

**CAREER MANAGEMENT FOR TECHNICAL PROFESSIONALS  
SELECTING THE RIGHT LEARNING EXPERIENCE:  
EDUCATION VERSUS TRAINING**

*Dr. Andres Fortino, P.E., Associate Provost  
Polytechnic University, Westchester, NY USA • [www.poly.edu/west](http://www.poly.edu/west)*

Once a professional has received the basic education and training of a bachelor's degree and begins a career path in the world of work, the knowledge acquired begins to lose currency. To keep up and to advance it is operative that professionals engage in some form of continuing education or they will soon find themselves less in demand. The question becomes: When to acquire more skills and knowledge and how? To keep advancing in one's career, even to keep up with one's job these days it is imperative to keep skills and knowledge current so more learning needs to take place. If the professional does not make plans and follow through on additional education, his skills and knowledge soon become out of date. The main issue in pursuing "continuing education" (and the quotes marks are necessary as it will soon become apparent) is the form of the learning experience: should it be in the form of training using short courses and seminars or should it be via more education in the form of graduate degree programs?

The answer to that question, in a true engineering fashion is: it depends. Or to answer it more directly, both are needed. The answer depends on the circumstances and the purposes for the additional learning. The main issue is deciding when education is appropriate or when is training indicated, and the difference between the two. The key is to develop an understanding of what education and training are and to be clear on their differences, with examples of each type of learning experience and the circumstances where each is appropriate.

The bottom line is to seek training to acquire skills and knowledge for short term advantage. Training brings the learner up to the level of others in the industry and will tend to make them the same as the experts they seek to emulate. For example, to get a better job as a network administrator learn how to install routers and become certified in internetworking technology. Training helps the learner solve known problems with a high degree of expertise.

Education is different. It should be used to acquire a mindset not currently owned or to deepen a mindset already possessed. An electrical engineer may wish to become a business person and uses an MBA education to acquire a business and management mindset, for example. A biochemist will go on for a masters in chemistry to deepen the mindset of a professional chemist learned as an undergraduate. Education broadens the learner, makes him different from everyone else and helps him think in his own way how to solve problems that have not been solved before. Of course educational programs include training in the skills and knowledge of the discipline, but they go further to develop thinking abilities, attitudes and behavior patterns that might be classified as a mindset. In this sense, training programs do not include education but education programs often include training.

Some of these definitions derive from presentations and the writings of one of America's foremost educators, Dr. Arthur Chickering [1]. The interpretation of his thoughts and their application to this topic are those of the author.

Additional definitions that support this view may be found in Wikipedia:

***Education** encompasses teaching and learning specific skills, and also something less tangible but more profound: the imparting of knowledge, positive judgment and well-developed wisdom. Education has as one of its fundamental aspects the imparting of culture from generation to generation (see socialization). Education means 'to draw out', facilitating realization of self-potential and latent talents of an individual. [2]*

***Training** refers to the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relates to specific useful skills. Today it is often referred to as professional development. [3]*

How to decide whether to engage in training or in education? And how to know which is needed, if maybe not both? There are several attributes of education and training that can help answer each question. Appendix A summarizes the attributes of education and training in a chart and poses the critical question the learner must answer when choosing between them.

### **First Issue - The Purpose Of A Course Of Study**

A course of study should lead to an increase in understanding of the world, to acquire new skills and additional knowledge.

Training is a course of study that helps the learner to develop new skills and knowledge, to perform new tasks, to deal with issues that are routine and to solve problems that are known and have been solved before. Training assists in becoming proficient at new tasks, to achieve a certain level of mastery and then claim to have obtained these skills and be hired for new jobs or additional responsibilities based on this new set of skills.

Examples of new skills are the installation and operation of new equipment, processes such as editing manuscripts or writing software in a new language, or bookkeeping procedures. These can be mastered through training.

Education, as defined here, is more complex and operates at a higher level of abstraction. Education is a course of study that helps the learner develop new mental models of the world or deepen his current models. These are rightly called mindsets. After being educated the learner should be able to analyze new situations and to deal with issues that are not routine and to solve problems that have not been solved before. Typical mindsets acquired with education are: an entrepreneurial mindset to know how to start a business venture; a global mindset to know how to operate globally; a business mindset to understand the world of business, or a

professional mindset in one of the many professions such as engineering, nursing, finance, accounting, or science.

Examples of education are learning to write fiction, to code accounting transactions, to analyze stock options, to create a business strategy for a company, to establish a company branch in another country, to solve engineering problems, to write a computer program to fulfill a business tasks, to manage a project, or to do science. Some of these mindsets can be acquired through trial and error and on-the-job training, but often they are acquired quicker by undertaking study through an educational curriculum.

The deciding question here is: To be transformed into a different person or only to master a new skill or acquire new knowledge?

### **Second Issue - The Nature Of The Experience**

Training differs from education in the way the learning experience is conducted and the learner acquires new material. In other words the nature of the learning experience differentiates education from training.

Training is a learning experience that is focused, intensive, narrow and exclusive to one subject matter. The method of instruction is usually one of drill: “to drill in.”

Education is open-ended, expansive, broad and inclusive. The learning experience is often orchestrated to draw the individual out – *educere*, as the quote below demonstrates.

*“In ancient Greece, Socrates argued that education was about drawing out what was already within the student. (As many of you know, the word education comes from the Latin e-ducere meaning "to lead out.")” [4]*

Both training and education can be experiential. They can both have labs, for example. Learning a language has both training aspects as in learning a vocabulary and education as in understanding the cultural mindset of native speakers. Drill to acquire a vocabulary, immerse in a culture to acquire the way natives think.

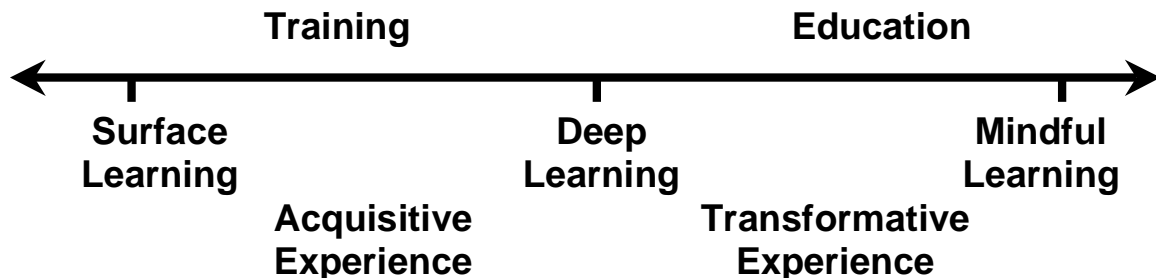
Chickering classifies learning into three broad types: surface, deep and mindful.

Surface learning relies on short term memorization of facts, data, concepts and information. Some other activities used to acquire this learning are: highlighting texts, making lists, creating outlines, developing mnemonics, and rehearsing alone or with friends. In surface learning the interaction with the instructor or mentor is in the form of asking questions to get the right answers.

In deep learning the learner seeks meaning, builds on, connects with, and challenges, prior knowledge and competence. Here there is reflection on mental models and on taking ownership of learning as well as application of new information to varied life settings.

Lastly, in mindful learning, which is the most transformative of all, the learner is open to new information, constructs his own categories and reconciles diverse perspectives, integrates new learning with that already possessed. The mindful learner chooses how to pursue learning and devises his own assignments and challenges as well as defines the end product of learning and the levels of expected performance.

The diagram below shows how education and training relate to these levers of learning.



### **Third Issue - The Determination Of Outcomes**

By the nature of the learning experience we can see that training and education naturally have different ways to assess outcomes, how to tell that learning took place. Certainly outcome is measured by performance, but there are strong indicators of learning acquisition in the various intermediate measures used, such as grades in education.

For training the typical measure of a successful learning outcome is to test for proficiency. Training easily lends itself to standardized tests and certifications. The learner's performance is measured up to a certain level of standard performance. It is relatively easy to test for proficiency in the acquisition of knowledge by written or verbal exam or in a lab by demonstration of the acquired skills.

In education it is harder to test for proficiency. There are no simple standardized tests and certifications. A typical method is to measure performance over time -- the evidence of competency. How to tell that a person who has been educated to have a certain mindset (able to solve problems or behave in an appropriate and successful manner of other professional with that level of education) is competent with that mindset? It requires the subjective evaluation by seasoned experienced professionals in the field. Supervisors can attest to performance on the job. During the course of an educational experience and the very end of it, one's teachers are called upon to make judgments of proficiency. College professors who are experts in their field can pass judgment on whether the learner has acquired the proper analytic skills and mindsets required of that profession or activity. The indicators are a grade in each course and a cumulative grade point average.

Sometimes professionals are called upon to give imperfect, but none the less useful indicators of proficiency. A successful novelist can tell if the learner is now able to write fiction or not. A seasoned business executive can judge whether a student created a successful business strategy or marketing plan. An electrical engineering professor can tell if the student can

analyze an engineering problem correctly and device a workable solution. A professional engineer can tell whether the bridge designed by the learner will stand up and an architect can tell if the building that was designed can be built.

Over time the evidence that an educational experience was successful in instilling a certain mindset is on-the-job performance -- competency. Given an assignment for which the new mindset was required, how competently did the learner accomplish it? The resume and the accolades of supervisors and peers will ultimately reflect that the mindset was adequately acquired.

The difference between education and training here is: By what measures will others (boss, co-workers, mentors, future employers) judge that the learner was successful in his learning experience?

#### **Fourth Issue – The Ease Of Acquisition And Persistence Of Learning**

Education differs from training in the ease of acquisition and in the time it takes for the subject(s) one has learned to lose value.

Training is easier to acquire. Often it only takes a matter of days or weeks. Training programs that are comprehensive may last a few months at the most. The material one learns through training is typically not useful after five years. It will need to be refreshed because new knowledge appears continuously superseding the old, and new machines appear requiring re-training to operate. Typically any training will last at most five years (this is a rule of thumb). That is why most licensing and certification programs require the licensee or certified professional to continually learn and provide evidence of such to remain credentialed.

Training loses its value relatively quickly. Putting certain skills on one's resume that are older than five years will impress the interviewer that you were able to acquire them at one time and maybe even became certified in that area, but will probably not win you the present job being advertised. You have to continually be in training and be recertified or gain new certifications in new emerging technologies. Some training lasts a lifetime, such as acquiring driving skills, or bookkeeping (although with the advent of computerized accounting systems, retraining is mandatory as new systems are installed at the firm). These are exceptions. The need for constant training is especially important in technical fields where technology changes at a rapid pace. The need for COBOL or FORTRAN programming skills will fade in the marketplace to be replaced by the need to code in C++ or Java or HTML. The education that created a professional programmer and gave him the mindset of computer scientist will last a lifetime, but the need to gain new programming language skills will continually be present.

Education on the other hand is harder to acquire. It takes more work. It takes more time. Since education involves the acquisition of new mindsets it is transformative. The learner becomes a different person after the educational experience. Transformation takes time -- typically months and years. Selecting the right learning educational experience must be done carefully and deliberately. It can't be undone, can't be done over again without a certain amount of pain and suffering, and since these programs are often expensive, without incurring considerable

expense again. But in the end it is not so much the cost in treasure but the loss of time that is painful if the wrong educational program is selected. Careful selection before starting is of paramount importance

An education lasts a lifetime. Once the writer learns to write fiction he does not lose that mindset. Once the budding engineer learns how to solve problems like a professional he does not lose that mindset. Once art is learned to be seen in a certain way, the newly acquired eyesight is used continuously. One mindset can be replaced with another but only with great difficulty and it takes a long time to do so.

College degree programs are often used as educational platforms. They set up educational experiences with cycle times in months (semester or quarters) and total program length in years. And they are also much more expensive than training.

The deciding questions here are: (1) Is the learner ready to undertake a lengthy and difficult process to acquire a new mindset or can something be done quickly to get some much needed skills and knowledge?; (2) How long is the learning process expected to take?; and (3) How long should results of this learning expected to last?

### **Fifth Issue - Types Of Credentials**

Credentials are indicative of one's skills, knowledge and mindsets. They are flags used in the professions to indicate the level of mastery that the individual has reached. They are keystones in one's career and useful when seeking a job. You list them in your resume and curriculum vita to indicate what you know and what you can do as well as what types of mindsets you have acquired. Those looking to hire you will look at a resume for the credentials of training and education as a preliminary method of filtering applicants for fitness to a job.

In training the most appropriate and credible credentials are certificates. They are especially valuable if the certification is offered by neutral third parties. A Project Management Professional (PMP) certification offered by the Project Management Institute is more credible than an internal certification of project management skills carried out by a company through its internal PM training processes. The granting of the certifying credential usually, but not always requires the passing of an exam or set of exams.

The preferred credential that signals the acquisition of an education is an academic degree. These are organized by the number of years of study (associates, bachelors, masters, doctoral) and the level of the experience and depth of the transformation. The degree also denotes the discipline, for example a Bachelors of Electrical Engineering (BEE), or a Masters of Business Administration (MBA). And the quality of the education is also denoted by the reputation of the institution granting the degree. All these are very visible and accepted markers of educational attainments.

Other papers in this series describe these credentials in more detail and will help sort out one from the other. One paper describes the choices in masters degrees [5]. Another describes the

choices in certificates and licenses [6] and a third describes the uses and paths to obtaining a doctorate [7].

The deciding question here is: Is the necessary credential a degree or a certificate?

### **Sixth Issue - Choosing The Institutions That Provide Learning Experiences**

It is natural to ask what institutions offer each type of learning. For education the answer is fairly easy. Education is typically provided by institutions of higher learning such as colleges and universities. They create the academic environment for education to take place. In the United States, they are tightly regulated by state boards of education. Colleges and universities are chartered by the state and they are approved by the state to issue degrees. They are also accredited to varying degrees by accrediting bodies. And they build their reputation over decades and in some cases over centuries.

Training is delivered by a wide variety of entities, mostly commercial, and mostly in business for a few years. There are the commercial training companies. Each profession has a large number of them specific to that field. Some training is available from vendors of equipment and software to operate the technology they sell. Training can be paid for and arranged by federal, state and local agencies to assist those who need to improve their economic outlook, or for special needs of the government. Training can be delivered internally by organizations, whether organized by the company with its own employees or purchased from external vendors.

Colleges and universities sometimes provide training as well, but it is not commonplace. Community colleges are more likely to provide many training experiences. On the other hand research institutions that offer seminars derived from the cutting-edge research of their foremost academics, is often beyond training and falls more in the realm of education due to the nature of the material being taught.

Many educational programs include training to develop skills which are useful to the graduate in acquiring a job upon graduation. The reverse is not true: training does not produce education as defined by this paper.

The deciding issue here is: Choose the right institution for the learning experience appropriate to the type of learning sought.

### **Seventh Issue – Plan For The Appropriate End Result**

The end result of the training experience differs markedly from that of the educational experience. Training tends to make everyone the same, brings everyone up to an acceptable level of performance of tasks and use of new knowledge. Training develops new capacities for doing things and to act out of habit

Education on the other hand tends to make everyone different. It draws people out to use their individuality, helps them be themselves as unique individuals who have unique contributions

and see the world their own way. Education develops new thinking capacities – acting after analysis. It is transformative. The learner becomes a different person after the educational experience.

The deciding question here is: What is the end result of the learning experience – to be a more experienced person or a different person with a new mindset?

### **Summary**

The bottom line is that if the learner is looking to acquire new mindsets, analytical skills and new ways of thinking and looking at the world, education is the correct path, as defined in this paper. If the learner is looking to acquire some skills and knowledge and is willing to accept that the acquired knowledge will lose value quickly, but nevertheless it is needed right now to advance a career, by all means training should be sought. Once embarked on the appropriate learning experience the learner must be aware of all its attributes, limitations and benefits and what the end result will be and not confuse the two types of learning experiences.

**BIBLIOGRAPHY**

- [1] Chickering, Arthur and Reisser, Linda, *Education and Identity*, Jossey-Bass, San Francisco, CA, 1993.
- [2] Wikipedia, [http://en.wikipedia.org/wiki/Education#\\_note-0](http://en.wikipedia.org/wiki/Education#_note-0).
- [3] Wikipedia, <http://en.wikipedia.org/wiki/Training>.
- [4] Yero, Judith Lloyd, The Meaning of Education, Teacher's Mind Resources:  
<http://www.TeachersMind.com>,  
<http://www.teachersmind.com/pdfdirectory/Education.PDF>
- [5] Fortino, Andres, Career Management for Technical Professionals: A Technical or a Management Masters Degree? Polytechnic University white Paper, 2007.
- [6] Fortino, Andres, Career Management for Technical Professionals: Certificates, Licenses and Degrees, Polytechnic University white Paper, 2007.
- [7] Fortino, Andres, Career Management for Technical Professionals: The Doctoral Degree Polytechnic University white Paper, 2007.

**APPENDIX A  
EDUCATION VERSUS TRAINING COMPARED**

<b>Attribute</b>	<b>Education</b>	<b>Training</b>	<b>Determining Factor</b>
<b>Purpose Of The Learning Experience</b>	Acquire or deepen mindset or profession	Acquire new skills and knowledge	Do I want to be transformed into a different person or just be more skillful?
<b>Evidence Of Learning Success</b>	Course grades, GPA	Testing, Certification Job performance	How will I and others know I was successful in my learning?
<b>Credentials</b>	Degrees	Certificates and Licenses	Do I want to get a degree or a certificate?
<b>Difficulty To Learn</b>	Harder	Easier	Am I read to undertake a lengthy and hard learning process or can I just do something quickly?
<b>Length Of The Learning Process</b>	One to three years	Typically from one to five days, or several weeks	How long do I expect the learning process to take?
<b>Persistence Of The Learning Outcome</b>	Lasts a lifetime	Shorter shelf life, five years on the average	How long should I expect the results of this learning to last?
<b>Style Of Learning</b>	Draw out, mentoring by instructor	Drill in, developing skill, habits, practice	What can expect my educational experience to be like?
<b>Behavior After Learning Took Place</b>	Acting after deep thought and analysis Skillful at thinking	Acting out of new habits and skills Skillful at doing	How will I behave after this learning experience?
<b>Change</b>	Transformational, deeper, more radical	Shallower, more superficial	What kind of change am I looking for?
<b>End Result</b>	Make you different from others	Make you the same as others with the same training	What am I looking for as an end result of my learning experience?
<b>Institutions Providing Learning Experience</b>	Colleges and Universities	In-house seminars, training companies, self taught	Where can I obtain this learning experience?
<b>Examples</b>	College Courses and degree programs	Training Seminars, job training	What are some examples of education and training?

