

Training dilemmas and false dilemmas

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The training world is rife with dilemmas and false dilemmas. Dilemmas mean that one has to give up something to achieve something else, when both are desirable. False dilemmas give the same impression but contain an error of reasoning or a misunderstanding. This note explores a few of these, encountered by the author, along several years of work in the area. Some of the issues are new. Others are old. Nevertheless, they still mesmerize trainers and observers.

Social versus Economic Motifs

After so many years, it must have become clear that training is a powerful means of enhancing productivity. And productivity increases, together with better technology, is what makes more goods and services available to society.

What more can we ask training to do? Yet, when unemployment soars, politicians and administrators are under pressure to do something. And repeatedly, they announce a new training program for the unemployed. Compared to other alternatives, training is quick, inexpensive and calls everybody's attention.

Unfortunately, it does not create jobs. Careful observers from the industrial world have known it all along, at least, since the disappointing experience of the seventies. And there are no reasons to believe that in developing countries the impact of training on unemployment is any higher.

There are exceptions. Some programs that are fine-tuned to existing jobs can produce interesting results. Training for self-employment can also have positive results. But they require far more elaborate schemes than those usually deployed.

Some have a good track record. For example, IDB's Chile Jóven and its clones in Argentina and other countries turned out to increase the employment rate

of its graduates. The key feature of the program is to condition the funding of training to finding jobs or internships, prior to the approval of the project by the government.

Unfortunately, these ideas have not been replicated in large scale. Perhaps, the main reason is that the requisite organization is far more demanding than the conventional version of announcing a new program and finding people willing to enroll.

Another way of stating the same problem is to ask whether training should be driven by economic or by social motifs. We have economics-driven training when a gap in skills is perceived and training is planned in order to fill this gap. Very often, training is offered to those already employed in industries when managers perceive the need to improve the performance of its workers. But initial training can also be offered if job openings are available for the trades considered.

Be it by social pressure or by a perception by the government that something must be offered to its poorer citizens, much training is offered without such precautions. This is particularly the case when unemployment soars. Governments decide that they need more social policies to help its citizens. The press complains that the government has abandoned the poor. Yet, the odds of obtaining good results are slim.

Ultimately, the strategies starting with the assumption that training must be driven by economic reasons tend to yield good results. Therefore, they help the poor, since most training caters to relatively modest trades. Perhaps, not the poorest of the poor, but still poor. Contrariwise, training that is conceived to help the poor, more often than not, it is ineffective.

A concrete example of that can be found in Brazil. SENAI - and its counterparts in the service sector - is managed by employers' association. It offers training to improve productivity and monitors the results. Several pieces of research indicate good results. In contrast, Ministry of Labor training is driven by social policies. By and large, its motivation is to help those who are more deserving. Evaluations of the huge PLANFOR program (run by the Ministry of Labor) have shown hardly any impact on unemployment and just as little improvement in productivity.

The paradox in this situation is the solid impact of training on the well being of workers when the motivation is purely economic. In contrast, it tends to be ineffective when social impact is the main motivation.

Training a few highly sophisticated workers or training for the masses?

When most training systems were created, the menu was relatively narrow. The task at hand was to train in the classic trades. Turners, machinists, woodworkers and many other occupations were needed, with higher skills or in numbers that could not be provided by traditional apprenticeships.

In those countries that were successful in industrializing, progressively, training requirements became more demanding. A lot more theory and abstraction was needed. More basic skills became necessary to deal with technology. It went from workers capable of handling CNC machines to high-level technicians.

At the same time, the simple-minded idea that the informal sector was a temporary stage turned out to be false. Even in the most successful developing countries, at least half of the labor force remains in the informal sector. There, levels of complexity and remuneration are modest.

Therefore, given limited resources, training agencies faced new and thornier choices. Training gaps remained in all three sectors. Welders and mechanics are still needed in significant numbers (in Brazil, initial wages for pipeline welders are higher than for engineers). Nevertheless, without highly sophisticated technicians, the countries lose their competitiveness. And what to do with half of the workers that labor in the informal sector?

Latin America experimented profusely with creative schemes to train in the informal, perhaps, more frequently than in any other region. Nevertheless, while some formulae were quite successful, they could not be replicated in numbers commensurate with the size of the informal sector. One reason was the high fixed cost of most training agencies, created to cater to modern-industry workers. At the same time, Ministry of Labor *ad hoc* schemes were not sufficiently robust and do not thrive either.

Sorting out the training priorities remains a real dilemma for most developing countries. Traditional programs drift towards higher-level training. Those dealing with social policies want more training for everybody but do not know how to do it.

Cohabitation of the old crafts with training for high tech occupations

Most European training institutions are quite segregated in terms of the complexity or sophistication of the training offered. Institutions preparing skilled workers are not the same as those training the unemployed or preparing technicians and higher-level workers.

In contrast, in less affluent countries, institutions tend to cater to all levels of workers. In some, quick training for simpler trades are offered, together with technician training. Some even offer post-graduate programs for engineers.

This is a good idea, as it permits economies of scale and more intense deployment of instructors and equipment. Yet, it often creates problems of status conflicts.

Recently, I visited a very good school, preparing workers for natural gas activities. It is a joint venture of SENAI and the Brazilian oil company, Petrobras. In addition, it deals with norms and does interesting research and development in gas applications.

A pair of top engineers showed me the school. They took me to their laboratories and research projects. When the tour came to an end, I realized that it had not reached the workshops where workers are prepared to adapt gasoline automobiles to burn natural gas.

This was a symptom of the dilemma faced by this school. Obviously, the top echelons of the school do not think training workers is so important. Therefore, it is not credible to imagine that workers being trained in these simpler trades fail to perceive that they are the lowly end of the school and are treated as such.

When visiting vocational schools in Tunisia and Algeria, I was able to see their programs to train skilled workers, as well as simpler and less expensive programs of apprenticeship. As it turned out, tracer studies had evaluated the employability of both and found that the cheap apprenticeships had a far superior performance. In fact, the regular skilled-workers program lead a little more than 5% of the graduates to regular jobs. At the same time, over two thirds of the apprentices stayed in their jobs after graduation.

By any standards, the apprenticeships are economically and socially more desirable programs. Nevertheless, since they had less status inside the Office de la Formation Professionnelle, they suffered from inadequate funding. The classroom and technology end of the program was never fully implemented and little attention was paid to it by administrators.

These examples illustrate the interference of status in the logic of training. In the first case, simple trade students must see themselves as belonging to a second rate category. In the Maghreb examples, attention was given to the wrong kind of training, from the point of view of the employability of their graduates.

Structured training or teachers "creating" their own materials?

Piaget never thought much about education, therefore, never wrote about it. Nevertheless, his followers have taken leads from his theories and gone deep into education. One of the lines partly derived from his ideas took shape in the "constructivist" movement.

It would be beyond the scope of this note to delve into the intricacies of this theory. From the point of view of the arguments presented here, we can agree or disagree with constructivism, it does not make any difference. However, what matters for the present argument is the transmutation of the original ideas on the epistemology of learning into an almost religious movement.

In contrast to American constructivists, Latin American apostles have become zealots and taken the original ideas much beyond what seems reasonable and deductible from mainstream thinking along such lines. To them, since students must "construct" their own understanding, each one learns differently. So far, so good. However, the implications derived by this group are quite unreasonable.

Educators preaching these ideas – and they are many – are adamantly against textbooks, particularly when they are detailed and step-by-step. They preach that teaching must follow the individual learning styles of students, not the line prescribed by the book. In moments of greater fervor, burning all textbooks has been suggested.

This strategy plays havoc with learning, in a Continent where teachers are poorly selected and poorly trained. At the same time, as more and more research accumulates, there is mounting evidence that the more structured and step-by-step the program, the more students learn.

In the last decade or so, as training had to incorporate broader skills in reading, writing, mathematics and science, several training agencies started

bringing in educators. And the newly hired teachers brought in their devotion to the idea that teachers have to “create” their classes.

Formerly, engineers and experienced workers organized training. They believed in detailed blueprints and learning sequences. With the advent of the new crop of educators, a lot less attention was devoted to learning materials. In some cases, entire departments that produced handbooks and manuals were eliminated.

The new gurus admit training modules. In other words, the teachers preparing their classes can go to the Internet and have access to hundreds of files with models and suggestions. This is the standard answer to those who regret the disintegration of the neatly woven curricula, handbooks and practical activities.

The theory might be fine – although this author disagrees – but the practice is not. The ultimate result is a lot more improvisation in classes and in the handouts to students.

For some mysterious reason, there is little reaction to this dominance by ideological educators. As far as I know, there is no dilemma here. Instead, there is a plain error. The superiority of training that benefits from structured and detailed materials have been fully demonstrated by research. In contrast, the “new school” styles suffer from repeated improvisation by a vast majority of teachers incapable of preparing quality materials (why should we expect otherwise, in a world with increasing division of labor in all spheres of life?).

Structured learning stilts creativity? Or it is the other way out?

The standard argument against the structured style of training is that creativity suffers. According to critics, students are given fixed questions and they must answer them precisely. No flights of imagination, no invitation to create, to invent, to speculate, to bring their own answers or to disagree. To the constructivist educators, this is the death sentence to training that offers detailed plans for all activities.

There is a logical error in this argument. Let me illustrate it with an ill-famed technique: programmed instruction. Some time in the fifties, the idea of sequencing exposition and drills became very fashionable. It was a spin-off from the ideas of B. F. Skinner with his “learning machines”. The initial rationale for programmed learning makes much sense. Teach a tidbit and test,

to ensure that it was learned and the student gets the proper feedback. This is the ultimate manifestation of structured learning.

As it turns out, this method was taken up on earnest to teach computer programming. The task at hand requires knowing the exact answer to questions that are not imaginative or inherently complex. Understand and remember: that is all that was needed.

Coming from that milieu, programmed instruction acquired a bad reputation among educators who wanted their students to fly high. We all agree that learning programming languages does not involve high-flying intellectual pursuits. However, was anybody asking whether programmed instruction could be also used to teach Comparative Literature? Following the same argument, this same subject taught by programmed instruction would be better or worse than following the meanders of each teacher's imagination?

There is more to this question than can be dealt with here. But we can forge ahead, with due precautions. Taking Bloom's taxonomy, we agree that programmed instruction used to learn computer programming was good to learn facts and rules, and to remember them. But can it be used to apply knowledge, to analyze, to use one's imagination?

It is my belief that not only this is possible, but also it is far superior to what can be attained with the run-of-the-mill teachers and instructors that exist today in schools and vocational training institutions. In other words, I want to argue that it is the other way out. Programmed instruction or other structured versions of teaching can better protect the fragile nature of higher order learning.

Suppose students must learn the concept of acceleration of gravity. The average teacher, improperly trained, as he tends to be, will go to the blackboard and show the formula. Next, students will get drills in applying it to different sets of numbers. However, they are not learning physics. They are merely training in the resolution of mathematical equations.

In structured learning, it is possible to bring many real life examples of acceleration, like falling bodies. In addition, the students can receive instruction on how to construct inclined planes, release balls and time their descent and acceleration. In other words, student can be given real applications. And we know full well that one learns the principles only when one applies them to problems. It is no longer applying numbers to formulae, but looking at problems and situations and being prompted to apply to them what was learned. Surely, individual teachers can do exactly that in their

classes. But are they prepared to do as well, considering the wealth of detailed examples and well-conceived projects that can be built-in the written materials (not to speak of audiovisuals and computer simulations)?

We should also consider another advantage of structured learning. Students must be tested. And if they are to learn high order skills, they must be tested on them. However, it is extremely difficult to create good tests dealing with high order skills. Teachers have neither the time nor the preparation to do that. The result is well known, tests ask for recall of what was learned, with no analysis or, even less, creativity.

In defense of structured learning, tests can be prepared by experts who have seen hundreds of ways to teach whatever is to be taught and how to test for higher order learning. It is not the superiority of a pile of paper over a real life teacher. Instead, it is the inevitable superiority of a significant planning staff, in which each member is specialized in a segment of the task at hand and having access to the best information anywhere in the world. Last but not least, with budgets and time to do a good job.

Let us illustrate what a good test can be, moving into a field that is far less concrete than the usual course in vocational training. Consider a real example of a course on Ethics. The teacher guide, after indicating that students should read Plato's defense of Socrates, asks the students to answer the following questions:

1. Was it fair to condemn Socrates?
2. Considering the stalemate faced by Socrates, did he have any other alternative?
3. If the judgment were today, would Socrates be considered guilty?

Could the average teacher prepare a test that is as thought provoking? Could he prepare equivalent sets of questions for every chapter of the course?

Therefore, for the average teacher or instructor, detailed instruction on how to conduct the class is helpful and welcome. There is a minor controversy here. Educators claim that teachers are not challenged when they receive detailed materials. But teachers always say that they love whatever makes their classes easier.

Suppose we agree that structured materials improve learning, in the case of the average teacher. But what about the highly creative teacher? The answer is very simple. There is no reason to constrain the creative teacher to use this or that material when he can do better with his own inventions.

No dilemmas, just an erroneous notion on the part of some educators. Structured leaning can help teachers deal with higher order skills. At least, the average teacher can do better with such materials.

What to do with basic skills when public schools do not teach them properly?

Increasingly, skilled workers need sound reading abilities, as well as the competencies to use numbers to solve practical problems. And they also need to deal with abstraction, with theories, and with higher-order concepts.

The problem is that vocational schools recruit students in the lower half of the academic achievement distribution. Therefore, they are chronically weak in these basic skills.

Complaining against the public schools is a patriotic duty of good citizens in the developing world. But not much is going to happen in the short run. Vocational schools have to deal with the students they receive. And even in countries like the United States, the proportion of functionally-illiterate students entering higher education is alarming (about one third have to take remedial courses).

Therefore, training agencies in developing countries face a thorny predicament. In order to offer the training that is required by modern industry, they have to do what primary or secondary schools should have done, but did not. In other words, they have to become also regular schools.

Do they have to add on to their programs the conventional curricula of regular schools? Do they need to become two schools? This is seen as a serious dilemma for training agencies.

That they have to teach basic skills, there is nothing that can be done. It is not an either or dilemma. Whether they like it or not, it is something they cannot avoid.

Low and behold, the idea of running two schools, side by side, is wrong. One of main reason they did not learn basic skills in elementary or secondary schools is the way they were taught. In fact, in the typical bad school, concepts are presented in isolation. Situated or contextual learning is absent – or present only in the official rhetoric of programs. And as we know full well today, unless teaching is contextualized, real understanding is not achieved

for most students, particularly those coming from modest backgrounds. Students memorize words, formulae, facts and principles. But since they were not fully understood, they are useless fragments of memory, not tools to work with.

As it turns out, the privilege of vocational training is to offer a natural, motivating and intuitive context to learn concepts and abstractions. The study of dilation of metals remains a vague concept, when learned in books and the blackboard. But it comes to life, when students have to adjust the gaps in the rings of a piston, according to the temperature they will reach inside the engine.

Therefore, the idea of two schools is a dead end. It implies that the strongest means to transmit basic skills is not being used in the academic classrooms. By merging the two, students of vocational schools achieve a much better mastery of the concepts, compared to what happens in regular academic schools.

The same happens with reading and writing. Students must read manuals and instructions on how to perform their everyday tasks. And they must write about what they are doing in the workshops. This leads to a better mastery of language skills than the vague and pointless readings of regular schools.

Of course, the best training system in the world intuitively knew it, all along. If one enters a Mathematics class in an electricity course, what the students think they are learning is “electricity math”. This is immediately useful and they perceive it as such. It does not matter that it is regular math.

I visited a course in metal work in the American State of Oklahoma. Students were building a helicoids stair. They learned all the calculations required to get it right. What was not told them is that they were learning trigonometry. In fact, one of the teachers told us that if they were to be told that this was trigonometry, their minds would freeze in panic, after having struggled with that subject in high school math classes.

The best Latin American training systems have done contextual learning for a long time and this is part of their strategy. But when other agencies organize training, the math tends to be an add-on program, achieving the same mediocre results that were observed in their prior schooling experience. The same happens with language skills.

Therefore, to the extent that learning basic skills in the context of trade training is practiced, there is a dilemma only in the sense that resources have to be allocated to this, adding to the costs. But it is not a dilemma when we consider that this is the best way of learning basic skills.