e-Learning: Towards a Technology Enhanced Learner-centric Platform

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The annual Training Synchronisation Conference (TSC) is a great opportunity to reflect on education and training (E&T). Not only on its application in a NATO context, but also on a more fundamental level. The search for better E&T is never over. Unfortunately, it takes more than new ideas and concepts to take an innovative leap forward. We tend to use a new development for the improvement of old ideas resulting in small improvement steps and an undervaluation of its full potential. I think it's our lazy human nature that slows down our critical thinking[1]. Anyhow, a conference exposes one to a myriad of ideas and can stimulate creative thinking by trying to combine them.

NATO's Training Spectrum (Figure 2 & Figure 1) is divided in four discreet areas, i.e. Education, Individual Training, Collective Training, and Exercises. Proficiency at the collective level requires forces, often joint, to engage quickly and to integrate their capabilities across domains, echelons, geographic boundaries, and other organizational affiliations. Since the individual's preparation is a prerequisite for collective effectiveness in the execution of tasks, individual and collective training must be viewed as a closely interconnected continuum.
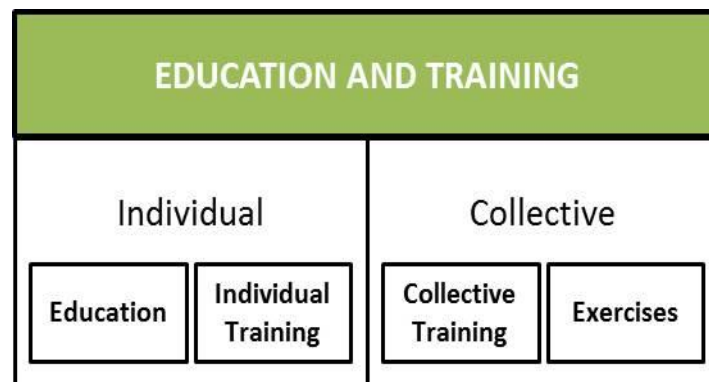

Figure 1 : The NATO Training Spectrum.

During the Training Requirements Analysis, a step within the Development Methodology, the tasks are examined in greater detail and further refined into Audience, Functional Area, Task Performance Statement, and Proficiency Level. The combinations of these 4 elements for every task result in the

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[1] See also Daniel Kahneman, 'Thinking Fast and Slow'.

individual and collective E&T requirements. These requirements are eventually matched to existing (or to be developed) E&T opportunities[2].

One type of E&T opportunities is e-learning. Within the E&T community this is considered as a contemporary tool that receives too little attention. It seems that the solution providers (i.e. school, centers of excellence, training institutions …) are not really keen or able to increase the production of this kind of courses. To their defense they bring forward arguments like not enough specialists to design e-material, need for hands-on experience, IT-infrastructure not adapted to this kind of teaching … All valid arguments, are they?

It is not that this is a recent struggle. No, it's a yearlong fight to get e-learning off the ground. To me that means the current paradigm is blocking progress. Unfortunately, I could not point at the origin of problem - as an engineer I have the instinctively desire to search for the ground cause of the problem – so I followed the speakers in their arguments. In my mind's eye I was looking at all the brought-up mischiefs on the crime board for the silent murder of e-learning. The battle was lost and I didn't see a way out.

The session on Artificial Intelligence (AI) in E&T gave me the first glimpse of a possible escape from current thinking. I've been reading a lot on AI lately, so there was nothing surprising about the briefings. 'AI could increase the interactions and make the current course more attractive' was the message entering my mind. AI to improve our current way of teaching. But during the Q&A, a speaker stated that AI makes it possible to manage complexity. A simple statement quite certainly lost to most of the attendees, but my brain captured it and kept it alive. The seed was there, but I was not sure what it needed to mature.

Some hours and coffees later in a session on e-learning, there was an example in which a company had left the brick and mortar approach to training by going full throttle for e-learning. Hands-on learning was replaced by e-learning combined with sending a box to the student's home. The student didn't have to go to a school lab. No, the part of the lab needed for the course came by FedEx to the e-student. Innovative.

The current construct of E&T began to fall apart. Not sure what initiated the process – our brain is, like AI, still a black box -, but suddenly I started to doubt the foundations of our current model. If a company can do that, what was stopping us, the military, to do the same?

A few moments later, the concept of micro-learning was introduced. I was not familiar with it and it sounded promising. Microlearning deals with relatively small learning units and short-term learning activities. Microlearning refers to presenting learning in short nuggets of 3-5 minutes long (or even shorter), with a specific focus, to meet a specific learning objective. It appeals to the learners as it consumes less time and is available to them exactly at the time of the learning need (just-in-time learning). Furthermore, its rich media formats ensure better retention. Examples are - but not limited to - gamified, scenario-based learning short videos; interactive PDFs/e-books; and Infographics. Microlearning holds the promise to be cheaper to build, quicker to deploy, and can be updated fairly easily.

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[2] E&T opportunities may come in different forms: trifold, webpage, course, On-The-Job training, exercise …

Microlearning could be the future of learning as modern learners are hard pressed for time and their attention span is short. They want bite-sized information that is focused, and can be absorbed on the go, at any point of time, on any device. To achieve this desired result, microlearning must be efficient and engaging. The design has to be visually appealing and the content precise, leading to the rapid attainment of expected learning outcomes.

In the exposé, in line with our lazy nature, microlearning was used to improve the current idea of e-learning. It was viewed as just another way to do better what we are doing now. But I was lost to the discussion. A new idea was starting to form. But first I had to destroy the current approach.

Once all pieces fell in place, it was easy to see what was wrong. The current E&T model, although successful in the past and present, held inherent limits that would not be overcome by these new ideas. We approach E&T from the side of the teacher and mistakenly use the term e-learning while it should be called e-teaching. Courses, although made with the best intentions and at great effort, are nothing more than a blueprint synchronized to the dumbest kid in the 'classroom'. Why should you follow a 50 minutes course if all you miss can be explained in 5?

Teaching lays the responsibility of almost every aspect of E&T on the shoulders of the solution provider: certifying based on attending all elements of a course – sometimes just being in the class is enough to get your certification - ; assuring quality by setting up an educational system certified against a specially developed set of quality requirements; organizing the post-course performance evaluation dictating time and place to the students; developing a business model that can turn the design and provision of courses into a profitable activity ... Rapidly, whatever the mission statement of the school may preach, all E&T centered activities become institution centric. Trying to fit e-learning into a teaching-centric environment is like fitting a square peg into a too small round hole. You only succeed by force resulting in a deformation of the peg.

Let's redesign the hole by shifting our focus to the individual student.

Suppose an individual is interested in learning to be able to perform a task. I know this is a very utilitarian approach to E&T, but as you will discover it is necessary to design the system but the result does not exclude a more existential approach to learning. The task to perform may vary in nature and complexity. The initial interest must come from the individual as you cannot force a human being to learn non-life-threatening responses. The individual is the starting point, but I'm confident that once we have the desired system up and running, it will be able to cover group learning too.

To perform a task, an individual must meet certain performance requirements. These requirements must be broken down, a bit like a tree diagram, into very small microrequirements that can be met by microlearning modules and, one way or another, tested against. The learner starts his/her path to meet those requirements with an 'exam'. This exam must determine the set of microrequirements missing in the present skill set. Every identified gap will be filled by presenting the learner with a specific micromodule. That module is not only a solution for that gap, but also the way how (and even the time when) it delivers the learning moment depending on the individual it targets. A game, a video, a text message … may all deliver the same message depending on how and when the student learns.

Of course, the exam must not be considered as a whole; it should be distributed throughout the learning project. It is no pass-or-fail. It is a continuous evaluation of the performance to offer the right micromodules at the right time and in the right format. This way the student is continually (re)evaluated and presented with the right modules until he/she reaches full compliance with the desired performance requirements.

The creation of such a tree of microrequirements with multiple microlearning solutions will be hard to develop for one student, let alone for a group. In contrary to a classroom course that needs to be fully developed before delivery, there is no direct need to develop the whole tree or all solutions before it starts. Students will come with some competencies and thus the corresponding micromodules are not needed in the beginning. The complexity increases further by adding more learning paths for other tasks using some of the existing modules. It soon becomes humanly unmanageable.

And here comes AI into play, it can manage this complexity. While drifting towards complexity and having found a capable manager, we are ready to fully open up the system. Forget the E&T institution as you know it, welcome to the new E&T solution provider. Everybody is able to provide a micromodule to answer a microrequirement, as long as he/she has the necessary competence on the subject and access to the necessary tools. AI doesn't only guide the learners towards the modules they need to assimilate, but also the teachers towards the requirements they may help to solve. Every individual becomes a teacher-learner.

What about the control of the quality of those modules? Due to the ease of making, quality is not an intrinsic element of a module, it is inspected out. A bit like the selection of YouTube videos, a module is of high quality when it provides a solution to a requirement – this can be tested by the AI macro-assessing the continuous evaluations – that is popular amongst the targeted types of students. Once it passed a certain quality threshold, the AI can offer that module to a student based on his/her typology. The system can even guide the solution for specific requirements based on specific media to the best-suited high quality 'teacher'.

I acknowledge that not all can be learned by games, simulations, videos … sometimes you need good old hands-on experience. Here is where an 'institution' can play its role. They can bring people and specialized material together to interact. An 'institution' is not necessarily a school, it may well be a factory equipped with the right machinery, or a community meeting room … If managed the right way, the interaction can be done in a flexible manner suited to both learners, teachers, and infrastructure.

A single microlearning module cannot be used to convey a complete lesson. However, several such modules (with each one undertaking a specific learning point), can be successfully used as supporting pillars for a full-fledged e-learning course. The next generation of AI, able to manipulate graphic media, can manipulate human-made material into just-in-time packages. A series of modules made by different teachers targeted at filling a student's gaps are on-line transformed into what looks like a succession of homogenous modules. If a student needs a break from a longer session, no problem; the system will take that into account.

The step from individual learning to collective learning in this system is a minor one. As the competency levels of the individuals are well-known by the system, the individual paths will bring

them to the level necessary to function as members of the team. Once that is reached, the synchronization is again done by AI in a way that individuals do not slow down to the rate of the 'slowest' learner, the team is approaches as an 'entity' – akin an individual - that needs to be brought to a predefined performance level. That path can be changed when needed (new member, losing a member, changed task …). As the distinctions between the different areas of the E&T spectrum fade away, the bridge between the individual and the collective side becomes a continuous spectrum of true lifelong learning.

Is there a business model that supports this new approach to learning? Not being an economical expert, I'll try to answer that one too. Imagine a company introducing a new product line in need for E&T for its employees. Instead of hiring a company to develop a course, they go for a technology enhanced solution and engage a learning platform. That platform is paid to guide employees towards a predefined performance level. Once the contract is signed, the employees start their paths. Every path may be different depending on the individual's learning preferences and acquired competencies. The platform may have some specialized teachers that will support the development of specific modules, but other members of the platform will also be challenged to develop specific solutions. If these teachers accept a request and their product is of high quality, they'll receive course points that in turn can be exchangeable for micromodules for their own learning needs (or why not for other things).

This concept may read like science fiction, but most elements are already out there. Just add a few links that are not there yet and it is up and running. The challenge will be to find a visionary entrepreneur who brings it together to build the first technology enhanced learner-centric platform.

Figure 2: Photographic Representation of the NATO Training Spectrum.