

The Integration of Computerized Tools into the Civilian and Military Higher Education System: A Review and a Conceptual Framework

Alina-Elena Ionașcu (Huluba)*

Abstract: In the context of the technological revolution combined with globalization and increasingly complex socio-economic environments, a significant shift in the training of human resources can be noticed. Education and training based on the integration of computerized tools have some of the most serious implications for higher education institutions, which need to develop and implement feasible strategies to ensure more skilled, flexible and adaptable graduates for the labor market. Thus, the first part of the paper provides a conceptual framework from the point of view of the current state of knowledge regarding the challenges faced by students and teachers as active parts in higher education conducted online or in blended format. In the second part, I will speculate on issues relating to the practices of the military higher education system in online or blended format and how civil experience can be used to address the training-education process in this field.

Keywords: computerized tools, higher education, online, blended system, military education

INTRODUCTION

At international level, organizational transformation in line with technological trends appears to be the natural way to improve performance and survival in a complex social, economic and political context. The imperatives of technological development resonate with modern higher education, according to education specialists, and many of them are committed to the idea that this matter indicates new opportunities for professional development conducive to sustainable adaptation to the working environment. In this paper, I will present various perspectives on the approach to the higher education system based on the integration of computerized tools and its implications for

* Alina-Elena Ionașcu (Huluba) (✉)

“Carol I” National Defense University, Bucharest, Romania
e-mail: ionascu.alina.03@gmail.com

the quality of education, learning outcomes and the improvement of students' and teachers' skills, despite the support they currently enjoy. In the military field, the integration of computerized tools into the training-education process associated with initial training of students, future military officers, provides the necessary prerequisites for the commitment of leaders to continuous training and the ability of organizations to adapt to new specific strategic challenges of national defense in a national and ally context, which means the fulfillment of future missions.

RESEARCH GAP: JUSTIFICATION OF THE PROBLEM ADDRESSED

The research prospects associated with the digitalization of the education field in general and higher education in particular, have become attractive and popular in the Romanian academic, political and social environment. However, the main approaches identified at national level take into account the quality of the education process, while this paper has as its research focus the issue of using computerized tools in terms of their impact on the main parts (students and teachers) and the organization, including an analysis of the military education. Characterized by flexibility and complexity, higher education based on the integration of computerized tools poses challenges that the people in this field must face. In this respect, Middlewood and Lumby (1999) argue that “the effective management of human resources is the key to providing high-quality educational experiences” and that “educational organizations depend for their success on the quality, commitment and performance of the people working there”. Therefore, revising the literature and creating an eloquent conceptual framework aimed at clarifying the issue of computerizing education from the perspective of students, teachers and educational management is a first step towards understanding the implications of this approach and implementing the measures necessary to deliver high-quality educational experiences. Moreover, the analysis of the specific use of computerized tools in the military higher education system is a promising scientific initiative proven by the importance of transforming the process of training human resources in this field, which was set out at strategic level by presidential administration (“Strategia națională de apărare a țării pentru perioada 2020-2024” 2020).

A NOTE ON THE TERMINOLOGY

Depending on the issues addressed, a wide range of concepts that relate to the topic of this work are to be found at international literature level. Therefore, in this section I will mention the most relevant terminology issues in order to indicate the main research directions. Thus, today, the contemporary paradigm for distance learning (DL) is online or digital education (Canty et al. 2020), which uses computerized tools such as: e-mail correspondence, e-learning platforms based on videoconferencing, websites, applications, blogs, etc. An important issue to keep in mind is the comparative analysis between DL and e-learning. The main similarity is that both use computerized tools. In the case of DL, connecting and interacting through applications, web platforms, etc. take place in sync but in different spaces, while online teaching can be carried out using technology and information tools in the same place, such as classrooms, which leads us to a blended system.

Moreover, at international level, Massive Open Online Courses – known as MOOC – are a topic of widespread interest among education institutions and students, as they facilitate access to important online materials and resources to support the teaching-learning-evaluation process under normal and exceptional conditions. Some examples of support tools for implementing courses in the distribution of distance learning are augmented and virtual reality, 3D animations, mobile applications, video lectures or interviews, tutorials, audio books, podcasts and blogs (Bailey and Bankus 2017). In essence, computerized tools specific to the educational field are known today as Course Management Systems (CMS) or Learning Content Management Systems (LCMS), which make up the technology that forms the virtual learning environment (Kenyon 2020). Moreover, the evolution of the virtual learning environment is now in line with the proliferation of the e-learning specific to the educational, formal and institutional framework, from primary schools to universities.

However, considering that students are prepared by acquiring a wide range of knowledge and developing their way of thinking, in order to adapt everything that is meant by “school” to life reality, which provides them with the ability to turn theory into practice, I have decided to focus primarily on the higher education system. As regards military education, it is worth noting that it is integrated into national education as a subsystem and its key co-ordinates are established by

the evolution of national education, the military system, society and the international environment.

Therefore, from the point of view of terminology, the paper is confined to the implications of using computerized tools specific to education for students, academics and higher education institutions, while identifying early ways of systematically intervening to help military cadets improve their virtual learning experience.

LITERATURE REVIEW

There has been a significant transformation at international level in the process of human resources training, which has been increasingly obvious in recent years. In general terms, this change is attributed to the technological development and has clear implications for higher education institutions, which need to develop and implement feasible strategies to provide workforce capable of joining the labor market. Moreover, by examining the challenges posed by the effects of the Covid-19 pandemic on education, analyzing beneficiaries' perceptions of the "blended" education system can be a solution for reviewing institutional strategies.

The phenomenon of distance learning, the technological upgrading of the education process and the internalization of training institutions have caused challenges inherent to the system and they have become increasingly visible during the Covid-19 pandemic. Firstly, the proliferation of distance higher education is a global phenomenon driven by globalization and the need to expand education institutions in order to gain international recognition, to reach the standards in the field and to attract human and financial resources. For example, in the United States, the number of students taking distance courses has increased significantly, so that in 2016 they accounted for 31,6% of the total number of registrations. 47% of them attended only distance courses, while 53% of the students engaged in the blended system and they also participated in teaching-learning processes conducted in the online environment. (Seaman et al. 2018)

In Europe, the phenomenon of the increasing demand for distance learning has been the topic of a comprehensive study based on the measurement of the students' interest in this education system, depending on the work carried out by students on the Distance Learning Port (DLP). Thus, 175.000 views per month were reported, and they were characterized by the active and explicit interest of students in this form of education (Carlsen et al. 2016). The students'

trend to opt for online education was also noticed in Australia, where the percentage of those interested increased by 22,8% in 2016 (Stone & O'Shea 2019).

In order to establish the degree of risk to which a student is subject in terms of successful learning, there are viable methods based on the collection of reliable data. For example, by identifying the low interest of literature in analyzing the implications of predictive learning, a concept known as Predictive Learning Analytics (PLA), a team of six specialists from the United Kingdom focused on the broad research of concepts and the level of engagement, targeting students, teachers, researchers and decision-makers in education institutions at the same time. As part of the study, they developed the OU-Analyze software (OUA), which provides predictive information about learners at risk of failure, managing their entire course. By using 70 “key factors” including organizational adaptation to e-education, perceptions of e-teaching and dissemination of results, OUA identifies students who will not perform the tasks assigned by their teachers. This approach contributes to the adoption of a range of measures that have an impact on the involvement of students in study activities, thus aiming at keeping students in higher education institutions (Herodotou et al. 2020).

At the same time, technology is an integral part of today's students' lives. This has led current debates on student training to focus on the impact of using digital tools on learning outcomes, which thus continues to be central to academic research. As one of the reasons for this finding, the study carried out by the researchers Sara Bice and Hamish Coates (2016), two teachers recognized for their work on improving the quality of higher education, focuses on identifying “best practices” and on “most useful” aspects of the use of technology. By using the analysis of the data gathered through a survey carried out among 1658 students enrolled in Bachelor's programs, they found that digital technology is used by higher education students as a support tool for course management in order to carry out academic tasks that only have little influence on their learning outcomes. Thus, it may not be surprising how the digitalization of education in general and of higher education in particular has evolved, in the context of the development of the e-teaching system, against the background of restrictions imposed by limiting the spread of the Covid-19 pandemic. As a result, research over the past year aims to identify to what extent the use of computerized tools influences the training of students and

the academic world. In this respect, the identification of an appropriate set of computerized tools that can be used quickly to help universities switch to the e-learning system has already been an effort. Such an approach has identified some computerized tools useful for the online teaching-learning process in the context of the Covid-19 pandemic, and some of them are: Gmail, Google Classroom, Google Jam and Open Board Software (Basilaiia et al. 2020).

Another initiative emphasizes that the use of computerized tools in universities means enhancing the quality of e-teaching as a consequence of the effects of the digitalization of academic operations (Dhawan 2020). A study on students' and teachers' perceptions of the digital transformation of higher education in Germany, from the point of view of face-to-face courses, was carried out at a medium-level university. Research results showed that the use of computerized tools by students depends on the extent to which they are implemented by teachers and promoted through university policies (Bond et al. 2018). This study also stresses the need to develop the technology skills specific to the deployment of e-learning among teachers. Regarding students' perceptions, a survey conducted at universities in the United States reports that 72% of students want to go back to face-to-face courses, but most prefer to do so by using one of the computerized tools specific to online education (Bryan et al. 2021).

In Canada, researchers addressed the issue of excluding international students from financial support programs, adopted in order to improve the effects of the Covid-19 pandemic (Firang 2020). They indicate that the support provided by the university for the students meant to minimize the effects of the pandemic will influence the choice of a Canadian education institution by future international candidates. In China, researchers analyzed the psychological impact of the Covid-19 pandemic on students, reporting that 24,9% of the subjects are affected by anxiety, against the background of distance learning measures associated with lack of interaction (Cao et al. 2020).

In practice, using e-learning, accessing MOOC and integrating the other digital tools mentioned in international universities contribute to the initial training of future labor market employers.

As regards the policies adopted by great universities, the great challenge is to manage distance learning at decision-making level in an optimal way. In this situation, a bottom-up approach is the best option for managing e-learning, which means that the objectives and programs of universities must be structured according to the attributes

required of each student for the integration into the labor market (Regehr & Goel 2020). Depending on the strategies of the universities, there are some universities at international level that experiment the HyFlex system, based on the combination between face-to-face and online education or just one of these two options. For example, the State University of Arizona uses three alternatives to provide teaching: in sync, face-to-face, by using computerized tools, inside the campus; in sync, face-to-face, by using digital platforms and distance learning, asynchronous, in the online environment, especially for employed students (Crow 2020) – all of them focus on good teaching-technology interaction. In Italy, one of the strategies adopted at academic level during the restrictions caused by the pandemic was the use of a single web conference platform. This allowed for lectures to take place in a synchronous manner, in order to facilitate the interaction between students and between teachers and students, while also being backed up by digital communication channels such as telephone calls (Agasisti & Soncin 2021). However, these approaches do not sufficiently emphasize that the training of students based on the use of computerized tools only implies satisfaction for students, teachers and universities. Here, I refer explicitly to accessibility, employability, personal development and professional performance. From this point of view, it is known that students use various tools that are specific to technology and information in most activities undertaken for socialization and leisure, but they are not always specific e-learning resources.

In this case, the role of education institutions is to provide the support they need in order to make proper use of the tools associated with teaching and learning through computerized tools.

THE SPECIFIC FEATURES OF INTEGRATING COMPUTERIZED TOOLS INTO HIGHER MILITARY EDUCATION

In line with technological developments, the demand for staff has also increased, thus leading to the emergence of training opportunities based on computerized tools, materialized with the help of the development initiative of Advanced Distributed Learning (ADL), in 1997, which is known as e-learning and its general aim is to facilitate access to high-quality education at any time and place. In this context, the need to align military education with these trends has been noted since 2005, when the Department for Advanced Distributed Distance Learning was developed at “Carol I” National Defense University in

Bucharest, and the key to its mission was the use of information and communication technologies to produce and disseminate modern teaching content (Roceanu & Beligan 2014). So far, the achievements of this structure have been noted internationally, mainly through the implementation of the ILIAS educational platform, the standardization of digitized learning content, the design and support of language courses or courses covering policies, strategies and practices for cooperation within the North Atlantic Treaty Organization, directly contributing to the development of the online “Ro Army” platform, designed to serve several military institutions in order to support initial and ongoing education and training for all categories of staff, interoperability and sustainability. The other military university institutions have recently adapted to these trends, so that each of them currently uses information and communication technologies to facilitate students’ access to a modern, functional and viable education process.

As such, similar to the civil environment, technology has had a profound effect on modern higher military education, making it possible to integrate computerized tools into the education and training process and to involve existing learning and training information systems, with military staff having access to an educational environment specifically designed for military needs. Moreover, in the context of the narrowing spread of the SarsCov-2 virus through distance learning, the national education system and, by extension, the military education system, have undergone a challenging period for organizations, teachers and students alike. Thus, the implications of distance or blended learning for beneficiaries have become more relevant for public discussion and research than ever before. In addition, knowing that initial distance training for military students is a risk factor that may affect their integration into the military environment, it is critical for military higher education institutions to identify those factors that have an impact on students’ performance and to build effective practices and support strategies to enhance their performance. It is therefore necessary for decision-makers to understand the challenges that military students face when engaged in distance or mixed learning and training and to make decisions that have a positive impact on the training of organizations as a whole. In view of these aspects, the systemic approach to the management of the training process is noted, by reference to the Canadian Armed Forces’ program called Class XXI. The program aims to transform training

rooms into a learner-centered and organizational performance-oriented multimedia area, using computerized tools, as a result of the difficulties identified nationally, such as: inadequate exploitation of modern learning methodologies; the inability of the technology-education infrastructure at that time to support modern learning, inadequate performance management, and, last but not least, the lack of synchronization within the staff generation system (Miller 2013). Compared to the above-mentioned idea, a different approach to the issue of training based on computerized tools is highlighted, according to which “the focus on the use of computerized tools only cannot deliver measurable results through better, more creative and more thoughtful graduates” (Paparone 2013). In the academic military environment of our country, a correlation between knowledge management and e-learning was found necessary, in order to achieve effective learning that is applied in solving problems and, finally, in decision-making (Giurgiu, Bârsan & Moșteanu 2015).

Therefore, I believe that an analysis of the specific educational background in the military field is appropriate from the perspective of the technical design and methodological considerations of distance learning design or e-teaching design. From a technical point of view, the use of information and communication tools in the framework of higher military education generally involves administrating, documenting, reporting and delivering education courses through the LMS. The key elements for connecting student–instructor–content are identity confirmation, managing the teaching material, launching and supporting the course and learning, supported by additional resources to create an interactive environment (Kenyon 2020). From a methodological point of view, experts of the US Army believe that the simple interaction between the student and the content designed and linearly controlled in the virtual environment can lead to poor performance due to the lack of mechanisms for learning, networking and engagement. In order to mitigate these effects, specialists suggest that courses be designed with the help of collaborative and attractive methods of using technologies (Bailey and Bankus 2017). From this point of view, I believe that a good example is the complexity and quite abstract level of presentation of the content on theory associated with fundamental disciplines, such as: military science or military art elements, which a military student must understand and operate with. To this end, supporting the theory with examples through audio-video, web applications and war games is a strategy that increases the

student's interest and involvement in giving meaning to the theoretical content, reaching deeper levels of cognitive processing. I also believe that the use of chat boxes in educational platforms for student discussions, team work and group projects encourage active learning, which gives them the opportunity to summarize information, build their own projections of theoretical content and exploit it in a collaborative and interactive way. These strategies for designing the training-education process in formal DL help directly to systematically assimilate knowledge and skills and to change the behavior and attitudes of future officers, namely the skills needed to best fulfill the function specific to the specialization and to the assigned weapon. As I have pointed it out for students and as regards teachers and military trainers, the use of online discussion forums and the interaction via webcam encourages active participation, which is highly important in presenting the various facets of military-specific content. The instructor can ask polling questions, directing the student towards achieving the learning goal. The instructor can also use the charisma and inspirational motivation specific to military leaders, presenting the tasks in an attractive way and highlighting the strengths and weaknesses of the responses provided by students (Voss 2021).

Undeniably, the realization of higher military education using computerized tools is similar to civil education, and the main specific aspects are related to the adaptation of its design to the requirements of modern military organizations with missions both nationally and in an ally context, to the training needs of future military leaders, the hierarchical character present in relation to instructors, and especially at the level of classification of the information provided. Thus, as opportunities for the increase of higher military education using technology and communication tools, there is a need to improve interconnectivity, exploration, collaboration and delivery of MOOC, paying particular attention to data integrity protection systems.

CONCLUSION

The integration of computerized tools into the civil and military education system will evolve constantly with the emergence of new educational technologies that will require the development of appropriate methodologies, strategies, practices and learning skills, which is increasingly obvious in the context of the COVID-19 pandemic, where leaders and researchers interested in this field have learned and continue to learn important lessons on this subject. They

have already acknowledged that computerized tools represent the future of education and the blended learning has the opportunity to increase students' knowledge and skills, to develop the pedagogical horizon of teachers and to provide institutions with flexibility in both administrative and curriculum delivery.

With regard to considerations concerning the integration of computerized tools into the military education system, this article supports the operational character of the military in the virtual environment, emphasizes the importance given to this issue at a strategic level and draws attention to the design of projecting ADL activities, which, in addition to a complex training infrastructure, must take into account the methods and means by which they can become more attractive, collaborative and secure in terms of information integrity. In view of the benchmarks above-mentioned, I have set out to outline a number of courses of action that will contribute to a better use of educational technologies. Therefore, increasing the attractiveness of DL courses or of online teaching is linked to the involvement of the teaching staff in the preparation and exposure of the scientific material by incorporating the media and interactive maps, signaling key information and minimizing the least useful one. The collaborative nature of an environment based on the hierarchy of degrees becomes all the more important in the online conduct of military courses. That is why discussions via webcams or online chat make it easier for students to reflect on their understanding of concepts from their own and group perspective, and help instructors to direct informative content to more problematic issues and develop new explanations for the theory presented. The integrity of military information provided in the online environment is essential for education institutions and for the army in general, which is why I believe that a committee to manage this element is essential for the area.

Finally, the integration of computerized tools into the education system depends on the educational management strategies of the relevant institutions, on the ability of teachers to effectively communicate the theoretical and applied content that is adapted to the individual needs or circumstances of students, who, in their turn, must direct their own resources to absorb knowledge and to train skills appropriate for their future careers.

REFERENCES:

- Agasisti, T., & M. Soncin. 2021. "Higher education in troubled times: On the impact of Covid-19 in Italy". *Studies in Higher Education*, 46 (1): 86-95. doi:10.1080/03075079.2020.1859689.
- Bailey, Liston, and Tammy Bankus. 2017. "Online collaborative course design for army e-learning". *Journal of Military Learning*: 66-77.
- Basilaia, G., M. Dgebuadze, M. Kantaria, & G. Chokhonelidze. 2020. "Replacing the classic learning form at universities as an immediate response to the COVID-19 virus infection in Georgia". *International Journal for Research in Applied Science & Engineering Technology*, 8 (3): 101-108. <https://doi.org/10.22214/ijraset.2020.3021> [accessed: 06. 27. 2021].
- Bice, S., & H. Coates. 2016. "University sustainability reporting: Taking stock of transparency". *Tertiary Education and Management*, 22 (1): 1-18. doi:10.1080/13583883.2015.1115545.
- Bond, M., V. Marín, C. Dolch, S. Bedenlier, & O. Zawacki-Richter. 2018. "Digital transformation in German higher education: Student and teacher perceptions and usage of digital media". *International Journal of Educational Technology in Higher Education*, 15. <https://link.springer.com/article/10.1186/s41239-018-0130-1> [accessed: 02.07.2021].
- Bryan, A., F. Darby, K. Fischer, A. Abraham, C. LeSane II, R. Staisloff, & K. Stout, 2021. *The Post-Pandemic College*. Washington DC: The Chronicle of Higher Education.
- Canty, A. J., J. Chase, M. Hingston, M. Greenwood, C. P. Mainsbridge, & J. Skalicky. 2020. "Addressing student attrition within higher education online programs through a collaborative". *Journal of Applied Learning & Teaching*, 1 (1): 140-152. <https://journals.sfu.ca/jalt/index.php/jalt/article/view/193/169> [accessed: 07.22.2021].
- Cao, W., Z. Fanga, G. Houc, M. Hang, X. Xua, J. Donga, & J. Zheng. 2020. "The psychological impact of the COVID-19 epidemic on college students in China". *Psychiatry Research*, 287. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7102633/> [accessed: 07.22.2021].
- Carlsen, A., C. Holmberg, C. Neghina, & A. Owusu-Boampong. 2016. "Closing the Gap". *UNESCO Institute for Lifelong Learning*. <https://unesdoc.unesco.org/ark:/48223/pf0000243264> [accessed: 06. 27. 2021].
- Crow, M. 2020. "Crisis should herald cooperation and differentiation". A Times Higher Education interview. <https://www.timeshighereducation.com> [accessed: 07.22.2021].
- Dhawan, S. 2020. "Online Learning: A Panacea in the Time of COVID-19 Crisis". *Journal of Educational Technology Systems*, 49 (1): 5-22. <https://doi.org/10.1177/0047239520934018> [accessed: 01.07.2021].
- Firang, D. 2020. "The impact of COVID-19 pandemic on international students in Canada". *International Social Work*: 1-5. sagepub.com/journals-permissions; journals.sagepub.com/home/isw [accessed: 05.07.2021].
- Giurgiu, L., G. Bârsan, & D. Moșteanu. 2015. "The technical dimension of knowledge management in the context of learning and training". *Proceedings of the 9th International Management Conference*, 9 (1): 506-512.

- Herodotou, C., B. Rienties, M. Hlosta, A. Boroowa, C. Mangafa, & Z. Zdrahal. 2020. "The scalable implementation of predictive learning analytics at a distance learning university: Insights from a longitudinal case study". *The Internet and Higher Education*, Vol. 45. <https://doi.org/10.1016/j.iheduc.2020.100725> [accessed: 06. 27. 2021].
- Kenyon, Peggy. 2020. "U.S. army training and doctrine command virtual learning". *Journal of Military Learning*: 91-96.
- Middlewood, David, and Jacky Lumby. 1999. *Human Resource Management in Schools and Colleges*. London: SAGE.
- Miller, D. 2013. "Individual training & education modernization in the Canadian armed forces". *Journal of Advanced Distributed Learning Technology*, 1: 3-4.
- Paparone, C. (Ed.). 2013. *The Sociology of Military Science: Prospects for Postinstitutional Military Design*. Bloomsbury Academic.
- Regehr, C., & V. Goel. 2020. "Managing COVID-19 in a Large Urban Research-Intensive University". *Journal of Loss and Trauma*, 25 (6-7): 523-539. doi:10.1080/15325024.2020.1771846.
- Roceanu, Ion, & Daniel Beligan. 2014. "Developing the advanced distributed learning capabilities in Carol I National Defense University". *Bulletin of "Carol I" National Defence University*, 1: 95-101.
- Seaman, J. E., I. E. Allen, & J. Seaman. 2018. "Grade Increase: Tracking Distance Education in the United States". *ERIC*. <https://files.eric.ed.gov/fulltext/ED580852.pdf>. [accessed: 01.07.2021].
- Stone, C., & S. O'Shea. 2019. "Older, online and first: Recommendations for retention and success". *Australasian Journal of Educational Technology*, 35 (1): 57-69. doi:<https://doi.org/10.14742/ajet.3913>.
- "Strategia națională de apărare a țării pentru perioada 2020-2024" / "The strategy for national defense covering the period 2020-2024". 2020. https://www.presidency.ro/files/userfiles/Documente/Strategia_Nationala_de_Aparare_a_Tarii_2020_2024.pdf. [accessed: 01.07.2020].
- Voss, Allen R. 2021. "Creating the blended online community leadership model: Synthesizing leadership theories with the community of inquiry within a new blended online faculty development course". *Journal of Military Learning*, 5 (1): 22-37.