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The Deployment and Use of Virtual Training Simulations: What Does it Take to Serve the Needs of Majority Of Its Users?

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ABSTRACT:
The potential and the benefits that virtual training simulations have in supplementing the training needs of the military is fairly well recognized, yet we still do not see the evidence of their large-scale deployment. The way these systems are currently integrated in training fulfills the needs of two groups of users only - the innovators and early adopters - but it fails to fully serve the largest group of user population - the early and late majority. We elaborate the requirements for most effective large-scale deployments - the factors that can influence the diffusion of this technological innovation and the adoption rate. The results of diffusion research were used to review and comment the practices, trends and common understandings related to the use of simulations, all collected in our extensive user studies in this domain.

KEYWORDS: diffusion of innovation, military training, training methodologies

1. INTRODUCTION

The virtual training simulations, including the simulators used predominantly by the pilots and the game-based training simulations, are recognized as the novel and effective tools in supplementing the training needs of the military (in further text we refer to all those systems as the 'simulations'). The potential that the simulations bring is not only consisted in the fact that they save precious resources - they also provide the training opportunities that would not be available or even possible otherwise. This very potential brings the simulations into the domain of contemporary military training where the doctrinal teachings and mission objectives are changing at an increasing rate. Additionally, the operational tempo is undergoing similar transformations, and there is a continuous demand for no performance drop-off. As a result of such high requirements, there is an increasing need to train in novel ways, in novel places and under novel conditions, to acquire novel skills and be ready to successfully conduct novel tasks, and to achieve all that in a very short period of time. It is clear that the use of technology supported training practices will not be the only way to achieve those high requirements, nevertheless there is a growing understanding that those training tools and opportunities will inevitably consist a good part of that solution.

It is therefore not coincidental that all DoD services invest considerable effort and resources to acquire good and tested simulations, and to have them effectively deployed in their training curriculum. The investments and the commitments undertaken by different services vary, with an example of the US Army's Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) reported to be investing two billion dollars annually for this type of training solutions [1]. While there is a continuous effort to extend such investments, we still do not witness the widespread diffusion of this type of innovative training solutions among the majority of its intended audience. The current practices suggest that so far only two groups of users (adopters) are well served – the innovators and the early adopters, but not the majority of

users. The brief examination also shows that the innovators and early adopters, while very important in a global process of adopting the innovation, may not needed a great deal of outside attention and support infrastructure while adopting the innovation when compared with the support necessary to be in place for the early and late majority adopters (the classification of adopter groups taken from [2]). The reason why we focus our attention on the needs of early and late majority comes from the following requirement: the paradigm shift in terms of truly enabling novel training practices and achieving significant results in that process, happens only when the largest majority of users (ideally everyone) adopts and employs the same novel training solutions in their everyday life. They should also do it methodically and consistently while having the 24/7 access to those novel training opportunities. Only such dramatic change in the perception and practice has a chance of bringing that user community closer to the successful outcome. As the use of simulations will most likely play an important role in achieving those results, our interest is therefore focused on the instruments and the infrastructure that needs to exist to fully support the adoption of simulations by the early and late majority adopters. This also includes the considerations for an accelerated rate of adoption while ensuring the long-term effects and minimizing the potential for the rejection of the suggested innovations.

The inspiration for this line of work came from our user studies focused around the use of simulations in learning and training; the inevitable set of questions we were challenged to answer in those projects was related to different aspects of the adoption process. The ideas and discussions presented in this paper are the result of nearly twenty years of our professional experience in the domains of Virtual Reality, human factors in VR, collaborative environments and the use of emerging technologies in learning and training. We also conducted the discussions and consultations with our colleagues who work in the same fields, and consulted with the military subject matter experts involved in our projects. The paper also harnesses the understandings and the results of one particular line of work - the diffusion research, and the work of Everett M. Rogers in particular [2]. All considerations presented in the paper are concerned with the simulations as a type of technological innovation used in training of the military, and the military expertise needed to organize that training is not the subject of this paper.

In Section 2 we illustrate the potential and the limits that simulations have in a global process of enabling the training of the military. The Section 3 presents the basic understandings related to the conditions and the parameters that influence the rate of adoption of any innovation. This is followed by the Section 4 that elaborates current practices and trends related to the dissemination, deployment and use of simulations in training practices of the military. The section 5 presents the mechanisms that are available to the military as a social structure that have a potential to affect the adoption rate more dramatically. We conclude with the Section 6 that offers a brief summary of the material presented in the paper.

2. THE POTENTIAL AND THE CAVEATS

The results from different research studies suggest that the simulations, if strategically incorporated in training curriculum, have a potential of being successful in several domains. Firstly they can enable more effective learning by making the training time shorter (people may learn quicker) and people may be able to keep the appropriate skill levels longer; both goals are

important at the times when a number of new skills need to be acquired very quickly and by a large number of people. Secondly, by using different kinds of simulations one can ultimately save people's lives (pilots can practice emergency procedures with no fear of risking their lives while trying out novel procedures), and they can reduce the number of injuries associated with the training in the real field conditions. Thirdly, the use of those systems in overall training program can reduce the requirements for costly ammunition, weapons, equipment, fuel, materials, complex logistical support (transportation, instrumentation in the field, remotely manipulated pop-up targets, simulated enemy fire and smoke signals), as well as the maintenance of the fire ranges.

Additionally, such systems and tools offer a new type of training environment with the simulated conditions that currently may not be available to the units: visual and auditory representations of the excessive weather conditions (snow, heavy rain, sand storms and the extreme temperatures, as well as their effects on equipment, weapons, and auditory and visual fields of view), the access to the large terrains or to different types of terrains (desert or jungle terrains). They can simulate the unlimited supply of special ammunition, presence of the air assets, presence of the enemy forces and large friendly forces, to name just a few.

Beside the values that are usually associated with the training with simulations, the value and the effect that the use of simulations can have on its users that is regularly overlooked is consisted in increasing the motivation of the trainees in learning and training process. This is an extremely important factor closely associated with good training results. Another factor that most likely will become even more apparent in coming years is related to the proliferation of digital gadgets, game consoles and video games in the lives the younger members of the society – it is the apparent discrepancy between the systems and tools this population is using during their working hours and the system and tools they use in their spare time. The situation that may emerge from this is that the users will start associating their working hours as the hours when they have to deal with 'clunky" and 'old' tools, and consider that their 'real' life starts in their spare time when they do have access to the tools and environments they feel very passionate about (and they know very well). While most likely this type of alienation from the work environment will not happen suddenly, it needs to be considered and addressed timely and properly.

Whenever we examine the potential that the use of simulations holds in the domain of learning and training, the following important caveats need to be mentioned:

- *Simulations are only the tools*: All training environments (including simulations) are only the tools designed to enable chosen training and learning practices - they do not represent the complete solutions to training situations. They are as good as any tool can be good when it is considered in the isolation from the rest of the training setup.
- *Simulations are not the ultimate replacement for the current approaches to training*: The simulations should not be seen as the ultimate replacement for other (some more traditional) training approaches, but rather as a supplement for the existing training practices, a supplement that has a power of enriching and extending current training opportunities. Advocating a complete replacement of the field training, for example, would be not appropriate; to date no simulation is capable of fully replacing the physicality and the complexity of the field exercise, including the human factors (duress,

tiredness, heat, cold) that are known to have a great impact on the skill acquisition and final performance.

- *Simulations should be employed when they are better solution for a given training objective*: While the simulations may have great training results for one set of skills, they may not necessarily be the best training tool for some other skills; the proper analysis and necessary evidence about their training effectiveness needs to be available prior to enlisting such (or any other) tool in every day training practice.

While considering the issue of simulations, one inevitably comes to the following question – what are those other elements of training setup that lay beyond a mere access to 'raw' technology even if that technology may be in its most perfected state? What are the elements that still need to be dealt with to attract and effectively engage the masses of potential adopters? We believe that many additional instruments still need to be put into effect if the goal is to have this type of training tools effective and to be adopted by the large user population - this paper presents the details of those instruments and our discussion of the solutions that may be considered.

3. DIFFUSION OF INNOVATIONS: THE CORE UNDERSTANDINGS

This Section provides the basic understandings related to the conditions and the parameters that influence the rate of adoption of any innovation as they are elaborated in [2]. The sections that follow this one will elaborate current practices in deploying and using simulations in training (including our suggestions for solutions) – that material will be reviewed in the light of the core understandings presented here.

- Diffusion of innovation has two facets: it is a *social* process as well as a technical issue. The structure and the relationships that exist in given social system will have a great impact on how the innovation will be adopted. Besides those social and pure technological parameters, in case of simulations used for training the additional factors that will play important role are related to the training as a discipline. These include specially designed pedagogical and instructional methodologies and approaches associated with the delivery of instruction and the use of simulation to help acquire new knowledge and skills.
- The four main elements that play important role in adoption process are *the innovation*, *communication channels*, *time* and *social system*.
- There are five categories of adopters: *innovators*, *early adopters, early majority*, *late majority* and *laggards*. The innovators are active information-seekers with typical mass-media exposure and with the wide interpersonal networks. This category of adopters is also able to cope with higher levels of uncertainty about an innovation and its implications than other adopter categories. The early adopters serve as the role models, and their behavior tends to be imitated by other members of their social system.
- The simplistic belief that the innovations and the apparent value they bring to its adopters will be sufficient for their widespread adoption is not correct. The innovations do not 'sell' themselves, and considerable efforts need to be invested to achieve their widespread diffusion. The process of adoption is highly unlikely to be only a '*pull*' process, and many '*push*' strategies will need to be employed to achieve a widespread adoption.

- Different rate of adoption is governed by several factors: (1) *relative advantage* over the current solution: the greater perceived relative advantage of an innovation results with more rapid rate of adoption, (2) *compatibility*: the degree to which an innovation is perceived as being consistent and aligned with the current system of values (this includes norms of given social system, past experiences and the needs of potential adopters). Higher compatibility with current values increases the likelihood of faster adoption rate for the innovation. (3) *complexity*: innovations simpler to understand and simpler to use have a better chance of being adopted more rapidly. (4) *trialability*: a degree to which an innovation can be adopted in an incremental fashion. Triable innovations reduce the level of uncertainty and minimize the fear from the big failures, as opposed to innovations that require radical changes and bring higher degree of uncertainty. (5) *observability*: a degree to which the results of an innovation can be visible to other adopters. The ability to clearly see the values that innovation has brought to the peers is highly regarded, and has impact on higher adoption rate.
- *Mass-media channels* play an important role in creating awareness-knowledge with the potential adopters; the *interpersonal channels* among the individuals with similar socioeconomic status, education and other values, are more effective in persuading the individuals to accept the innovation. It also turns out that most people predominantly form their opinion on the basis of a subjective evaluation of an innovation that is conveyed to them by their peers or near-peers and who already adopted the innovation. In case of simulations, the value brought by those systems will be more successfully conveyed to the masses of military users by their own peers - the military who are regularly and successfully using those solutions in their own training practice, and not so much by the scientists and their scientific studies of systems' benefits (though the latter is more useful for attracting the attention of innovators and first adopters).
- The *opinion leaders* are not the most innovative members of some social system, but they are in position to influence other individuals' attitudes towards the innovation. They tend to conform to the system's norms and embody the structure of the system, while having an influential position in system's communication structure. A *change agent* influences the people's decision-making process with respect to the innovation, usually seeking the adoption or the prevention of adoption of some innovation. The change agents use opinion leaders in given social system to achieve desired results in the diffusion process. The *change agent aide* is less than fully professional change agent, and by their standing in the social system they are usually much closer to the potential adopters thus helping to bridge the gap between the change agents and the potential adopters.
- The fastest rate of adoption of innovations results when the decision about the adoption comes from the authority. Making a training segment that uses a simulation to be a compulsory segment within certain training regiment is one way of achieving the widespread adoption of that simulation (example: the compulsory use of simulators for the pilots – they cannot fly real plane before they complete 40% of their flying time in simulators and successfully pass a set of tests on selected simulators).
- An innovation should not be considered in isolation from other innovations. In case of simulations one needs to consider the causal effects with other innovations such as a proliferation and omnipresence of video games, game consoles, cheap laptops, myriad of digital gadgets, as well as the software applications regularly used on all those devices. As an illustration our preliminary statistics say more than 60% of Marines play video

games in their free time, and almost all candidates of the Infantry Officers Course own a computer. This growing interest represents a potential that is waiting to be tapped in and used for training purposes on much larger scale that it has been done so far.

4. CURRENT PRACTICES, TRENDS AND UNDERSTANDINGS

In this Section we elaborate the current practices and trends related to the dissemination, deployment and use of simulations in training of the military. This includes the understandings that prevail among the users; the same understandings, while not officially endorsed by the official structures, are still present among the potential adopters and need to be adequately addressed if the goal is to increase the number of adopters and to speed-up the adoption rate. The insights presented here reflect our experiences from the projects that involved a number of USMC units (the preliminary results presented in [3]); the discussions with the colleagues and our students who have more intimate working knowledge about other services, confirm that the large majority of the same practices, trends, and understandings are registered across all services.

While some practices presented in this Section may not directly influence the adoption rate, indirectly they all make an impact. They also contribute towards a growing perception about the simulations that is visible to the masses of potential adopters. All practices and trends listed in this section are therefore classified under the characteristics that they influence most directly:

1. **Influencing the relative advantage**: The following practices and trends make an impact on reducing the possibility to achieve good training results, have positive skill transfer, and do it in short(er) period of time, thus making the relative advantage more difficult to achieve, less tangible and less visible to the potential adopters:

- *Absence of 'full package' solutions*: Our experience and the results from past studies provide the unanimous conclusion: the issues of availability of good training simulations cannot be treated separately from the issues of availability of equally good training approaches and methodologies designed to be used in a conjunction with simulations. The two are tightly and critically connected, and together they predict the success of training with simulations. Current situation is marked with the absence of good, well thought through training and instructional methodologies specially designed for training with simulations. As a result the training happens in the 'best guess' fashion and the good training results get achieved on equally accidental basis. The optimal way of addressing this situation is to start providing not only the training system but a full package consisted of the training system and a detailed guidance on how to use that system most effectively in training practice.
- *Black box solutions*: A great desire of any user community is to provide its members with a 'black box' solution that will couple all tools they may need ('put everything I need on a CD' approach). There is additional expectation that after getting such 'black box' the members will be capable of 'consuming' those solutions on their own. However, as we pointed out earlier, the 'black box' solution represents only a tool i.e. it is only one necessary ingredient in the process of learning and training, and many other elements need to be put in place to have that tool being deployed and used most effectively. The disappointment that most likely will result from the situation like this will have a negative impact on adoption rate.

- *Lack of formal training*: The instructors who organize the training with simulations are either military personnel or contractors (a large majority of them former military personnel). Typically, neither has received a formal training to be an instructor with this kind of training environment. The simulations are indeed a different kind of training environments than a typical face-to-face classroom setup for which the same instructors are all so well versed; it is therefore wrong to assume that a instructor who is good in classroom training setup will be equally good with simulations. An appropriate formal training of this group of military instructors is very much needed if the goal is not to risk the randomness of the success with the individual training solutions people will devise on their own.
- *One-time exposure only*: The trainees usually receive their training with simulation in one block of several hours of instruction only, with no possibility to use the simulation again (a lack of time in their busy schedule usually being the main reason). There is no repeated exposure to a particular simulation and no opportunity to do a proper solidification and correction of the acquired skill-set. Making sure that the repeated exposures to the training environments are included in training regiment will increase the chances for good (better) results.
- *Short exposure*: The total time that the trainees spend using simulations is insufficient if the goal is to achieve good and visible training results; this is especially the case if the trainees are expected to master a complex set of individual and team skills. The time spent using the simulations need to correspond to the complexity and the performance level expected to have as a result of that training.
- *Timing not appropriate*: The trainees use the simulation at the point when it is not most optimal considering their entire training regiment and training objectives. This also includes a lack of understanding of how to interweave the real and virtual training (training in physical environments and training with simulations). More appropriate timing for this type of training intervention is needed to make sure the chances to have better results are maximized.
- *Wrong order of skill mastery:* some forms of team training using the simulations is organized with no special attention given to becoming proficient with the individual skills prior to everyone's participation in team training. Ideally, the initial skill level of each trainee should be evaluated and proper individual training provided before they engage in team training with or without the simulations. If needed the appropriate prep-classes designed to bring everyone's skill level to a higher (necessary) degree should be put in place to maximize the chances for the best training results with simulations. This trend is closely associated with the previous trend (timing not appropriate).
- *Disconnect between the simulations and (right) users of those systems:* The trainees who end up using the simulations may not necessarily be the MOSs (Military Occupation Specialties) that should have received that particular training in the first place. It may well happen that the people who received that training were the ones who were simply available at the time when the training with simulation was scheduled. The special attention should be given when selecting the people who need to receive this (or some other) type of training, making sure that the key people do get exposed to training situations focused on the skills they need to master.
- *Training or 'fun'?* Some trainees see this kind of training as 'gaming' (i.e. fun) and may not approach it with the right attitude thus reducing the chances of having good training

results and achieving positive skill transfer. The special instructional approaches should be devised to alleviate and (ideally) remove this perception.

- *Missing training relevance*: There may not be very tight and regularly updated connection between the training provided in simulations and the training requirements in the filed (i.e. live fire exercises, operational theater). A regular and careful update of the newest procedures needs to be incorporated into training sessions with the simulations.
- *Lack of accountability for achieved training results*: When the use of simulations is left to be optional, usually there is no identified accountability for the training results achieved in these systems on the part of trainees. We are not sure how this could be addressed, but one possible solution could be to use the motivation and peer-competition as an alternative tool to maximize the potential that such systems provide.

2. **Influencing the compatibility**: The following practices and trends make simulations less compatible with the social norms, practices and a value system typical of the military community:

- *Lack of system support for AAR (After Action Review):* After each training session all units and their leaders are thought to perform a thorough AAR – this is an important part of their training and operational practice. Many simulations provide none or only rudimentary support for AAR. Additionally, even when the systems do provide solid AAR support, the instructors miss to use it or to inform unit leaders about this system feature, leaving the unit with no good tool for the AAR.
- *Do I need to forget everything I knew and did so far?* The practitioners should be encouraged and offered time to explore a synergy of old (proven) training environments they know very well and simulations. Not everything they know will be obsolete, and if the mix is used in a strategic way the practices will reinforce each other (the mix may even turn out to be the best solution for given training objective).

3. **Influencing the complexity**: The following practices and trends make simulations be understood as too complex to learn and handle.

- *People believe they need to be the technology experts:* A wrong understanding among the potential users is that the simulations are too complex and that they will not be able to learn them fairly quickly; they do not even think about a possibility of managing such systems in their own units. While deploying and using simulations it is important to stress that users are not expected to have high level of expertise, and, instead, encourage an atmosphere where asking for help, guidance, lessons learned and best practices among the peers is normal.

4. **Influencing the trialability**: The following practices and trends make simulations be perceived as too radical and not be an incremental change in adopters' lives.

- *Rigid definition of what it means to 'use the technology'*: Current understanding of what it means to 'use the technology' tends to assume that one has to entirely give up the way he/she organized the training in the past and start using the technology exclusively i.e. that this new practice should cover 100% of their instruction and training time. This understanding is seen as a huge mountain to climb and many people give it up before even trying. At the same time, it may well be that such extensive amount of time with simulations may not even be needed and may not effectively support users' training

objective. A much better chance of having positive response from a large number of users will be achieved if they are encouraged to take part in a gradual introduction of such tools/systems in their training practice rather than asking them to opt for radical changes. Later on, depending on their experience with the system, the results they achieve with it, their learning needs and training goals, they may even decide to extend that time and dedicate larger part of their training time to this new type of training environments.

5. **Influencing the observability**: A considerable number of simulations such as simulations that train tactical decision-making skills, offer visible relative advantage only when used over a longer period of time. Therefore, this type of simulations is inherently disadvantaged over the simulations that provide visible, quick and high relative advantages. Presenting the user community with the realistic expectations in terms of the time and efforts needed to be invested to see the results of such deployment, seems to be one way how users' disappointment could be alleviated.

- *Mandatory or optional use of simulations?* The only community that has a widespread use of simulations as a mandatory tool in its training curriculum is the aviation. There are some other MOSs that have started to act in similar manner, such as the units that enable missile engagements, the ship and submarine navigation, Professional Seamanship Courses, tank units and similar. The common factor for all those communities is the fact that the relative advantage of using the simulations was clearly visible and very tangible to all members in that community: the cost of an airplane, a tank, a submarine, or a missile, and ultimately the life of an individual if he/she did not use simulation. Other communities have an option of using the simulations in their training regiment (note: a simulation still needs to pass an approval process if it is to be officially endorsed for training). When presented with an optional requirement, a majority of users tends to opt for the solution they know very well; as a result the possibility of using simulations in regular training regiment is even further reduced.

6. **Influencing users' attitude and expectation levels**: We add this as a separate category as it embodies the understandings that may have a significant impact on level of rejection.

- *'This solution is the only thing you will ever need'*: Some companies that sell simulations tend to encourage the understanding that the solution they provide will be all the users will need to achieve good training results. This far fetching suggestion is wrong in most cases; when users do not achieve expected results, the level of disappointment is bound to be high. Instead of becoming active disseminators of the innovation, the unsatisfied users become the advocates of its abandonment.
- *Unrealistic expectations on learning results and timing:* One way to putt-off the large majority of users is to impose huge expectations on results that should come out of the training regiment, and to demand them in a short period of time. Some of those expectations are self-imposed and some are imposed from the outside world i.e. the institution that requests that training. The process of getting acquainted with the system (and ultimately using it) is exactly that – a process, and one needs to allow for the time to get sufficiently familiar and comfortable with the system and with the new training practice. Once that familiarization is over, the appropriate time has to be allowed for the learning process before passing the judgment on how successful some system is. One

training sessions will not be enough to judge if certain solution 'works' for an individual or an entire group.

- *Accountability for the skill transfer (field performance)*: There is a tendency among some user communities to opt for the training in real (physical) environments if those are available, even when they have a viable (faster, cheaper or equally effective) option of conducting the same training with simulations. While the reasons for this behavior are most likely complex, one contributing factor may be a fear related to the accountability for the consequence of the training they are organizing and for which they are ultimately responsible for (people not demonstrating required skill levels, or in extreme cases becoming a casualty in field operations). This understanding, if not addressed properly and timely, will inevitably slow down the adoption rate.
- *Reduced number of instructors?* The promise of needing a reduced number of instructors to organize training with simulations is attractive to all unit leaders (this is sometimes advertised by the companies selling the same simulations). In reality this is not correct in most cases. The realization that they will need not less but most likely more instructors than before, is yet another factor that will produce disappointed users and reduce the adoption rate.

5. CAN THE ADDOPTION RATE BE ACCELERATED?

The previous Section provided the insights of different factors that influence adoption rate and our discussion on what could be done to affect i.e. increase that rate. The suggested improvements, while being important and necessary to happen, will most likely contribute with gradual increase of the adoption rate over a longer period of time. The social system and the system structure that are typical for the military community offer some other mechanisms and tools that will most likely enable much faster increase of the adoption rate. This Section presents those mechanisms and explores the approaches that could be undertaken.

Introduction of mandatory deployment and use of simulations: Clearly the fastest way to disseminate and deploy simulations in military community is setting the requirement for its mandatory use. Some communities have opted for such steps (previously commented case of aviation community), and their experiences in providing a rationale for adopting such decision and the process they had to go through would be extremely helpful to any part of military community that may consider doing the same for their training regiment. The only caveat that we would suggest here is to consider the strategies that also ensure the acceptance level (the 'buy in') from the end-users, the people who will be the very consumers of proposed simulations. They should have clear understanding of how their lives and work will be augmented with the use of systems and approaches they are requested to use; this, in return, will ensure that the level of rejection for the same systems is minimized. It is important to note here that we do not suggest the introduction and mandatory use of simulations (or any other tool for that matter) for its own sake – this decision is something that each community will need to think about very hard and make sure the final decision is backed up with the strong and valid rationale.

Create new billets dedicated to dissemination and the use of simulations: Whether the use of simulations is mandatory or optional, the existence of a large number of agents of change will be necessary if the goal is to attract and effectively engage large number of adopters. By this we

have in mind the military personnel that will be considered by the majority of potential adopters as their peers or near-peers. Therefore it is most likely that an ideal agent of change will not be someone who works on the level of large unit such as a regiment or a battalion, but someone whose work is closely associated with a smaller unit like a platoon or a company. The potential responsibilities of people with this billet would be to provide the unit with continuous support for planning, organizing, managing and potentially conducting the training with all types of simulations that the unit may need to use in their training (this includes 'train the trainers' responsibilities). This person would also be expected to be updated with the developments in this field (technological and instructional) and continuously communicate that to the unit leadership and military instructors on all levels.

More active (and changed) role of simulation centers: Current trend that prevails within military community is to centralize the equipment and the expertise needed to organize and conduct the training with simulations, and use simulation centers and the institutions responsible for that activity. While this was the optimal way at the time when the price of computers and the complexity of training simulations was high, current situation is very much different. The cost of computers and associated software is much lower, and the simulations are much easier to understand and use even by the naïve users. When this is coupled with the need to train and make this type of systems available to a large number of users, the role that the simulation centers should take is not the one of securing more regular visits from the units but quite opposite – they should be the advocates of their own 'removal' from this process, making sure that they provide enough guidance to the units so that the units are capable of conducting the training in their own environments and not needing to come back to the simulation centers. This distribution of the expertise and the systems across the units is inevitable to happen if the goal is to achieve 24/7 access to training tools for all members of military community. The systems that are still most likely to remain and be used in simulation centers are the solutions that are either too expensive to be acquired for individual units, too complex to maintain or they are used rarely so that their acquisition for the individual units cannot be justified.

Introduce challenge programs: One way of increasing the observability could be to devise a type of challenge programs that promote the use of simulations in training. As a part of the program, the individuals (or units) who achieve the best training results would get recognized and acknowledged in the community and in the way that matters to them most. Each service and each MOS has very good understanding of the values embedded and nurtured in that community, and they are in the best position to define the parameters of such challenge program and maximize the potential of having highly motivated users (trainees).

6. CONCLUSION

In this paper we elaborated the potential that virtual training simulations hold in the domain of training for the military. The ability to have this type of tools effectively used by the masses of potential users holds the promise of addressing (to good extent) the challenging training goals set for the military. The adoption of simulations, as much as adoption of any innovation, is a complex process, and many factors influence the rate of that adoption; we used those findings to reflect on current practices and trends related to the dissemination, deployment and use of simulations in training practices of the military. Some suggested improvements, while being

important and necessary to happen, will most likely contribute with gradual increase of the adoption rate and some other mechanisms will hold the power of much faster increase of the adoption rate.

The collection of the factors presented in the paper is most likely not a complete set - this paper is intended to serve as a starting point for discussion with the colleagues in the field. We hope that this discussion will contribute towards the global efforts of making the adoption of virtual training simulations more effective and accelerated, ultimately resulting in their large-scale deployment and fulfilling the potential that they hold in the domain of training.

We also hope that the insights and considerations provided in this paper will have a high degree of relevance to other fields of human activity that also have big expectations from this type of technologies. The obvious examples are the communities that use simulations in learning, such as the education world (K-12, K-16) and industry (learning of new skills and procedures).

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ABOUT THE AUTHOR

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