tasks being taught in a given course. The Student Data area contains the self-assessment data for the students that attended the course. The Summary Student Scores, Instructor Certified Tasks, and Summary Class areas show the analysis results, which should be automatically generated by the spreadsheet formulas.

Interpreting and Using the Results

Interpreting Results at a Glance

The recommended color-coding, which links a specific color with each score, provides very quick visual clues as to what is going on.

For example (see Figure 4), a "white" Student Data area would indicate that none of the tasks listed were taught — i.e., the class did not occur as planned.

Job Task		Student Score			
		Jones	Wong	Kim	Brown
1	Vent the vacuum system	0	0	0	0
2	Evacuate the vacuum system, from a controlled shutdown	0	0	0	0

Figure 4: In this figure, the student scores show that none of the tasks were taught and that none of the students are able to perform them.

A red Student Data area (see Figure 5) would indicate that the students have never been exposed to the listed tasks before and have no confidence in their ability to do those tasks.

Job Task		Student Score			
		Jones	Wong	Kim	Brown
1	Vent the vacuum system	1	1	2	2
2	Evacuate the vacuum system, from a controlled shutdown	1	2	2	2

Figure 5: In this figure, the student scores show that none of the students are able perform the tasks in question. You would expect to see student data like this on a pre-class self-assessment.

A yellow Student Data area (see Figure 6) would indicate that the students are aware of the tasks but still lack the confidence required to do them and still need assistance when performing them.

Job Task		Student Score			
		Jones	Wong	Kim	Brown
1	Vent the vacuum system	3	3	3	3
2	Evacuate the vacuum system, from a controlled shutdown	3	3	3	3

Figure 6: In this figure, the student scores show that the students know something about the tasks, but that they cannot perform them on their own. These are scores you would expect to see on a pre-class self-assessment, but you might see them on a post-class self-assessment if something was wrong with the training class — such as a lack of training equipment — whereby practice sessions were cut short or eliminated.

A green Student Data area (see Figure 7) would indicate that the students were confident in their ability to do the tasks.

Job Task		Student Score			
		Jones	Wong	Kim	Brown
1	Vent the vacuum system	4	5	4	5
2	Evacuate the vacuum system, from a controlled shutdown	4	5	4	4

Figure 7: Here the student scores show that the students know how to perform the tasks. Scores such as these on a pre-class self-assessment would mean that it is unnecessary for the students to receive training in the tasks and that they should go straight to certification.

A blue Student Data area (see Figure 8) would indicate that the students were confident in their ability to do the tasks and that an instructor had verified that they could actually do the tasks. You should note that it may be assumed that an all-blue Student Data area "passed through the green stage." This makes sense because it is unlikely that you would certify a student who did not feel confident in their ability to perform the indicated tasks.

Job Task	Student Score			
	Jones	Wong	Kim	Brown
1 Vent the vacuum system	c	c	c	c
2 Evacuate the vacuum system, from a controlled shutdown	c	c	c	c

Figure 8: Here the student scores show that all the students were certified in the tasks in question. On a post-class self-assessment, these scores would indicate that *both* the students and the instructor had verified that the students could do the tasks — and that the training class had been run successfully.

Analyzing and Using Pre-Class Self-Assessment Results

A critical component of any training program is to set expectations. But while it is the Course Description that presents the objectives of a training course (i.e., the Job Tasks to be covered), it is the job of the pre-class self-assessments to spell out the standards by which mastery will be judged (i.e., the Key Results that must be achieved).

Another purpose of the pre-class self-assessments is to determine where the students are, in terms of their skills development, and what training, if any, they really need. With this knowledge, the right training program can be implemented for each student, and students can avoid having their time wasted.

For example, in Figure 9, we see the analysis of a pre-class self-assessment. It shows that, on average, 71% of the tasks to be taught are ones that the students feel they can perform already. Even more to the point, it shows that Jones, Wong, and Brown are ready for certification in most of the tasks to be taught. In this case, Jones, Wong, and Brown should be sent for certification as opposed to a training class.

Another thing that pre-class self-assessments can do is to reveal potential difficulties and allow you to "head them off at the pass," so to speak.

For example, Jones, Wong, and Brown would probably be unhappy being sent to a training class and repeating the material they already know. Regardless of the quality of the course material or the instructor, it is likely that their dissatisfaction would be high if the instructor did not step up to meet their needs by allowing them to skip straight to certification or by focusing on the tasks they didn't know — even if those tasks were outside the scope of the Course Description. And more than that, sending Jones, Wong, and Brown to class would be a waste of their time *and* the company's time.

By the way of another example, take the data shown in Figure 9 again. It also shows that there is a great disparity between the skill levels of Jones, Wong, Kim, and Brown — with Kim being far less advanced than the others. Were these students to be placed in the same class, it would be very difficult to accommodate the different needs of the students. In "mixed classes," like this one would be, it is often the students with the lower self-assessment scores that suffer most. Experience shows that the more advanced students will tend to dominate the class with their needs and that the beginning students will often not receive the training in fundamental topics that they require. This means, in our example, that Kim might not get the training he needed — although a superior instructor could turn such a situation to his advantage by having the advanced students mentor the beginning ones in class.

Figure 10 shows an example of a pre-class self-assessment where the student levels are more equally matched. In this case, only 4% of the tasks are ones that the students believe they can already do — which means it would be appropriate for all the students to attend training and be put in the same class session.

Pre Class Self Assessment & Certification Scores				Student Score			
Job Task	**Level 1 / 2 / 3**	**Cert. Method**	**SA Average**	**Jones**	**Wong**	**Kim**	**Brown**
1 Vent the vacuum system	1	DKW	4	5	5	3	4
2 Evacuate the vacuum system, from a controlled shutdown	1	DKW	4	5	5	3	4
3 Isolate the gun and vent the interstitial space	1	DKW	4	5	3	3	5
4 Evacuate the gun interstitial space	1	DPI	4	5	5	1	4
5 Isolate the airlock chamber, and measure the rate of vacuum decay	1	DPI	4	5	5	1	4
6 Operate the accelerator pump user interface	2	DPI	3	4	4	2	2
7 Operate the airlock jet pump user interface	2	DPI	5	5	5	3	5
8 Remove and replace the airlock jet pump	2	DPI	4	5	4	1	5
9 Remove and replace airlock gauge	3	DPI	4	5	4	1	5
10 Calibrate the airlock mass flow valve	3	DPI	4	5	4	2	5
11 Calibrate the airlock vacuum valve	3	DPI	4	5	4	2	5
12 "Bake out" the stack and gun to achieve vacuum	3	DPI	4	5	4	2	5
Job Tasks NOT Taught / Self-Assessed - Total Score 0	N/A	N/A	N/A	0	0	0	0

	Total	%					
Total Score 1	4	8.33%	N/A	0	0	4	0
Total Score 2	5	10.42%	N/A	0	0	4	1
Total Score 3	5	10.42%	N/A	0	1	4	0
Total Score 4	11	22.92%	N/A	1	6	0	4
Total Score 5 or C	23	47.92%	N/A	11	5	0	7
Total Score Count	48	100%	**N/A**	**12**	**12**	**12**	**12**
Job Tasks Certified - Total Score C	0	0.00%	0	0	0	0	0
Able to perform task - Total Yes %		**71%**		**100%**	**92%**	**0%**	**92%**
Unable to perform task - Total No %		**29%**		**0%**	**8%**	**100%**	**8%**
Start Date				04/07/98	07/02/98	02/20/00	01/01/99
Self-Assessment Date				06/27/01	06/27/01	06/27/01	06/27/01
Business Division Experience (weeks)				168	156	70	130

Figure 9: This pre-class self-assessment shows that only Kim requires training and that the others are probably ready for certification. Note that, collectively, the students believe they can do 71% of the tasks.

Pre Class Self Assessment & Certification Scores				Student Score			
Job Task	Level 1 / 2 / 3	Cert. Method	SA Average	Jones	Wong	Kim	Brown
1 Vent the vacuum system	1	DKW	3	1	5	3	1
2 Evacuate the vacuum system, from a controlled shutdown	1	DKW	3	1	5	3	1
3 Isolate the gun and vent the interstitial space	1	DKW	3	3	3	3	1
4 Evacuate the gun interstitial space	1	DPI	2	2	3	1	1
5 Isolate the airlock chamber, and measure the rate of vacuum decay	1	DPI	2	3	3	1	1
6 Operate the accelerator pump user interface	1	DPI	2	1	3	3	1
7 Operate the airlock jet pump user interface	2	DPI	2	1	3	2	2
8 Remove and replace the airlock jet pump	2	DPI	2	1	3	3	2
9 Remove and replace airlock gauge	2	DPI	2	3	2	1	2
10 Calibrate the airlock mass flow valve	3	DPI	2	2	2	1	2
11 Calibrate the airlock vacuum valve	3	DPI	2	2	2	1	2
12 "Bake out" the stack and gun to achieve vacuum	3	DPI	2	2	1	3	2
Job Tasks NOT Taught / Self-Assessed - Total Score 0	N/A	N/A	N/A	0	0	0	0

	Total	%		Jones	Wong	Kim	Brown
Total Score 1	17	35.42%	N/A	5	1	5	6
Total Score 2	14	29.17%	N/A	4	3	1	6
Total Score 3	15	31.25%	N/A	3	6	6	0
Total Score 4	0	0.00%	N/A	0	0	0	0
Total Score 5 or C	2	4.17%	N/A	0	2	0	0
Total Score Count	48	100%	N/A	12	12	12	12
Job Tasks Certified - Total Score C	0	0.00%	N/A	0	0	0	0
Able to perform task - Total Yes %		4%		0%	17%	0%	0%
Unable to perform task - Total No %		96%		100%	83%	100%	100%
Start Date				04/07/98	07/02/98	02/20/00	01/01/99
Self-Assessment Date				06/27/01	06/27/01	06/27/01	06/27/01
Business Division Experience (weeks)				168	156	70	130

Figure 10: This pre-class self-assessment shows that all of the students require training and that they have, approximately, the same level of knowledge about the tasks. Note that, collectively, the students believe they can do 4% of the tasks.

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Analyzing and Using Post-Class Self-Assessment and Certification Results

Figure 11 shows an example spreadsheet for post-class self-assessment and certification data. It shows us that, at the end of the class, the students felt they were able to perform 73% of the tasks, that the students were certified in tasks 1–3 (with the exception of Brown, who was only certified in task 1); and that out of the 12 tasks listed, one was not taught. It also shows that student Kim felt the least confident in his abilities.

In analyzing this data, we can determine that most of the students feel they can perform the majority of the tasks and that our training efforts are resulting in certification. On the other hand, we can also see that the students believe they cannot handle 27% of the tasks, that they remain uncertified in most of the tasks, and that one task was skipped. Were these all the tasks that our business had to perform and all the people we had to perform them, we might begin to worry a little.

Post Class Self Assessment & Certification Scores		Level 1 / 2 / 3	Cert. Method	SA Average	Student Score			
	Job Task				Jones	Wong	Kim	Brown
1	Vent the vacuum system	1	DKW	C	C	C	C	C
2	Evacuate the vacuum system, from a controlled shutdown	1	DKW	C	C	C	C	4
3	Isolate the gun and vent the interstitial space	1	DKW	C	C	C	C	4
4	Evacuate the gun interstitial space	1	DPI	4	5	5	1	4
5	Isolate the airlock chamber, and measure the rate of vacuum decay	1	DPI	4	5	5	1	4
6	Operate the accelerator pump user interface	2	DPI	3	4	4	2	2
7	Operate the airlock jet pump user interface	2	DPI	5	5	5	3	5
8	Remove and replace the airlock jet pump	2	DPI	4	5	4	1	5
9	Remove and replace airlock gauge	3	DPI	0	0	0	0	0
10	Calibrate the airlock mass flow valve	3	DPI	4	4	3	2	5
11	Calibrate the airlock vacuum valve	3	DPI	4	4	3	2	5
12	"Bake out" the stack and gun to achieve vacuum	3	DPI	4	4	3	2	5
	Job Tasks NOT Taught / Self-Assessed - Total Score 0	N/A	N/A	N/A	1	1	1	1

	Total	%				
Total Score 1	3	6.82%	N/A	0	0	3	0
Total Score 2	5	11.36%	N/A	0	0	4	1
Total Score 3	4	9.09%	N/A	0	3	1	0
Total Score 4	10	22.73%	N/A	4	2	0	4
Total Score 5 or C	22	50.00%	N/A	7	6	3	6
Total Score Count	44	100%	N/A	11	11	11	11

	Total	%				
Job Tasks Certified - Total Score C	10	22.73%	N/A	3	3	3	1

		%				
Able to perform task - Total Yes %		73%	100%	73%	27%	91%
Unable to perform task - Total No %		27%	0%	27%	73%	9%
Start Date			04/07/98	07/02/98	02/20/00	01/01/99
Self-Assessment Date			06/20/01	06/20/01	06/20/01	06/20/01
Business Division Experience (weeks)			167	155	69	129

Figure 11: An example of post-class self-assessment and certification data. Here, we see that the students indicated they (collectively) could perform 73% of the tasks; the instructor certified most of the students in three tasks; and one task was not taught.

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As you can see, post-class self-assessment and certification data can *mathematically* tell us much about what tasks were and were not covered in training, what the students accomplished, and what the business is now able to do as a result. Based on the results, everyone (instructors, students, training managers, student managers, etc.) can evaluate classes and put together a plan to improve the training program.

It should be noted here that it's important to remember not to leap to conclusions when interpreting post-class data and to look for the real causes, if problems are indicated. For instance, in our example, there are a number of possible reasons why the one task was skipped. There may have been insufficient time to run the class, the training equipment may have been diverted for other purposes, the task may have been obsoleted, or the class may have been overloaded with students. If the task was skipped because it is no longer necessary — then there is no real problem. On the other hand, if one of the other reasons were the cause, we would have to look further into the situation.

It is also important to remember that it is still necessary, after a class has finished, for the students to continue practicing the tasks to achieve and maintain mastery — especially if they were not certified in all of the tasks by the end of the class. If we pre-empted our training equipment for other purposes, we must ensure that the students complete their practice time to prevent our business from suffering.

As a final word, note that the use of Polar, or 'Radar' charts can be very useful for visualizing and communicating the results of the training done (see Figure 12). Polar, or 'Radar' charts are a form of graph that allows a visual comparison between several quantitative or qualitative aspects of a situation. For example, in Figure 12, we can clearly see how each of our students has done in learning a task group and how Jones has improved the most, going from 0% mastery of the tasks to 100% mastery. Charts such as this are easily generated and can greatly facilitate the analysis of your data.
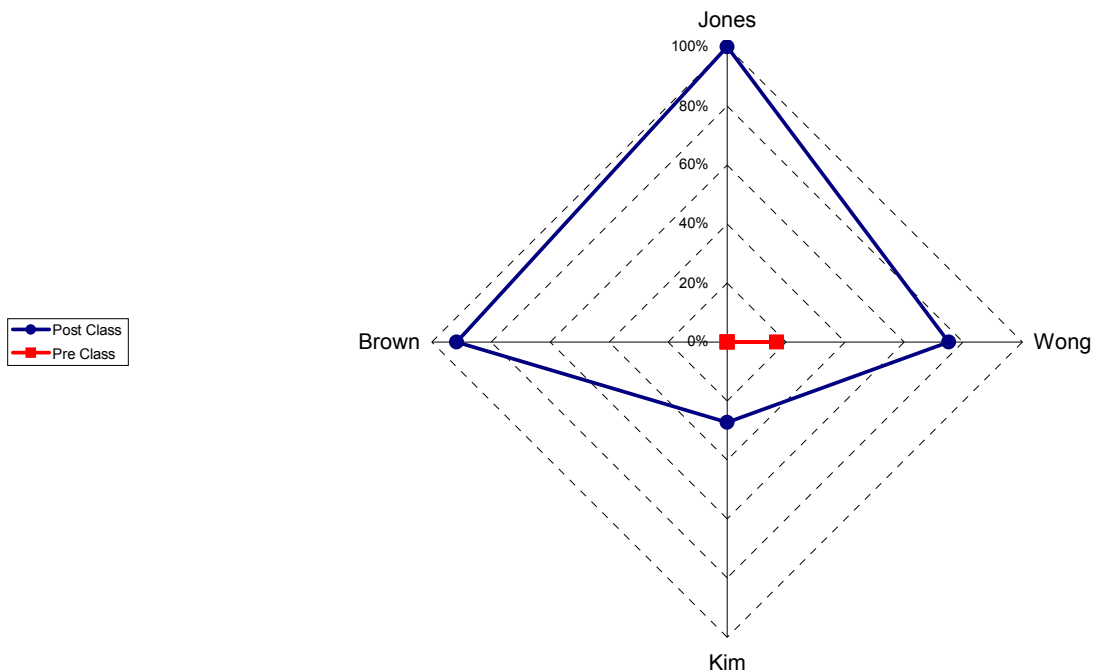
Student Self-Assessment Scores

Figure 12: Example of a polar chart showing, in one graphic, the improvement of students from pre class to post class. Jones improved the most; Kim the least. Note that these are self-assessment results, which would need to be verified by the instructor. (Chart based on results shown in Figure 10 and Figure 11.)

Appendix A

Example Smiley Sheet

Course Evaluation

Course Name	
Instructor	
Date	

Circle one of the following options for each statement.

1=Strongly Disagree (Low Score) / 5=Strongly Agree (High Score)

Course

The course met the course objectives described in the course description.	1	2	3	4	5
The length of the course was appropriate.	1	2	3	4	5
The subjects were covered thoroughly.	1	2	3	4	5
The demonstrations were good.	1	2	3	4	5
The practice exercises were useful.	1	2	3	4	5
The time spent on the practice exercises was sufficient.	1	2	3	4	5
The skills tests reflected the material covered in class.	1	2	3	4	5
The reviews and summaries were adequate.	1	2	3	4	5
There was opportunity for participation.	1	2	3	4	5
There was variety in the methods used to deliver content.	1	2	3	4	5
The training was relevant to my job.	1	2	3	4	5
The skills learned will improve my job performance.	1	2	3	4	5

Instructor

The instructor was organized.	1	2	3	4	5
The instructor was knowledgeable.	1	2	3	4	5
The instructor was clear and concise.	1	2	3	4	5
The instructor was enthusiastic.	1	2	3	4	5
The instructor kept the class on schedule.	1	2	3	4	5
The instructor provided for a comfortable learning environment.	1	2	3	4	5

Facilities and Equipment

The training room was suitable.	1	2	3	4	5
The supplies and resources were adequate.	1	2	3	4	5
The technical equipment (circle all that apply) was available and worked properly.					
Computers	1	2	3	4	5
LCD projector	1	2	3	4	5
Presentation media	1	2	3	4	5
Training tool	1	2	3	4	5
The class size was appropriate.	1	2	3	4	5

Overall Rating

This was an enjoyable learning experience.	1	2	3	4	5
I would recommend this course to others.	1	2	3	4	5

Comments

What worked well:

What needs improvement:

Other:

Figure 13: The above example shows questions that may be found on a typical "smiley sheet" evaluation. You will note that whether or not a student acquired new skills is addressed only in limited terms (does the student think the training was relevant? or that the skills learned will improve his/her job performance?). And what those skills might be are also not identified, unless the student chooses to add further comment at the bottom.

Appendix B

Class Analysis Spreadsheet Formulas

	A	B	C	D	E	F	G	H	I	J
2			**Post Class Self Assessment & Certification Scores**					**Student Score**		
3		"Set Up" Data	**Job Task**	Level 1 / 2 / 3	Cert. Method	SA Average / Student Data	Jones	Wong	Kim	Brown
4		1	Vent the vacuum system	1	DKW	C	C	C	C	C
5		2	Evacuate the vacuum system, from a controlled shutdown	1	DKW	C	C	C	C	4
6		3	Isolate the gun and vent the interstitial space	1	DKW	C	C	C	C	4
7		4	Evacuate the gun interstitial space	1	DPI	4	5	5	1	4
8		5	Isolate the airlock chamber, and measure the rate of vacuum decay	1	DPI	4	5	5	1	4
9		6	Operate the accelerator pump user interface	2	DPI	3	4	4	2	2
10		7	Operate the airlock jet pump user interface	2	DPI	5	5	5	3	5
11		8	Remove and replace the airlock jet pump	2	DPI	4	5	4	1	5
12		9	Remove and replace airlock gauge	3	DPI	0	0	0	0	0
13		10	Calibrate the airlock mass flow valve	3	DPI	4	4	3	2	5
14		11	Calibrate the airlock vacuum valve	3	DPI	4	4	3	2	5
15		12	"Bake out" the stack and gun to achieve vacuum	3	DPI	4	4	3	2	5
18		Tasks Not Taught	Job Tasks NOT Taught / Self-Assessed - Total Score 0	N/A	N/A	N/A	=COUNTIF(G4:G15,"0")	=COUNTIF(H4:H15,"0")	=COUNTIF(I4:I15,"0")	=COUNTIF(J4:J15,"0")

	C	D (Total)	E (%)	F	G	H	I	J
22	Total Score 1	=SUM(G22:J22)	=D22/D27	N/A	=COUNTIF(G4:G15,"1")	=COUNTIF(H4:H15,"1")	=COUNTIF(I4:I15,"1")	=COUNTIF(J4:J15,"1")
23	Total Score 2	=SUM(G23:J23)	=D23/D27	N/A	=COUNTIF(G4:G15,"2")	=COUNTIF(H4:H15,"2")	=COUNTIF(I4:I15,"2")	=COUNTIF(J4:J15,"2")
24	Total Score 3	=SUM(G24:J24)	=D24/D27	N/A	=COUNTIF(G4:G15,"3")	=COUNTIF(H4:H15,"3")	=COUNTIF(I4:I15,"3")	=COUNTIF(J4:J15,"3")
25	Total Score 4	=SUM(G25:J25)	=D25/D27	N/A	=COUNTIF(G4:G15,"4")	=COUNTIF(H4:H15,"4")	=COUNTIF(I4:I15,"4")	=COUNTIF(J4:J15,"4")
26	Total Score 5 or C	=SUM(G26:J26)	=D26/D27	N/A	=COUNTIF(G4:G15,"5")+COUNTIF(G4:G15,"C")	=COUNTIF(H4:H15,"5")+COUNTIF(H4:H15,"C")	=COUNTIF(I4:I15,"5")+COUNTIF(I4:I15,"C")	=COUNTIF(J4:J15,"5")+COUNTIF(J4:J15,"C")
27	Total Score Count	=SUM(D22:D26)	100%	N/A	=SUM(G22:G26)	=SUM(H22:H26)	=SUM(I22:I26)	=SUM(J22:J26)
30	Job Tasks Certified - Total Score C	=SUM(G30:J30)	=D30/D27	N/A	=COUNTIF(G4:G15,"C")	=COUNTIF(H4:H15,"C")	=COUNTIF(I4:I15,"C")	=COUNTIF(J4:J15,"C")
33	Able to perform task - Total Yes %	=SUM(G33:J33)/4			=SUM(G25:G26)/G27	=SUM(H25:H26)/H27	=SUM(I25:I26)/I27	=SUM(J25:J26)/J27
34	Unable to perform task - Total No %	=SUM(G34:J34)/4			=SUM(G22:G24)/G27	=SUM(H22:H24)/H27	=SUM(I22:I24)/I27	=SUM(J22:J24)/J27
35	Start Date				04/07/98	07/02/98	02/20/00	01/01/99
36	Self-Assessment Date				06/29/01	06/29/01	06/29/01	06/29/01
37	Business Division Experience (weeks)				=(G36-G35)/7	=(H36-H35)/7	=(I36-I35)/7	=(J36-J35)/7

Labels: "Summary Student Scores" (rows 22–27), "Instructor Certified Tasks" (row 30), "Summary Class" (rows 33–37)

Figure 14: This figures shows the formulas used in Microsoft Excel to generate the class analysis results.

Appendix C

Example Course Description

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Servicing the Airlock
Performance-Based Training

Course Code: 300014

This course provides students with the skills and techniques needed to replace the major Field Replaceable Units (FRUs) for the airlock system, including the operation of the accelerator and airlock jet pumps.

Prerequisites:

The following courses are a prerequisite for this course:

➢ Product Introduction
➢ Safety
➢ Basic Operations

Who Can Benefit:

This course is designed for Field Service Engineers.

Skills Gained:

Upon completion of this course, you should be able to:

➢ Vent the vacuum system
➢ Evacuate the vacuum system, from a controlled shutdown
➢ Isolate the gun and vent the interstitial space
➢ Evacuate the gun interstitial space
➢ Isolate the airlock chamber, and measure the rate of vacuum decay
➢ Operate the accelerator pump user interface
➢ Operate the airlock jet pump user interface
➢ Remove and replace the airlock jet pump
➢ Remove and replace airlock gauge
➢ Calibrate the airlock mass flow valve
➢ Calibrate the airlock vacuum valve
➢ "Bake out" the stack and gun to achieve vacuum

Time Required:

3 days

Class Size:

Minimum 2 students

Price:

$xx,xxx

Provided by:

Technical Training Services
Widget, Inc.
123 Oak Street
Silicon Valley, CA 94555, USA

Tel. 408-555-5555
Fax 408-555-5556

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Figure 15: The Course Description sets out the learning objectives for a course — that is, it lists the Job Tasks to be mastered. It tells students and their managers what to expect from the course. Note that the Skills Gained section lists exactly the same tasks listed in the self-assessment, so that what is promised matches what is actually delivered in class.

jTask is a leader in the development and mathematical measurement of Performance-Based Training and Certification.