EDUCATIONAL BOOTCAMP
FOR THE VOCATIONAL DEVELOPMENT
OF ADOLESCENTS IN RESILIENT SOCIETIES
– A PROPOSAL BASED ON PROJECT MANAGEMENT –

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The article presents the main lines of effort for implementing an extracurricular program dedicated to the development of adolescents in national vocational high schools with a military profile.

The proposed framework is subsumed under the imperatives of STEAM education, tailored to the military field, based on a project management approach, with an appropriate quantitative and qualitative methodology.

The study highlights the premise that the target audience is a valuable resource for training active officers, military quartermasters, and non-commissioned officers.

Keywords: development; resources; vocation; project; defence;

THE GENERAL, CONCEPTUAL, AND PRACTICAL FRAMEWORK OF THE APPROACH

Transforming current educational systems is an essential action in today's world, with the ultimate goal of producing teenagers who are highly adaptable to future challenges in a volatile, uncertain, complex, and ambiguous environment. The issue at stake, linked to the irreversible trend of processes specific to digitalisation, Industry 4.0 and artificial intelligence, requires a public agenda focused on the *development of adolescents* (vocational education, military profile) adapted to these interdisciplinary realities. In this context, it is essential to provide the target group with viable solutions for cultivating resilient behaviour through which they can understand current socio-technical mechanisms and develop harmoniously as future professionals and citizens. The direct beneficiaries of the project-based approach are 11th grade students at a National Military College (NMC). Using STEAM *(Science, Technology, Engineering, Arts and Maths)* solutions, a modern learning experience (in the form of lectures and summer school activities) is proposed, which will bring short-term added value in terms of adapting learning to the stage of training for the transition to university education. The deliverables offered increase young people's interest in the practical side of STEAM, mainly through the use of collaborative working models, critical thinking, teamwork, simulation, gamification, and experience transfer.

The quality of training for this category of human resources is essential for the process of generating human resources for security and defence, given that military college graduates constitute the main component of admissions to military educational institutions for the training of future officers, military quartermasters, and non-commissioned officers. Given the current requirements, a high level of STEAM knowledge is needed, taking into account the contemporary realities of war.

The idea of a resilient society was chosen for the title because, at present, the concept encompasses both challenges and, complementarily, opportunities, due to its complexity and implications for military organization management in general and defence human resources management in particular. An example of existing international concerns in terms of strengthening the framework outlined above is provided by the idea of the CORE project (European Commission, CORDIS – Eu results, sCience and human factOr for Resilient sociEty). The fact that knowledge specific

to STEAM education (with clearly defined learning outcomes) is implemented in initial military vocational training facilitates, at the university level, the understanding of advanced concepts applied in practice at the level of integrated technical systems platforms and the acquisition of skills appropriate to the military profession. In other words, the fact that future students have a much more solid general and specialized knowledge base allows them to better understand the changes occurring in the field and to adapt much better (quantitatively and qualitatively) to the new changes, i.e., to be more resilient.

Such a formative approach requires a solid technique, correctly applied to the general specifics of military education (Magnussen, Boe, Torgersen, 2023) and the military organization (Iancu, 2022) itself, which led to the consideration of project management as an implementation solution. Regarding the specifics, necessity, and practical usefulness of project management, it is stated that the appropriateness or even difficulty of success is such that: *"The appropriateness of a project may be a matter of taste, nuance, or perspective. Of course, assessing the viability of a project also involves a degree of subjectivity, which is inherent in any human judgment or, in any case, difficult to avoid."* (Vladu, Pîrvan, 2024, p. 24.)

DESCRIPTION OF THE PROPOSED SOLUTION

The main focus of the project team (10 people, teaching and research staff) is on achieving the project objectives. The collaborative workspace and activities supporting the achievement of five objectives have been defined in three dimensions by: (a) the technical, systemic, and operational perspectives of the STEAM field; (b) institutional missions, rule enforcement, and resource allocation as the main types of organizational processes targeted; (c) source, sensor, and decision-maker, as qualities of the stakeholders involved. Upon completion of the project, from an educational point of view, it is imperative to ensure the fulfilment of the goal of harmonizing the triad formed by *cognitive involvement* (specific to the age of the adolescents considered the target group), *understanding the general concepts* used in the field of resilience and social security (facilitated by the specificity of STEAM), and, last but not least, *increasing interest in knowledge* (through teaching strategies that facilitate the attractiveness of science).

The objectives designed to be achieved through the application proposed by the project team are:

– O1. Supporting the transformation of Romanian pre-university education by involving high school students, vocational stream, military profile, in interdisciplinary learning experiences, in a STEAM context, appropriate to the requirements of a constantly changing society;

– O2. Raising awareness among military high school students of the contribution of STEAM subjects to the development of transversal skills, such as critical thinking and creativity, in the development of innovative solutions that respond to the complexity of contemporary problems;

– O3. Increasing the motivation of young adolescents for school, for multilateral development, stimulated by the identification of current development opportunities;

– O4. Developing and internalizing personal values that enable them, as citizens and professionals in training, to respond appropriately, confidently, and resiliently to technical changes that impact society;

– O5. Encouraging the exchange of experiences between generations, based on self-knowledge and knowledge, in real and simulated situations, dominated by current scientific and technological paradigms.

The topic contains the deliverables and objectives detailed below.

Deliverable 1 – Project launch event

1.1 Project launch conference. A presentation will be made on the project's objectives, stages/phases, and expected outcomes, highlighting the project's context and targeted results. The aim is to raise awareness among adolescents at this stage about the challenges of today's society and the need to train and develop themselves in order to respond to these challenges as effectively as possible, both in terms of vocational maturation and training as responsible adolescents in relation to their role as citizens and professionals in the field of security and defence.

Deliverable 2 – Lecture series

2.1 Critical thinking in research, development, and innovation for a resilient society. The lecture aims to raise awareness among teenagers of the need to develop critical thinking in order to achieve the goal of building a safe and resilient society. The theme will focus on the development of skills, attitudes, and habits specific to the manifestation of critical thinking in the context of contemporary society. The place and role of citizens in today's and tomorrow's society will be analysed, as well as ways of using appropriate algorithms to interpret processes in the environment. Emphasis will be placed on presenting the possibilities of using science to identify logical and realistic solutions for strengthening individual and social resilience.

2.2 Collaborative responsibility in sustainability and entrepreneurship. The theme aims to develop cross-cutting skills among adolescents that facilitate innovation. Starting from the argument that entrepreneurship is important at the societal level, the lecture focuses on describing the concept, presenting its evolution at the global and national levels, and highlighting examples of how entrepreneurship can respond to a problem or opportunity. The theme connects entrepreneurship

with sustainability to explain to young people that entrepreneurs must be responsible and that innovation must be sustainable, respecting the principles of non-discrimination and equal opportunities. Another objective of this lecture is to highlight the collaborative aspect of innovation and change. The phenomenon of entrepreneurship has gained momentum, facilitated by the current legislative framework, scientific and technological progress, existing financing opportunities, but especially due to the involvement of the academic environment as a partner in dialogue and a framework for disseminating information to stakeholders, public or private actors.

2.3 Modern technologies at the service of society: current applicability, development opportunities, and security challenges. This topic aims to create a framework that is easy to understand and adapted to the level of preparation of the target group (17-year-olds) in order to improve their perception of trends in the development of contemporary technologies. The aim is to understand their usefulness and the concrete advantages they bring to the functionality of various areas of everyday life, while at the same time providing a balanced overview of their vulnerability and associated risks. A special subchapter is devoted to digital technologies and how STEAM impacts social development. It also addresses the main trends in technological development at NATO level, in the dual-use sector and for civil emergency management.

2.4 The multidimensionality of security culture – between technical imperatives and the need for human development. The lecture aims to help young people become aware of the need to develop a robust security culture by combining technology with human development in order to instil in them a sense of responsibility for individual protection and collective safety. The theme will address the dimensions of security culture in interdependence with the human and technological factors, thereby contributing to the development of the skills so necessary for the younger generation to face the challenges of an increasingly complex world, helping them to become not only responsible users of technology, but also involved and resilient citizens.

Deliverable 3 – Selection based on a project competition

3.1 Establishing the competition information package. The transition from deliverable 2 to deliverable 4, in terms of target group selection (from 120 to 25 people), will be made following the competition between the two deliverables, based on the preparation of a project entitled: *Solutions based on modern technologies for a resilient society*. The conditions for participation, evaluation criteria, project implementation criteria, and deadlines will be included in an information package

that will be brought to the attention of the target group, both upon completion of deliverable 2 and through the specific section of the project created separately on the website *https://www.armyacademy.ro/managementul_proiecte_cercetare.php*

3.2 Monitoring of the competition. Following the submission of applications on a MOODLE-type IT platform, with a link that will be communicated to beneficiaries, the project submission stage will be monitored according to the schedule established and communicated to participants, and administrative assistance will be provided as appropriate*.*

3.3 Evaluation and selection. After the deadline for submitting projects, each project proposal will be evaluated by a panel of three evaluators from within the project. The project manager will determine the composition of the three evaluation panels and assign the projects for evaluation. Following the ranking of the scores obtained, the first 25 applications in descending order of score will be declared winners for participation in the summer school. The results of the selection process will be communicated to the beneficiaries via the MOODLE IT platform and will also be published on the project's dedicated page.

Deliverable 4 – Summer School

4.1 The evolution of techniques and technologies. Case study for Romania: from folk techniques to startups dedicated to digital technologies. A thematic workshop will be organized at the ASTRA Museum of Traditional Folk Civilization in Sibiu, which provides an authentic setting for exploring the transition from folk techniques to modern technologies. The workshop will focus on: exploring Romanian techniques and technologies and presenting how folk techniques (crafts, traditional tools, indigenous devices, etc.) have influenced the development of modern technological solutions; presenting case studies of local innovation, based on Romanian startups that have transformed creative ideas into competitive digital technological solutions, highlighting the development process from concept to implementation; participation in an interactive innovation workshop, based on a practical session in which young people create a digital prototype inspired by traditional Romanian techniques and physically produce it using modern technologies (such as 3D printing); participation in a brainstorming activity in which participants are actively involved in identifying solutions for promoting and/or improving the heritage exhibited in the museum, based on digital technologies (Internet of Things, holograms, VR/AR technologies, etc.).

4.2 Features of military techniques and technologies. Case study: dual-use technologies. The evolution, role, characteristics, and operational usefulness of current military techniques and technologies will be presented. The aim is to conduct presentations and demonstrations of dual-use equipment available in the host institution's laboratories. The focus of this topic will be on interactive, hands-

on activities involving the use of dual-use technologies, such as mini-drones, mini-robots, VR/AR glasses, and 3D printing, available at *„Nicolae Bălcescu"* Land Forces Academy of Sibiu (NBLFA). A role-playing session will be held to discuss aspects related to the industry's interest in military technology.

4.3 Technical solutions for modelling and simulating activities in the field of security. The activity aims to familiarize teenagers with serious gaming solutions used for education. The transition from reality (through simplification, essentialisation, abstraction) to model (including mathematical models) will be explained. Specifically, participants will be familiarised with the Virtual Battlespace (VBS3) virtual training system and will take part in an airsoft activity. The aim is to raise awareness among teenagers about the role of simulations in the field of security and civil emergencies and, in particular, to highlight the importance of STEAM in the transition from reality to conceptual models that can be used in simulation, for a robust transfer of experience. The necessary infrastructure is available at NBLFA, within the Military Action Modelling and Simulation Centre (through Military Action Modelling and Simulation Laboratories 1 and 2, the Robotics and Artificial Intelligence Laboratory and the MILES and Drones Department). Complementarily, the aim is to understand the evolution of modelling and simulation, correlated with the evolution of techniques and technologies at NATO and EU level.

4.4 Sustainable approaches for a sustainable society. The activity aims to identify creative and innovative solutions for a sustainable society. Starting from an integrated approach to STEAM education and education for sustainability, participants will work in teams and be encouraged to use both scientific and technical knowledge and skills such as critical thinking, systemic thinking, problem solving, and decision making to develop solutions to current challenges. In addition to developing technical, scientific, and entrepreneurial skills, the activity also aims to raise awareness of environmental and social responsibility and promote sustainability values through experimentation, problem-solving, and teamwork.

4.5 From misinformation in the digital age to hygiene for cyber resilience. The aim of the activity is to develop critical thinking in young people and to train them in practical skills in the field of social engineering related to the use of technology in everyday life, so that they become more responsible and resilient to online manipulation and attacks. The activity is designed to help young people understand how to recognize and avoid cyber traps and risks in the digital age. The activity combines two essential themes for the modern world: accurate information and digital safety, in a way that is engaging and relevant to the younger generation.

Deliverable 5 – Project closing event

5.1 Project closing conference. The results obtained within the project will be presented, final feedback from the beneficiary will be provided, and the

sustainability requirements of the project will be highlighted. The information resource package will be presented and distributed to both the participants of the selected NMC and all national military colleges.

Considering the proposed objectives and the topics of the planned deliverables, the relevance of organizing and carrying out the activities, divided into three main categories of deliverables, is presented in detail below.

A. For the deliverable *Lecture Series*, held at the NMC headquarters and scheduled to take place in May, a series of four lectures was envisaged, with topical subjects related to the current state of development of the STEAM field, the way in which military high school education is carried out in Romania in the vocational stream, the military profile and, last but not least, related to current societal challenges in terms of security and resilience. The proposed topics are relevant for raising awareness of the challenges, implicitly with specific educational imperatives, in areas such as *Culture, creativity, and inclusive society* (with an impact on social and economic resilience) and *Civil security for society* (with an impact on the sector of cybersecurity growth), as set out in national strategic documents on research, innovation, and smart specialization. The training of responsible citizens, especially for the vocational stream, begins in high school, and the provision of educational programs that integrate current trends in science is an added bonus in generating an educational profile adapted to the current and future requirements of society. The unprecedented development of technology and techniques brings with it advantages and disadvantages, the latter having the potential to turn into vulnerabilities or even threats, with widespread societal effects. We want to raise awareness among the target group that we are all part of the possible solutions to be developed in the aforementioned context, and that science, approached in an interdisciplinary and transdisciplinary manner, plays an overwhelming role in shaping the mindset appropriate to these realities. Problem-solving, critical thinking, and discovering new perspectives on the proposed topics are relevant in the context of transforming adolescents to a higher level of maturity in the exercise of knowledge.

B. The deliverable *Selection based on a project competition* (scheduled to take place in July) aims to select 25 students from the initial target group to participate in the summer school organized at NBLFA. The aim is to assess the students' potential to understand the role of modern technologies in serving society (in order to create greater resilience) and to encourage creative behaviour in proposing solutions on a given topic. Attitudinally, but also practically, this stage aims to correctly assess the need to ensure a balance between rigor (by complying with the specifications of the project-specific information package) and flexibility (through the scalability

of the proposed solution and the way a STEAM application is replicated in the final solution). This increases self-esteem, responsibility, and confidence in the level of maturity achieved. The ability to use project-based management is developed, with the design of solutions to societal problems, and, subsumed, awareness of the role of universal constraints (time, quality, resources, skills) and planning (as an essential function of management).

C. For the deliverable called *Summer School*, scheduled to take place in August, the aim is to continue the themes from the lecture session, resulting in five practical and applied activities. The goal here is to improve technical skills in the field of technology in general, and in the cyber-digital area in particular. Since certain activities will involve teamwork, there is an emphasis on collaborative skills, with participants being encouraged to step outside their comfort zone in terms of ideas and actions. They are thus involved in brainstorming sessions and red flag exercises that demonstrate the importance of group cohesion, which is less successful in formal activities. The aim is to raise awareness of the socio-technical multidimensionality of security culture and, by extension, the role of STEAM in providing education tailored to the needs of diverse socio-professional categories.

For the lectures, the target group consists of 120 11th grade students, who at the end of the project will be in 12th grade and will be preparing for admission to higher military education institutions. For the *Summer School* deliverable, scheduled for the end of August, before the start of the school year, 25 students will be selected on the basis of a project competition. The projected impact consists of:

- informing and stimulating beneficiaries' interest in STEAM subjects by combining formal education with non-formal education;
- developing skills among young people, such as technical skills, communication and teamwork, critical thinking, problem solving, and competitiveness, by involving them in interactive summer school activities and in the competition to select participants for activities;
- stimulating the creative and innovative side of students by helping them acquire entrepreneurial skills and motivating them to get involved in developing sustainable solutions adapted to contemporary realities;
- increasing motivation for learning and performance by integrating into the activities carried out, specific to the three deliverables (2-4), new learning strategies facilitated by access to new technologies (artificial intelligence), which allow the development of transversal and digital skills.

The outcome indicators for the planned deliverables are presented in *Table 1.*

Table 1: The outcome indicators for the planned deliverables
(authors' conception)

Nr. indicator	Projected result indicators	Unit of measurement	Assumed value
1	Number of lectures given	Number	4
2	Number of students participating in the lecture series	Number	120
3	Project selection competition for participation in the *Summer School*	Number	1
4	Applications submitted for participation in the *Summer School*	Number	40
5	Applications accepted for participation in the *Summer School*	Number	25
6	Number of practical activities carried out during the Summer School	Number	5
7	Number of participants in the Summer School	Number	25
8	Percentage of *Summer School* participants who consider (via feedback questionnaire) that they have acquired new skills or practical tools to address security and resilience issues	Percentage	75
9	Percentage of total participants who consider (via feedback questionnaire) that they have acquired new skills or useful knowledge	Percentage	75
10	Post-event questionnaires	Number	2
11	Dissemination of results - good practice reports	Number	1
12	Dissemination of results - scientific articles in BDI journals	Number	2

The indirect beneficiaries (which supports the national character of the project) are students from the other four military high schools in the country. They will each receive an information package containing the resources developed during the project, the content of which will be presented during visits to promote the image of the institution (an activity that NBLFA carries out annually in national military

colleges) and during the visits that national military colleges make annually to military academies to provide information on the specifics of the officer profession *(https://www.armyacademy.ro/ev_2024_09_25.php)*. In the case of national colleges and civilian high schools, the results obtained are disseminated through the project website and through visits that high schools make to the NBLFA headquarters during the *Alternative School program*, the *NBLFA Open Day*, and the *Romanian Army Day in Schools (https://www.armyacademy.ro/ev_arhiva.php#octombrie2024).* The expected impact on indirect beneficiaries consists of:

- documenting stakeholders on everything related to involvement in the implementation of STEAM programs and the benefits that can be obtained;
- the possibility of providing information on the changes that are expected and that result from the combination of science and innovation, as a result of the materials disseminated in military high schools and published on the project website;
- encouraging students to get involved in similar activities (carried out at the direct beneficiary) by increasing their motivation for personal development, knowledge exchange, and learning the latest scientific and technological concepts;
- raising awareness of the opportunity to access, through such initiatives, visits to laboratories and spaces equipped with the latest technologies, with the capacity to simulate complex processes and situations.

The estimated budget for the planned activities is presented in *Table 2.*

Table 2: Budget and categories of planned expenditures
(authors' conception)

	Categories of expenses	National budget (lei)	Own sources budget (lei)	Total (lei)
TOTAL PROJECT	1. *Personnel expenses* (including employer contributions)	140.000	0	140.000
	2. *Logistics expenses*	53.000	0	53.000
	2.1. Inventory expenses	24.600	0	24.600
	2.2. Expenses for services performed by third parties	28.400	0	28.400
	3. *Travel expenses*	50.000	0	50.000
	4. *Indirect expenses* (max. 5% of direct expenses)	7.000	0	7.000
	Total project (1 + 2 + 3 + 4)	**250.000**	**0**	**250.000**

CONCLUSIONS

The solution presented may be applicable to all national military colleges in Romania, but in this case, the triple constraint specific to project management is at a much higher level than the requirements. The costs of implementation increase and, of course, greater capacity is required from the implementation team and institution. The implementing institution leading the project can be any of the military academies in the national higher military education system.

The increase in the number of beneficiaries from a college, combined with the implementation of the project in all existing military colleges at the national level, leads to the opportunity to consider a program with the integration of stand-alone projects for each college. In this case, the involvement of all existing military academies at the national level can also be considered.

The implementation of an iteration, as presented, provides an adequate space for identifying lessons learned, thereby ensuring the scalability of the solution at the program management level, even in the context of a different subject and skills to be developed.

BIBLIOGRAPHY:

1. European Comission. CORDIS – EU results (2025). *Science and human factor for Resilient sociEty*, https://cordis.europa.eu/project/id/101021746, retrieved on 24 August 2025.
2. Iancu, D. (2022). *Managementul organizaţiei militare: elemente fundamentale*. Sibiu: Editura Academiei Forţelor Terestre "Nicolae Bălcescu".
3. Magnussen, L.I., Boe, O., Torgersen, G.-E. (2023). *Agon – Are Military Officers Educated for Modern Society?* Education Sciences, *13*(5), 497, https://doi.org/10.3390/educsci13050497, retrieved on 24 August 2025.
4. Vladu, L., Pîrvan, M. (2024). *Management de proiect: cum transformăm o idee bună într-un rezultat durabil*. București: Editura Comunicare.ro.