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MISSION: EDUCATION - ACHIEVING TACTICAL SKILLS THROUGH DIGITAL GAME-BASED LEARNING

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Abstract: *This paper analyzes the importance of digital game-based learning within the higher military education system. The advantages of implementing digital wargaming in the learning system are presented, including its risk-free and cost-effective nature, its ability to allow "what-if" scenarios, facilitate knowledge transfer, skill acquisition, attitudinal/behavioral change, time-saving benefits, and the ability to understand the operational environment or test new technologies. The combination of these specific advantages, along with the motivation derived from the enjoyment of the game, should be the focus of military education academics and practitioners. Additionally, the paper highlights the requirements that the chosen game must meet, such as complexity, realism, balance, and providing opportunities for learning and developing skills that are tracked through data collection and subsequent feedback. By integrating digital games and using the principle of "play, have fun and learn", the learning process in higher military education can effectively improve the development of essential tactical skills that are difficult to achieve through other traditional teaching methods.*

Keywords: digital game based learning, tactical skills, wargaming, vbs4, arma3

1. Introduction

Learning with the help of games or using elements specific to games is a strong point for higher education and the military one is no exception to this rule. The age specific to the end of adolescence (late adolescence) requires the use of games for the effectiveness of student motivation and engagement. This aspect was even more evident in the absence of face-to-face courses such as those held on e-learning platforms imposed by the Covid pandemic. Two similar but different concepts are used in the specialized literature: gamification and games-based learning (GBL). Gamification can be defined as the use of game elements in non-entertainment contexts to promote learning [1]. Using games in education is not an element of novelty and a series of elements such as points, badge, feedbacks, level, rewards, challenges has been used over time to motivate the subjects involved [2]. On the other hand, the game-based learning concept involves a game designed and used for teaching and learning. GBL combines the elements of fun and educational concepts to increase student's motivation and engagement [3].

But the popularity generated by the advancement of technology, the multitude of digital games and the ubiquity of online platforms that host multiplayer gaming sessions have taken players' motivation to another level. Digital game base learning (DGBL) is the new black. The purpose of most of these digital games is entertainment and financial profit but the possibility to set

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learning objectives in some popular digital games can be a solution to the old problem of fighting students' distraction [4]. The potential of using in education is also evident from the concepts used over time in the educational field, such as "serious game", "game-based learning", "design-based learning", "educational game", "video game", "simulations", "virtual worlds" [5]. Their efficiency is evident in the learning process, but it depends on the game design [6]. This study uses the approach of the qualitative scientific research method through which the data are collected and analyzed, and the findings are integrated in the end in order to obtain a picture as accurate as possible of the effectiveness of the implementation of digital games in the learning process in the educational system of higher military education.

2. Wargaming

In the military environment, game-based learning has been included as wargaming and it consists of a multitude of manifestations, depending on purposes, styles and related terms as shown in Figure 1.

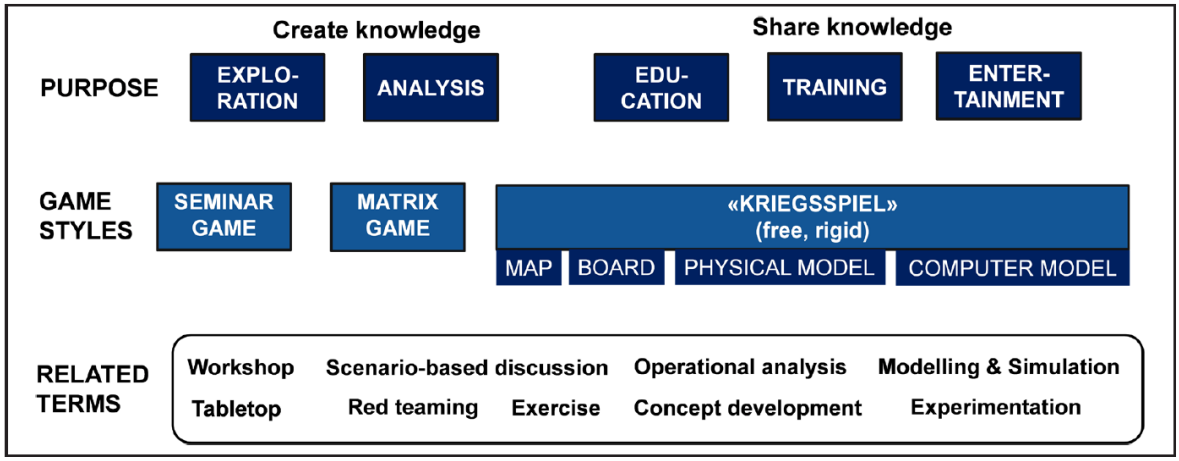


Figure 1: Wargaming purposes, styles and related terms [7].

Simulations like the tabletop type (such as Chaturanga, Kriegsspiel), role-playing, matrix games, exercises or the new computer games and platforms have been used since ancient times. Military decision-makers have always included classic mini games or role-playing games in the military decision-making process. Mini-games can be useful in basic courses, while role-playing and simulations can provide access to more advanced learning objectives, although they require more effort to support the learning objectives [8]. But certain studies show that the classic wargaming may be insufficient if we consider the complexity of theaters of operations such as Afghanistan or Iraq [9], and the use of modern simulation technology is needed to create virtual combat environments through modern games that address the complexity of today's military conflicts.

Within the higher military education, cadets with no previous experience need to develop, during bachelor's degree study programs, competences that a young officer should possess in order to be deployed in a theatre of operations and "*must be prepared to make life-and-death decisions in situations characterized by high complexity, danger, and stress*" [10]. This leads to a second assumption, also highlighted in the study developed in the Scandinavian Journal of Military Studies, that "*military exercises and wargames are powerful tools for the development of the competence necessary to make expedient decisions in war*" [11]. So, we need not only games but also a specific discipline defined, in the

same study, as: "*an applied discipline encompassing the creation, use, synthesis and analysis of wargames to conduct research, explore concepts, develop and test hypotheses, and dynamically communicate insights to inform, educate, and train individuals and organizations*" [12]. Next, the study will highlight the positive aspects but also the measures that must be taken for the implementation of a discipline that uses digital game base learning (DGBL), of the wargaming type, in the higher military education system. Throughout the paper we will use the term DGBL or wargaming with reference to a software, program, simulator or digital game that can be implemented in the learning process in higher military education.

3. Advantages of applying DGBL in bachelor's degree military study programs

Among the advantages of implementing digital games in the military academic environment one can mention the following:

- *Risk free*. The biggest benefit of implementing DGBL in military education is cadet safety. Familiarization with combat techniques without the injuries caused by lack of experience or the difficulty of the terrain is important for military students. The use of maneuver or live ammunition in tactical exercises allows them to easily understand military techniques, tactics, and procedures in a realistic and safe environment.
- *Cost effective*. Low cost is the second benefit of implementing a digital wargame. Regardless of the level of economic development and the financial budgets allocated to military institutions, no state can afford the acquisition and use in military higher education institutions of military vehicles, equipment and materials used by front-line combat groups. It is impossible to imagine that military institutions of higher education can access funds that would allow them access to LEOPARD, HIMARS, JAVELIN or SWITCHBLADE even if the war in Ukraine shows us that they cannot be absent from future military conflicts. Current military cadets are the future commanders in the field and their training must reflect General Patton's conclusion: "*You fight like you train*". More than that, serious video games developed with modern graphics allow the use of both NATO military vehicles and equipment, as well as those of the opposing armies, to get to know them. The challenge of the interoperability of NATO states is obvious taking into account the membership status of some countries that in the past were part of the Warsaw Treaty, and the case study of Ukraine, which is forced to train on Western techniques, completes this thesis.
- *Predicting and testing courses of action in the MDMP*. Games within the decision-making process were constantly used by leaders and military staff in formulating estimates and a most likely and most dangerous course of action. Digital games also offer the opportunity to make mistakes and to apply the "what if?" principle in an interactive way. Repetitions and learning by doing are superior to classic simulations where commanders and staff are limited to imagining the future actions and reactions of the adversary.
- *Developing necessary competences*. Digital wargaming can obtain knowledge transfer, skill acquisition and/or attitudinal/behavioral change [13]. Cognitive acquisitions, critical thinking development, decision making in the context of limited information, problem solving, multitasking are some examples.
- *Time saving*. Practicing military decision-making through digital games saves the time needed to prepare for training exercises in the field. Moving forces to starting positions or distributing weapons and ammunition are just a click away. DGBLs allow doubling or even tripling the actual training sequences by

making up for time lost in the pre-training stages. More time means more training and the formation of insights and *mental muscle memory*. It takes many hours of "play" and a variety of scenarios to develop cadets' skills that allow them to correctly detect and respond to *life-and-death challenges*. Digital wargaming also allows the diversification of scenarios and ease of implementation of ad hoc incidents. The opportunity to test the cadets' ability to resolve an incident that was not originally planned can be solved with a mouse click by the trainer without the need for a break or additional time.

- *Understanding specific operational environment.* Digital wargames allow the development of scenarios in all existing combat environments. Access to a desert-type or delta-type battlefield is impossible in certain regions, or the challenge of a short adaptation time from open terrain to urban combat can be solved by simply loading a map close to the actual terrain in which you are going to take action. Training in the conditions of irregular wars in which civilian actors (civilian population, non-governmental organizations, political parties, terrorist, paramilitary or criminal groups) are realistic components of the modern battlefield, which makes virtual scenarios sometimes more effective than those on the training field. The feedback of a virtual mission in which abuses (accidental or intentional) have been recorded allows understanding the specific operational environment and being aware of actions (destruction of private property, non-compliance with religious customs, culture shock) that in real life could lead to the escalation of the situation in the field.
- *Difficulty level.* Digital wargaming can be adapted to the training level of the military cadets so that trainers work differently with each group.
- *Encouraging collaboration*. Digital wargames are team games and help increase cohesion among military cadets. They develop or improve their social, communication and teamwork skills, which is a priority in the military environment.
- Wargaming can test *new technologies, techniques, tactics and combat procedures.* The massive use of drones in Ukraine has shown their utility in conventional conflicts. Digital wargaming allows training with drones even if they have not yet entered the arsenal of the respective military structure.
- *Accessibility*. Technology evolved and laptops or the small size of computers offer wargaming the mobility military structures sometimes need in order to operate inside a military camp or out of basic institutions.

4. Aspects regarding the optimization of DGBL

At the same time, we must understand that there are aspects that trainers must take into account in order to achieve the objectives by using DGBL. The first is the correct choice of "game". Using a software based on the fact that it provides a lot of fun solves the problem of motivation and is attractive but not useful for military cadets. The first step in planning and running the digital wargaming process starts from answering the question: *Which are the skills required?* If the process targets future naval officers, then Modern Naval Warfare (https://www.matrixgames.com/game/modern-naval-warfare) is a better option while the Air Force would find a simulator game like Digital Combat Simulator World (https://www.digitalcombatsimulator.com/en/) more useful. In the Land Forces, modern military simulators such as Virtual Battle Space 3 (VBS 3) [14] or VBS 4 [15] should be first on the list of wargaming trainers. VBS 4 offers everything needed to train young military Land Forces cadets, such as: the ability to train in any location in the world, increased speed for trainers in creating scenarios and 3D terrain editing, implementation of virtual players controlled by artificial intelligence (AI), high-fidelity

data access via VBS World Server [16]. If the budget does not allow the purchase of VBS 3/VBS 4 licenses and computers that have the minimum system requirements required by the manufacturer, it is necessary to identify a game that meets the following conditions:

- The ability to create and *edit scenarios* for all types of military operations so that trainers can customize and adapt the game experience to their specific needs. Reusing old scenarios (from stability and support operations) in the context of new objectives (from offensive operations) can be a mistake and the lack of diversity in scenario editing brings limitations in the learning process.
- a digital wargame must be as *realistic* as possible in the sense that it must provide an authentic representation of military conditions and situations. It must cover all the roles pursued and possess all the necessary elements (vehicles, weaponry, maps, communications, infrastructure, military and civilian characters, etc.). If it doesn't allow access to real maps like VBS4 does, it needs to have an editor that can make accurate terrain representations or libraries with maps from all military action environments. If the established objectives include knowing the military technique, the game must have a virtual library from which trainers can choose graphic elements that faithfully reproduce the targeted equipment. This requirement is not difficult to achieve. The video game industry has reached hundreds of billions of dollars and the trend is upward [17]. The graphics of today's commercial games have reached an extremely high level and certain recordings from the ARMA3 game managed to fool the moderators of some TV shows who presented them as real recordings from Ukraine [18]. Other footage from the same ARMA3 game was used to create fake news by showing a NATO military column being attacked and destroyed in Ukraine [19].
- The game must offer a variable range of *difficulty levels* so that users can start with easier levels and gradually progress to more difficult levels as they gain more experience and skill. At the same time, the game must be easy to learn so as not to transform the objectives of learning some military skills into digital skills.
- the game must be *balanced* so that all sides have an equal chance of winning. Trainers must avoid players drawing simplistic conclusions such as “we lost, so the game is bad” or “we won, so the game is good”, which can be detrimental to the learning process.
- it is imperative that the game allows giving *feedback*. Many times learning happens from failure. A digital wargame must provide opportunities for learning and skill development tracked through data collection and subsequent feedback. Post-action analysis must connect the game to the objectives and the learning outcomes to be achieved. Cadets should be constantly invited to make suggestions for improving the scenarios as this initiative can generate intelligent discussions and deeper results than the game itself.
- Wargames are played collectively and must enable competitiveness. Studies in the field of video games have shown that creating human-vs-human rivalry conditions are more effective than human-vs-computer ones due to the recorded level of engagement [20]. A quality wargame must have a large community and allow cadets to “fight” with other real players from around the world.

5. Conclusions

The decision to use wargaming in the military environment was based on other reasons than those specific to GBL in the civilian environment. In the military environment specific wargames have not been adopted to increase user motivation and engagement or the entertainment factor even if these activities offer the participants a great deal of satisfaction [21]. They were

based on the need to stimulate military thinking (tactically, operationally or strategically) and to develop better decision-making skills in real war conditions but without exposing the participants to its violence. The present paper has highlighted the advantages of using DGBL in higher military education and the conditions that lead to the achievement of the set objectives. Risk free, cost-effective, "what if" scenario, knowledge transfer, skill acquisition, attitudinal/behavioural changes, time saving, understanding the operational environment or testing new technologies are only a few arguments in favour of digital wargaming implementation. But they can only be achieved under the conditions of a complex game but easy to learn, realistic, balanced and capable of providing a type of feedback adapted to the set objectives. Combining these specific benefits of DGBL with the motivation provided by the enjoyment of the game must be the focus of theorists and practitioners in the academic military environment. These can be combined by introducing a discipline that uses attractive digital games and the principle of "*play, have fun, and learn*" into the learning process of higher military education. This approach can aid in developing military tactical skills that may be more difficult to obtain through other teaching and learning methods.

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