Developing Required Regulations to Accelerate the Design and Implementation of Newfound Applied Technologies in Modern Educational Systems

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Abstract

In the current situation, now is the time to take advantage of emerging new technologies by design and implement new regulations on accreditation for using high-tech educational systems. That will enable the education industry to do more training, more often, home-based, with a wide range of infrastructures utilizing the latest technologies. To achieve this, the Tool-to-Task approach; which, is the existing paradigm for developing training solutions, must transform into the Task-to-Tool concept. As a result, the purpose of this article is to describe required changes, from the standpoint of the modern education management view, toward the modality of using new regulations to avoid undesirable diversity of using these newfound technologies, whilst time plays a crucial role in between.

Keywords: Management, Modern Education, Technology, Regulation

1. Introduction

In this article, we will discuss the current training situation, near-future needs, and best practices. This will address the unique opportunity we have at this time to do a deep dive into the use of all technologies we can have today and how we take advantage of them within the existing regulations. Technology has a profound effect on using different training methods and propelling them in some entirely new directions. But the question is why, as an industry, we cannot continue to do what we have always done when it comes to systems and devices accreditation for use in education and training. In our current industry situation, now is the time to take advantage of emerging modern, newfound, and high-performance technologies. In order to receive the most-effective feedback from these new technologies, the upcoming regulatory update is necessary for training devices qualification, which will provide more training, more often, home-based, with a wide range of solutions utilizing the latest technologies seeking education. The Task-to-Tool approach predicts to be an assistive model, which the organizations can use to modify their required systems development strategies and meet their requirements by utilizing the right solutions.

2. Task-to-Tool approach

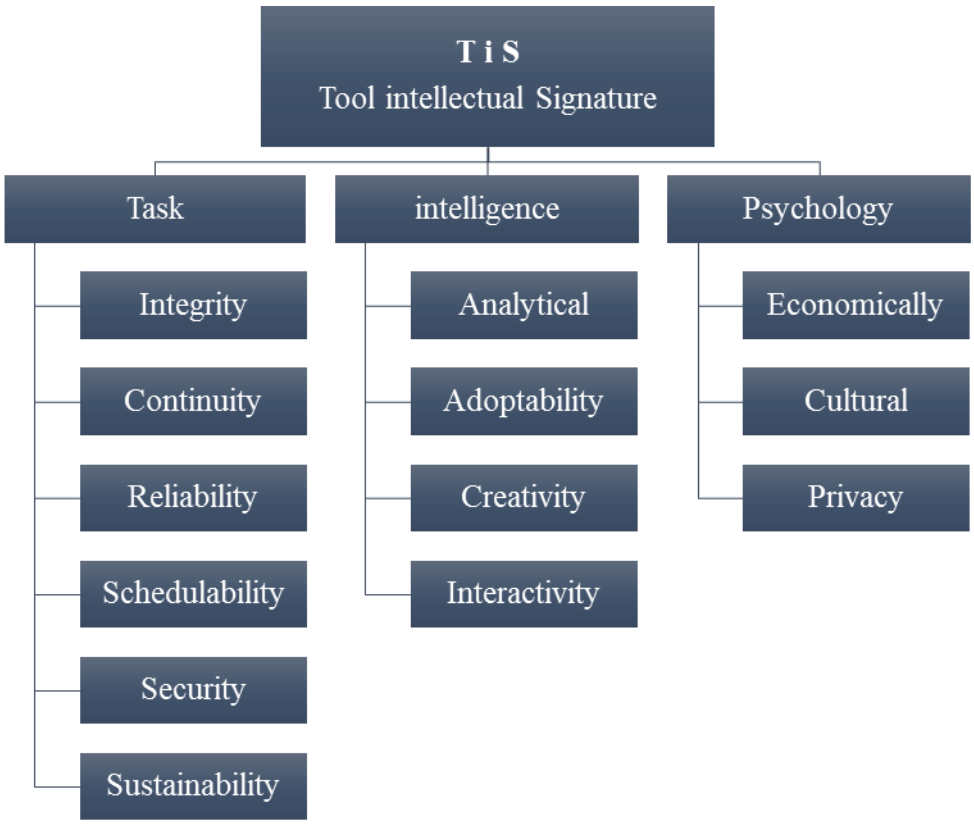
The existing paradigm to use different types of tools or devices in educational and training systems has been with our industry since many decades ago when the strong focus was on the device with the highest fidelity and sometimes the expensive comparing to the outcome task they provide. Recent researches have stated there is a need for a new paradigm of developing tools and facilities for the training. They have to provide flexibility and accessibility to other innovative technologies, embracing the latest training methodologies, whilst maintaining the desired and indeed the revolutionized outcome.

As we have explained, there exists a mismatch in training needs and regulatory acquisition with currently not enough rules to describe new technologies and concepts with standards-based on updated device type specifications. To achieve this, we must revise and replace the Task-to-Tool approach with the previous Tool-to-Task approach. For implementing new technologies, and achieve the desired training outcome, the question is; what type of credits can be helpful? In other words, the existing solution is trying to find a problem to fix, so now we have to find out what do we need to do to credit training in a wide variety of devices using current and emerging high-performance and applied technologies. Artificial intelligence (AI), virtual reality (VR), argument reality (AR), mixed reality (MR), and gesture control are only some of them that can be useful. Promptly, there is driven by the training needs, and importantly, legally acceptable to the regulators, besides the industry failures, preach-constantly at our researches that the answer is starring in the face. The philosophy taken by the national and international working groups on updating the regulations documents, such as "UNESCO[1] Policy guidelines for mobile learning," "US NCES[2] Technology in Schools Task Force," "European Commission Digital Education Action Plan," or "EASA CS-FSTD[3]." We attempted to find the common-features and specifications of training facilities that define any device from the simplest one to a complex and sophisticated system. The reason is how much fidelity need from each of these features to achieve any given training task or task for any given training type. Figure 2.1. shows the results. Accordingly, we determined the integrity level of the features and specifications, from the lowest to the highest description level, then combined, which we named the "Tool intellectual Signature" or TiS™ for short. You might consider the TiS represents the DNA[4] of a particular tool or device in terms of features and their associated fidelity levels. More significantly, the TiS describes

[1] · United Nations Educational, Scientific and Cultural Organization
[2] · United States National Center of Education Statistics
[3] · European Aviation Safety Agency, Certification Specifications for Flight Simulation Training Devices.
[4] · Short for "deoxyribonucleic acid". The nucleic acid that is the genetic material determining the makeup of all living cells.

the required DNA the system is carried out for specific training, testing, or checking in any given task or training type. For a given task, you need to meet a TiS, as shown in figure 2.1.
The "TiS" model, which describes and determine the whole system paradigm, comprises three main areas of the operations, 1- Task, 2- intelligence, 3- Psychology, each work individually but has the inter-connectivity capability to communicate (not specifically physically) with the other areas when it comes to the outcome interpretation. Also, each of these operations areas has its own operations sub-areas, as depicted in the chart, labeled figure 2.1, as below:

Figure 2.1. Tool intellectual Signature



The state or quality of each area or specification of the above model has, but is not restricted to, their own descriptions and interpretations meaning. They will be developed and will be shared upon completion of the next step of our researches.

TiS is the role of all the individual tasks, and you get the TiS that is needed to train all of these tasks together with proficiency. The logical conclusion is that any system, device, or tool should have a TiS in the feature that describes its DNA and then directly correlates with the TiS being necessary for the training tasks desired. We will no longer theoretically need miscellaneous qualifications, just the TiS itself. So, the hard work has been done and is available for adaptation in use of this as TiS philosophy, and must be reflected in documents as a legal reference.

3. Regulatory Framework

Despite the widespread use of technology in educational systems, there has been a surprising dearth of theory and research on regulations. By providing these regulations, IT[5] departments and individuals

[5] · Information Technology

developing these systems become more oriented about the exact need of the education industry and what should be produced with what kind of specifications and the way it interacts with the users and with the educators. However, the regulatory framework has also been driven to be restrictive and inflexible in these devices when it comes to assign and credit for training, especially those with some level of complexity which requires to demonstrate a minimum proficiency level requires to be achieved as a training result; something that we will hope lost not lasts, during previous years until recently, seems not to have been vastly developed by the major national administration authorities in the way originally-foreseen, and its inception, why? Well, change is scary. People followed by regulators in naturally resistant to change and, this is potentially a big-change, and they say it should first be broken, then try to fix it. We contempt it is broken. As we mentioned, we currently follow almost no rule in terms of regulated systems, and the education industry is waiting for the regulation to change before experiencing another shock as it happened due to the recent pandemic. Well, long last, it seems regulations are about to change. At least in some training industry fields; which needed immediate action following the disturbance, they have already started to modify or develop the required regulation. Such industries are like transportation, aviation, or the medical industry. By the way, we have to commence mainly with TiS experts in different parts of the scope to update the regulations and infrastructure development in the interest of optimizing the training quality.

Another important and almost the initial factor contributing to the successful regulatory process is indeed the management point of view. From the beginning steps of preparing the suitable proposals for such a vast development, it is the upstream officials' responsibilities to be encouraged enough to facilitate the process when those regulations have to be implemented. During the transition period, absolute-support and seriousness are expected from the regulatory management authorities.

We had the privilege of working in these committees since the beginning along with many other training experts. The ways we have seen is that the proposed integration of the regulations into the legal documents requires a specific regulatory framework to enable the TiS and also other concepts we have very briefly explain to you in this presented article. The subject is always about social adoption. Hopefully, in quarter four, we might achieve a semi-final and tasked-to approach that tailors systems, devices, or tools requirements to the desired training, rather than from the training to the specifications or Tool-to-Task concept as previously.

The overall road map has two main categories. Firstly, our TiS adopted to show the type of training initially, the devices and facilities requirements in terms of TiS; secondly, regulations documents developed or updated to show the system features and fidelity level criteria for any further qualification, hopefully, TiS. Also, the required documents to be developed or updated to accommodate new certificates and materials to compare entire TiS concepts. Perhaps is this also cater or emerging new technologies. We strongly believe the TiS concept can also be used to describe features and fidelity levels of new technologies they are increasingly becoming part of training more and more these days, such as AI, AR, VR, MR, etc. Enabling such devices using these technologies to credit for certain aspects of training has to be part of an approved course, and rightly so, if we are stick to our preferred Task-to-Tool approach. The regulation has to be capable to accommodate technological changes and enhance capabilities into accrediting training more quickly now than ever before. We cannot afford to continue the way for the regulations to catch up several years later.

4. Findings

A good example is SATCE[6]. The principal benefits of SATCE being that it supports dynamic, realistic, training scenarios or things like CBT[7] and EBT[8] scenarios, especially for worldwide

[6] . Simulated Air Traffic Control Environment. In ICAO (international civil aviation organization) Document 9625 "Manual of Criteria for the Qualification of Flight Simulation Training Devices" (4th Edition, 2016), SATCE is defined as: "The simulation of other traffic entities within an airspace or ground environment, along with the associated ATC radio and data communications to other traffic and the ownship".

[7] · Computer-Based Training

[8] · Environment-Based Training

management situational awareness and communications competencies and further reduces costs, and it perceives fidelity between classic paradigm and modern paradigm environment by providing improved immersion in training. The TiS concepts that we have been describing enable this ATC environment desired for training in terms of the simulator's features fidelity level that described the required complexity for different types of training or training tasks. So, we know it could be done for other training fields; or technologies, as well. Therefore, if this TiS concept is successful in some areas and training tasks, then there is no reason in our opinion while the TiS concept cannot further be adopted, to all education branches and training types, for example, schools, universities, or any other training organizations, as already have been done in some countries or educational pyramids. Hopefully, this will be addressed with courage, the rulemaking transcripts dealing with modernizing the training system commencing either early this year or later on. But for now, let's get started and stick with accepting and modifying the Task-to-Tool training paradigm by facilitating the use of any devices with the required TiS for training; whether they are existing or are new types of devices we may not yet have seen. So, in summary, the objectives as we have done these analyze, for the first time stated and presented in this paper are:

- Reconnect and strengthen the connection between training and devices. Current regulations are very weak and confusing in terms of development expanse and even contradictory when it comes to assigning credit to the other than currently devices.
- Enable tailored devices to industry training needs. We do not have to use current available devices for everything. So, we have to ensure other devices have the right features and fidelity levels, or TiSs to support the Task-to-Tool approach.
- Make use of all kinds of devices and technology's individual capabilities. Many lower-level devices far exceed the regulatory device's minimum requirements, but often get no additional training credit benefit that reflects the trim capability.
- Ensure all devices qualification standardization. Still one of our dreams is that all regulatory frameworks and authorities would and could apply a common approach between device qualification and also training credits interpretation.
- Enable new regulatory frameworks to better facilitate advancement and innovating in education technology. We must have a way to recognize new systems capabilities. There is no constrain by current regulations. If the regulation cannot embrace them, then it's die-fool wider adaptation.
- Enable greater flexibility for training providers to provide more cost-effective training. Perhaps this last point is even more important than ever and will be new normal for all with regard to training device utilization and costly training and traveling to train.

5. Conclusion

The time has never been more appropriate or more relevant than now to embrace these significant improvements, in the use of all facilities and training technologies types to do it in the right way in the new normal. Our goal is to enhance the effectiveness of these systems in organizations. To achieve this, we offered a new direction for research on the topic, which is the Task-to-Tool approach and its regulations. Hats off to those researchers and experts for taking the lead, and we hope other authorities will feeling encouraged to follow the seed.

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