

Erasmus+ Capacity Building Project
610133-EPP-1-2019-1-FI-EPPKA2-CBHE-JP



Countering Hybrid Threats: Innovative Approaches and Synergy of the Erasmus+ Project WARN



WARN

WORKSHOP “Resilience to Hybrid Threat Challenges”

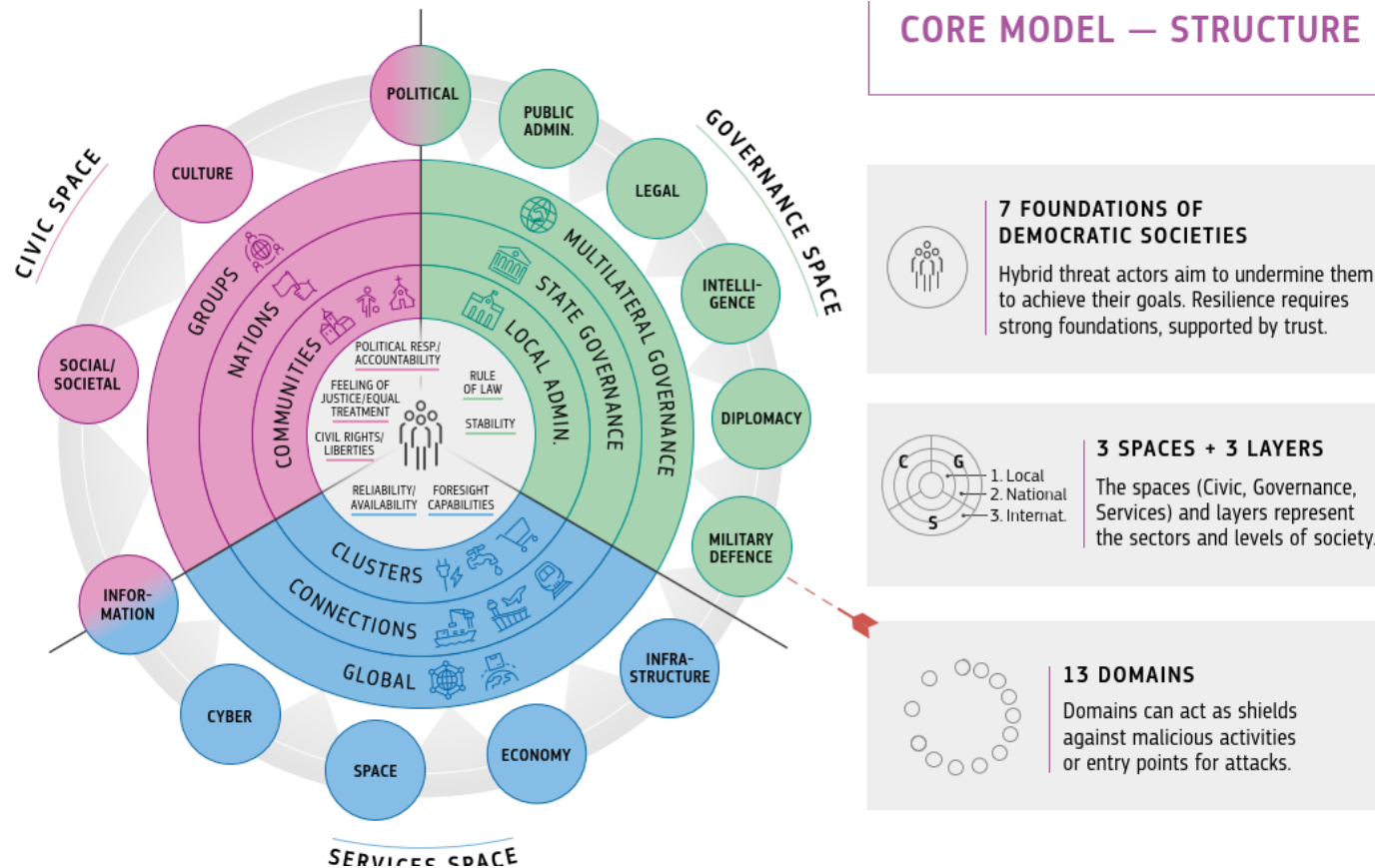
November 7, 2024

Ministry of Education and Science of Ukraine

Co-funded by the
Erasmus+ Programme
of the European Union



HYBRID THREATS: The Challenge of a New Reality



Multidimensionality

Encompasses politics, economics, social relations, technology

Flexibility and Adaptability

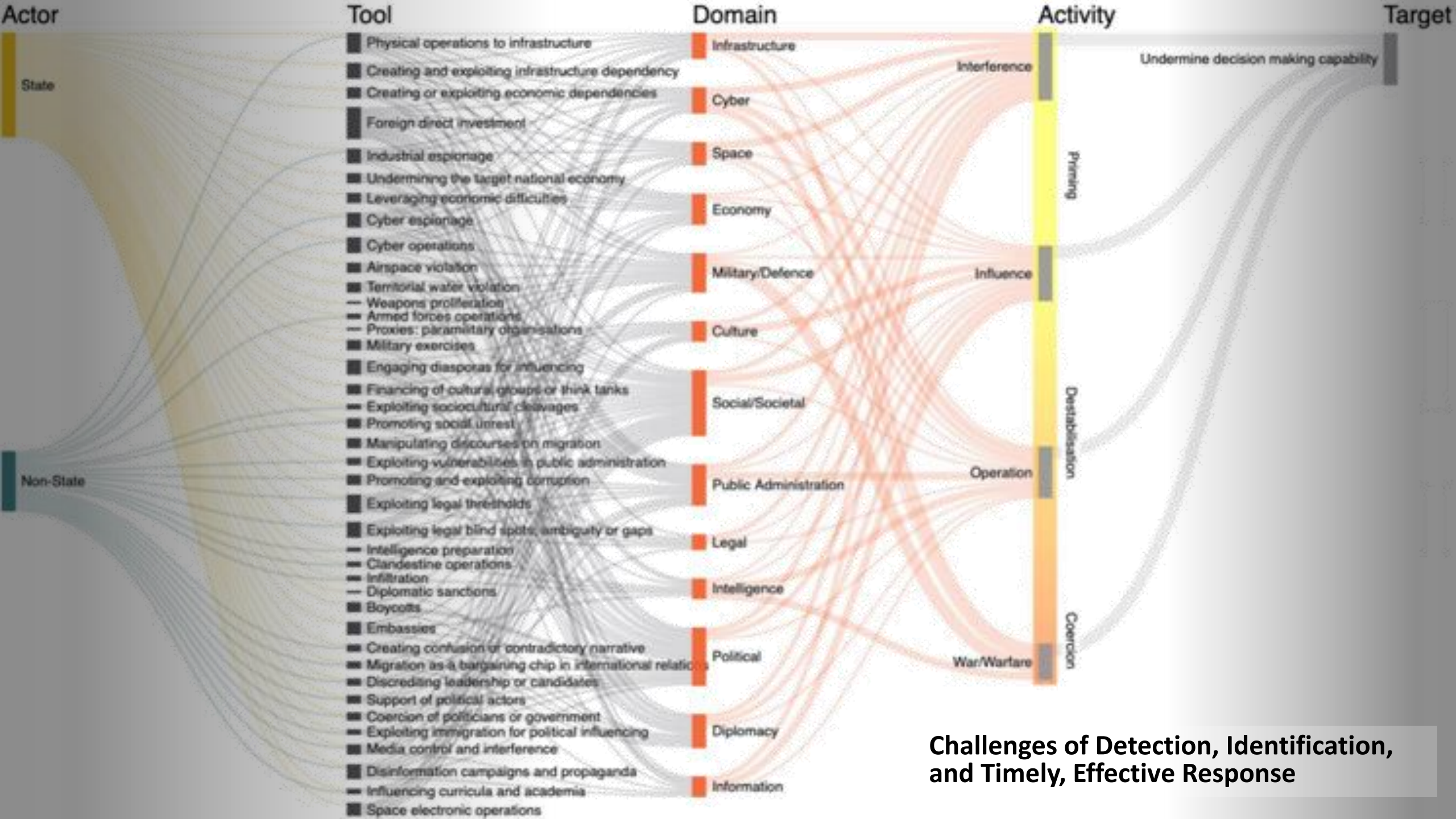
Able to rapidly change forms and adapt

Impact on Democratic Processes

Undermines trust in democratic institutions, provokes radicalization

Various Forms

Cyberattacks, economic interventions, cultural expansion, infrastructure dependencies, proxy warfare operations



Challenges of Detection, Identification, and Timely, Effective Response



PREPAREDNESS: The Foundation of Protection

actions and preventive
measures that

ensure operability
(ability to act)

during disruptions, both
under normal conditions
and in emergencies.

EDUCATION: The Path to National Security

Threat Recognition

A key element in ensuring security

Effective Response

Essential for national resilience

Role of Education:

- Raising public awareness of hybrid threats
- Building resilience against external influences



Insufficient Response Speed	Traditional educational programs are not adapted to rapid changes in the security environment
Technological Gap	Malicious actors exploit new technologies , while education struggles to keep pace with modern tools
Gap Between Needs and Capabilities	Education focuses on specific fields, while hybrid threats target cross-domain vulnerabilities
Gaps in Civilian Security Education	Civilian sectors remain vulnerable to hybrid threats due to insufficient preparedness
Lack of Practical Skills	Insufficient emphasis on practical skills leaves professionals vulnerable in responding to new challenges

EDUCATION VS HYBRID THREATS

Identified Issues



warn-erasmus.eu



New security skills and increased civic resilience to hybrid threats in Ukraine



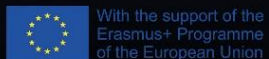
11 adapted study programs in 7 fields of study
New LLL courses on hybrid security



Transsectoral environment countering hybrid threats

Модернізація освітніх програм і взаємодія в міжгалузевому середовищі з метою протидії гібридним загрозам і посилення національної безпеки.

ARMING WITH KNOWLEDGE



The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Erasmus+ KA2 CBHE (Capacity Building in Higher Education projects)

Academic Response to Hybrid Threats



- **The general aim:** to fill the security skills gap across various professional domains to increase civil resilience to hybrid threats in Ukraine.
- **The target groups:** students, UA HEIs, faculty members, companies and organizations, society in general
- **Project duration:** from November 15, 2019 to November 14, 2022 to November 14, 2023 to November 14, 2024

Erasmus+ Capacity Building Project 610133-EPP-1-2019-1-FI-EPPKA2-CBHE-JP

Co-funded by the Erasmus+ Programme of the European Union



PROJECT WARN: Versatility



2019 Hypothesis

Universal security competence can be formed, which:

- **is integrated** into the system of professional competencies of any educational program
- **does not violate** subject-oriented professional knowledge and skills
- **adds** vigilance skills and builds resilience



PROJECT WARN: Versatility



Achieved
since 2020

WARN© The professional competency

Capability to socially and responsibly adapt work processes and personal space to complex and unpredictable situations caused by hybrid threats

WARN© The learning outcomes

- Understanding of the complexity, difficulty, logic and patterns of hybrid threats
- Detecting, identifying, and classifying hybrid threats, and being capable of responding to them effectively through trans-sectoral collaboration



PROJECT WARN: Versatility



2024

PROVED

An adaptive security approach can be integrated

into any master's program

Systems of Artificial Intelligence

Media Communications

Public Administration

Economics
(additionally)

Cross-cultural Management

Management of Financial and Economic Security

Public Policy and Administration under Conditions of Hybrid Threats
(new master's program)

Teacher Training (Secondary school) History, Psychology

Political Sciences

Organization Management and Administration

National Security

Software Engineering



PROJECT WARN: innovativeness



Learning outcomes cannot be achieved through new content alone

proactive behavioral skills must also be developed:

- Appropriate response to "unknown unknowns"
- Ability to navigate unexpected situations
- Rapid and effective action in complex, uncertain conditions

2019
Hypothesis



PROJECT WARN: innovativeness



Home About us Hybrid Threats Recent Publications and reac



June 11, 2024

Ukrainian professors trained on the use of game-based methods for countering hybrid threats

Hybrid CoE and the Netherlands Organization for Applied Scientific Research (TNO) delivered a train-the-trainer course to Ukrainian universities on the use of game-based methods for training and foresight in countering hybrid threats. The course was part of the [Erasmus+ project "Academic Response to Hybrid Threats"](#) (WARN), coordinated by the University of Jyväskylä and hosted by ECAM-EPMI (Graduate School of Electrical Engineering) in Cergy, France, from 14 to 16 May, 2024.

<https://www.hybridcoe.fi/news/ukrainian-professors-trained-on-the-use-of-game-based-methods-for-countering-hybrid-threats/>

<https://doi.org/10.62067/978-617-8242-02-2>



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"Academic Response to Hybrid Threats" Erasmus+ Capacity Building Project WARN
610133-EPP-1-2019-1-FI-EPPKA2-CBHE-JP

Методика навчання в умовах гібридних загроз

Результат 2.3 Нова методика навчання

VERSIONING AND CONTRIBUTION HISTORY

Version	Date	Revision	Description	Responsible Partner
01	27/02/2022		Creation of document	NURE (Svitlana Gryshko)

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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Achieved
since 2020



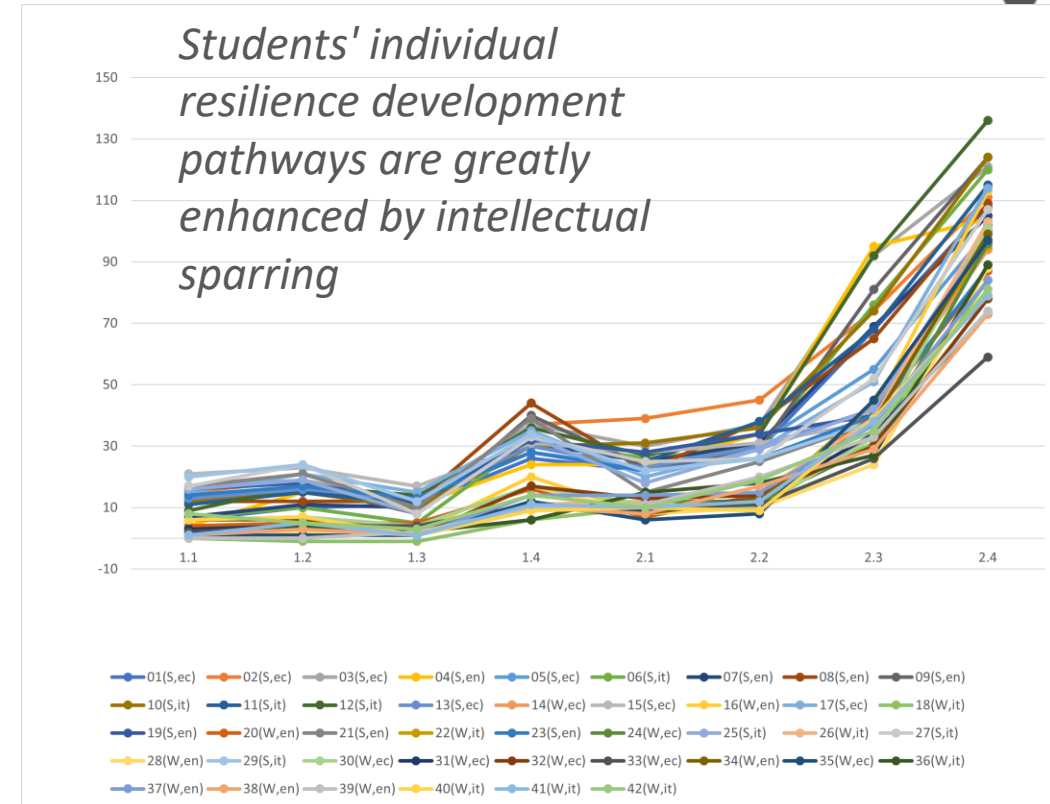
PROJECT WARN: innovativeness



2024: **PROVED**

Adversarial Learning Methods WARN

- Stimulate active student **engagement**
- Develop skills for **quick threat response**
- Foster **proactive defense skills**
- Ensure **preparedness** for challenges



Gryshko, S., Terziyan, V., & Golovianko, M. (2024, submitted). Resilience Training in Higher Education: AI-Assisted Collaborative Learning. In: Proceedings of the 27th International Conference on Interactive Collaborative Learning. Lecture Notes in Networks and Systems. Springer

PROJECT WARN: effectiveness



New content

- **24** new master's courses
- **39** updated master's courses
- **7** LLL courses for teachers
- **18** LLL courses in professional domains

Education

- Over **2,500** master's students trained through WARN programs
- More than **6,100** lifelong learners (4,600 LLL students + 1,500 teachers) gained new knowledge from LLL courses

Feedbacks

- **4** cycles of stratified surveys in target groups

<https://warn-erasmus.eu/ua/deliverables/updated-study-programmes/>

Robust support from students, employers, and civil society



PROJECT WARN: effectiveness



Survey plan

Annex S – Internal evaluation of the project results

WP #		The subject of study (survey)	Where feedback to be considered	Indicator	Due Time	Results	Proof Link
1. Feedback of the Students and Trainees							
WP1	1.1	Needed/expected student skills to counter hybrid threats Необхідні / очікувані навички студента для протидії гібридним загрозам (оцінка студентів / слухачів)	To adapt curricula and programmes profiles (WP2)	<ul style="list-style-type: none"> audience: at least 150 students and trainees. list of the skills. 	November 2020 – February 2021	440 responses list of the skills (p.73 – 81)	WP1 Analytical Report
WP2	1.2	How do the first drafts of syllabuses and curricula reflect the expected learning outcomes and competencies correspondingly? Як базова версія навчальних планів і освітніх програм відображають очікувані результати навчання та компетентності? (оцінка студентів)	In the updated curricula – 2022; the syllabuses (core version)	<ul style="list-style-type: none"> 100% of study programmes (11 specializations) get proper feedback; audience: at least 150 students representativeness (response rate > 40%) list of the proposals 	November 2021 – January 2022	225 responses The general average response rate is more than 70%. list of the proposals (p.9)	Report Survey Revised Curricula Dec2021
WP2	1.3	How do the fine-tuned version of syllabuses and curricula reflect the expected learning outcomes	in the fine-tuned version of the curricula – 2023;	<ul style="list-style-type: none"> 100% of study programmes (11 specializations) get proper feedback; 	Sept-Oct 2024		

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Feedback

Сергій К., ХНУРЕ, магістерка "Системи штучного інтелекту"

Вважаю предмет курсу потрібним та актуальним для вивчення курс дає більш широке та прикладне розуміння поняття гібридних загроз із конкретними прикладами сьогодення, допомагає поглянути на ризики з інших боків. Також курс допомагає зрозуміти результуючі наслідки тієї чи іншої гібридної агресії, і, найголовніше, навчитися протидіяти їй, адже боротьба із гібридними загрозом починається з обізнаності кожного з нас.

Thank you for the current update of the security component of education - practical skills related to countering hybrid threats **unexpectedly turned out to be very useful** in the practice of our media resource The results of the survey (Department of EC, NURE, 2024

<https://drive.google.com/file/d/1hL3MyiSnBR-wjBht...>

Serhii

Studying Hybrid Threats and Artificial Intelligence was very helpful. I learned about threats affecting AI systems, such as data poisoning and adversarial attacks. Practical exercises with Jupyter Notebook were valuable for building secure AI systems, detecting misinformation and fakes.

Ірина Ільченко (НАКККІМ)

Доступність інформації, легке сприйняття матеріалу, Отримала відповіді на питання, які не могла зрозуміти без належних знань

Ярослав Батан (НАКККІМ)

Дякуємо за цікаву програму! Професійних викладачів! Доступний виклад матеріалу! Все дуже інформативно та максимально інформативно! Нехай програма живе та розвивається з кожним днем! Це надзвичайно актуальна тематика... тим паче заклади культури вкрай потребують розвитку в такому напрямку! Дякуємо!!! Можливо необхідне запровадження короткострокових курсів для керівників закладів культури територіальних громад! Тема дуже актуальна та модернована на найвищому рівні! Впроваджуємо її на найнижчій рівні!!!

Сергій Житник, Інститут державного управління Каразінського університету, магістерка "Публічне управління та адміністрування"

Дисципліна «Гібридні загрози та комплексна безпека» актуальна по суті та цікава за змістом. Порушена проблематика повністю конгруентна сучасним викликам, загрозам та небезпекам. Поданий матеріал дає комплексне уявлення про види загроз, способи їх виявлення, методи аналізу. Наводить приклади протидії, шляхів вирішення проблем та подолання криз, як складових комплексного забезпечення безпеки.



3

WP #		Subject of study (survey)	Where feedback to be considered	Indicator	Due Time	Results	Proof Link
WP3	1.5	Upon finishing the courses: How do new and updated courses reflect the expected learning outcomes? Після закінчення навчання на нових курсах: Як нові та оновлені курси відображають	in a new revision of the curricula and syllabuses	<ul style="list-style-type: none"> attendance: on average at least 70% of total classes academic performance: the average score for each course is not less than 75 points. 	June – July 2023 June 2024	Attendance: 94% of students completed their studies. The average score = 83 points	WARN Learning es 2022



PROJECT WARN: team spirit

WARN environment = Community of Practice

Interdisciplinary Approach

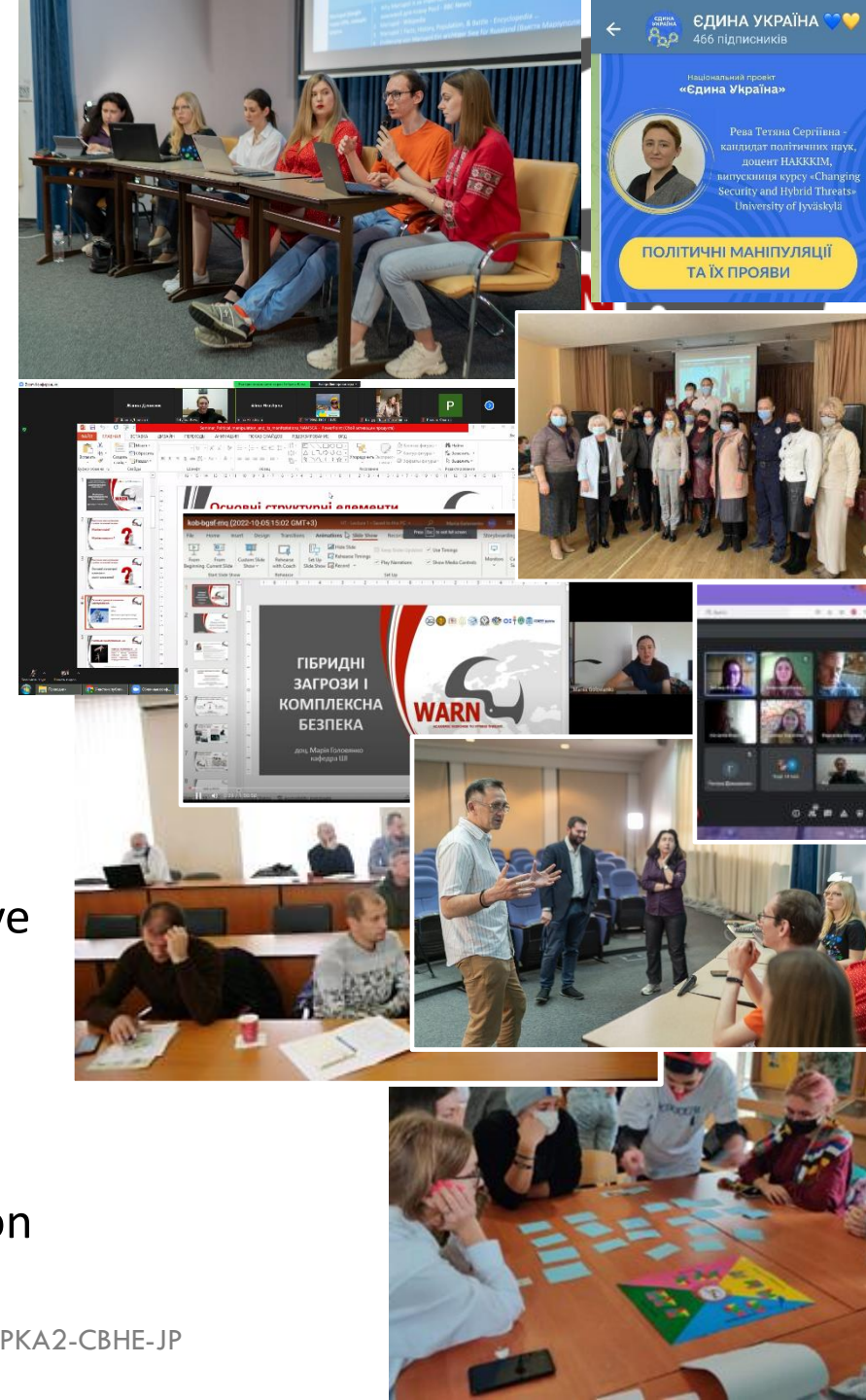
Uniting specialists from various fields to counter hybrid threats

Equipped Hubs and Laboratories

Advanced computer and media equipment that facilitates effective collaboration

Challenges of the Pandemic and War

Adapting to new conditions through a reliable space for interaction



PROJECT WARN: team spirit



International Scientific **Project Platform**
(SUIT conference, since 2020)

Interactive glossary
Resource for raising awareness



Events in **various formats**:

- round tables
- interactive discourse platforms
- quests
- trainings
- creative workshops

Scientific research: articles (Scopus), master's and postgraduate theses

Kaikova, O., Terziyan, V., Tiihonen, T., , Golovianko, M., Gryshko, S., Titov, L., (2022). Hybrid Threats against Industry 4.0: Adversarial Training of Resilience. <https://doi.org/10.1051/e3sconf/202235303004>

Kopiyevska, O. (2021). “Creative Discourses of Educational Practices: Student Youth of Arta and Culture Professions”, Youth Voice Journal, ISBN: 978-1-911634-21-8
rasmus+ Capacity Building Project 610133-EPP-1-2019-1-F


PROJECT WARN: team spirit



Independent publication **Texty.org.ua** has released the results of a study conducted as part of the course "Hybrid Threats in Media" at the School of Journalism and Communications of UCU

The **QS World University Rankings journal "Global Education News"** published an article about the interdisciplinary WARN environment and the well-equipped laboratories.

Геолокація Україна



Чому


Результати пошуку для України пов'язані з актуальністю тематики. Якщо пошукова платформа знаходить новини за темою, то вона пропонує їх користувачам. На перші місця пропонуючи медіа з високим рівнем довіри, яка визначається великою кількістю цитувань та посилань на ці медіа (адже саме кількість зовнішніх посилань Google бере за основу в роботі свого пошуковика)

<https://texty.org.ua/articles/107020/n-eyedyna-onlajn-ukrayina/>

Запит: Маріуполь Азов

Усім користувачам Google пропонує три локації на Google Maps з назвами: «Готель Азов», «Батальйон "Азов"», «Azov Oul». На початку видачі присутній Telegram-канал "Азов" та офіційна сторінка полку, а також новина про загиблу психологиню полку.

Геолокація Москва



Чому

Завдяки цензурі урядові ЗМІ є найпопулярнішими в Росії, тож Google пропонує їх першими для переходу.

При запиті «Маріуполь евакуація» видача не була настільки пропагандистська, як цього очікувалось: у перших п'яти пропозиціях видачі фігурують DW, Радіо Свобода та НВ. Ймовірно, словосполучення «Маріуполь евакуація» в Росії гуглило небагато людей, тож алгоритми показували росіянам результати з українських медіа. Цей приклад актуалізує питання щодо відмови українських медіа від російських версій. Існування правдивого контенту російською мовою дає шанс потрапити на очі росіянам з наративом, відмінним від російського офіційного.

Запит: Маріуполь

Геолокація Москва. Google через VPN з «точкою входу» в Москві пропонує у видачі матеріали, що поширюють російські наративи та дезінформацію («сдавися боевики», «беременные нацистки «Азова» тощо)

Ось перші п'ять посилань:

1. Маріуполь покинули автобуси со сдавшимися боевиками «Азова» — URA.ru
2. Из подвалов «Азовстали» вывели беременных нацисток «Азова» — EurAsia Daily
3. Пушилин: завод «Азовсталь» в Мариуполе снесут — URA.ru
4. Азов встал и пошел: Украина надеется обменять своих выходящих из окружения солдат, но в России выступают против этого — Коммерсант
5. Минобороны РФ показало видео сдачи в плен украинских военных с завода «Азовсталь»

http://drive.google.com/file/d/1WfO_LAB8LaGltU5lvWeMI_lwuvEX_UCg/view?usp=share_link

Academic response to hybrid threats

Ukraine – Researchers from Kharkiv National University of Radio Electronics (NURE), a member of the international consortium of the ERASMUS+ project WARN, claim adversarial training, which increases the resilience of artificial intelligence against cybersecurity threats, can be used in academia.

The idea is to be piloted in the highly relevant Ukrainian context: the team is developing and embedding new gamified adversarial learning techniques into multi-discipline master's and LLL study programmes of Ukrainian universities updating them based on the best EU practices. The ambitions are to increase societal awareness of hybrid threats targeting modern democratic societies and apply a-whole-of-society approach to counter them efficiently.



With this aim a trans-sectoral environment will be established, creating an international network of comprehensive security and hybrid threats hubs connecting academic and industrial and state experts.

One hub has already been created in NURE. It comprises interfaculty capacities of Artificial Intelligence Department and Department of Economic Cybernetics and Management of Economic Security, including technical facilities of two newly equipped labs for research and development in the field of hybrid security.

PROJECT WARN: team spirit



WARN Experts' Contributions (NAKKKiM, 2023):

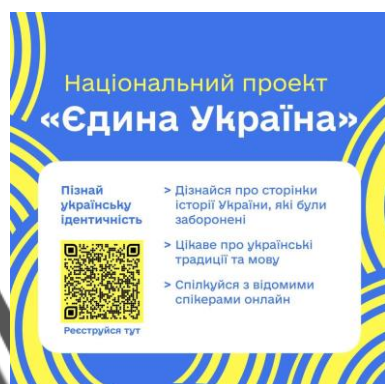
- Training **Ukrainian Cultural Fund** experts for chaplain rehabilitation
- Shaping the **Community Culture Development Strategy**

<https://warn-erasmus.eu/ua/news/digest-of-autumn-events-scientific-educational-and-social-events-of-the-warn-partnership/>



Center for **Social Integration and Personal Development for Youth** from Occupied Territories of Ukraine (HIFL DSPU at the WARN Hub, since 2021)

<https://warn-erasmus.eu/ua/environment/participation-in-the-development-of-the-community-culture-development-strategy/>



Lecture for the **national online project "United Ukraine"**

Seminars for **Combat Veteran: interactions between the "Patriots to Power" and WARN projects** (KhNU, from 2021)

WARN Expertise in National Decision-Making:
T. Reva serves on the National Commission for **National-Patriotic Education Projects**

<https://warn-erasmus.eu/ua/environment/lecture-for-the-national-online-project-united-ukraine/>

UNIQUE CONTRIBUTIONS OF EU PARTNERS: Enhancement and Collaboration



European partners:

University of Jyväskylä, **Finland**, University of Coimbra, **Portugal**, University of Tartu, **Estonia**,
Graduate School of Electrical Engineering ECAM-EPMI, **France**

PROVEN

The European expert environment and partnership remained effective even in the absence of ready-made solutions

Ukrainian educational programs were not adapted from existing European programs but were developed "from scratch", leveraging unique access to European partner materials, training sessions, and close expert collaboration.

Advantages of UA-EU Cooperation:

- Attracting **best practices** and knowledge previously unavailable.
- Close **expert collaboration** in addressing project tasks.



PROJECT WARN: Solidarity and Resilience



PROJECT WARN:
Cultivating Resilience in Others
While Exemplifying Our Own

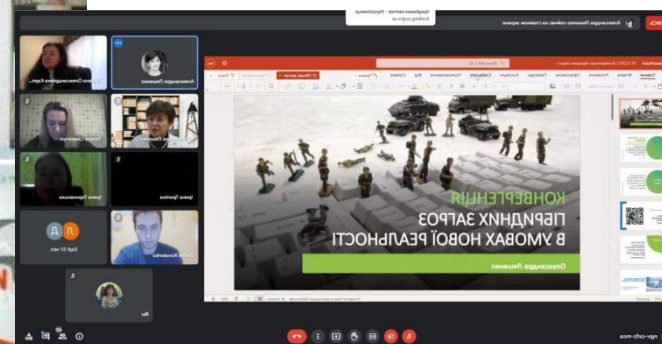
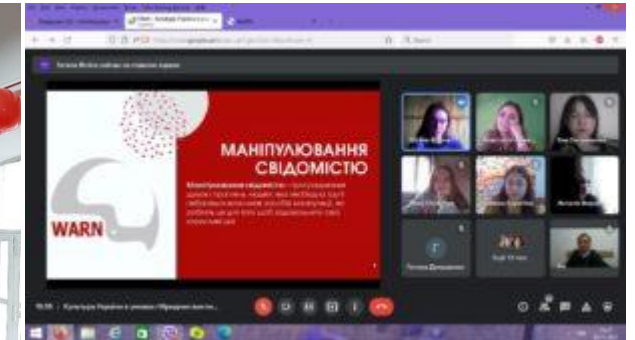
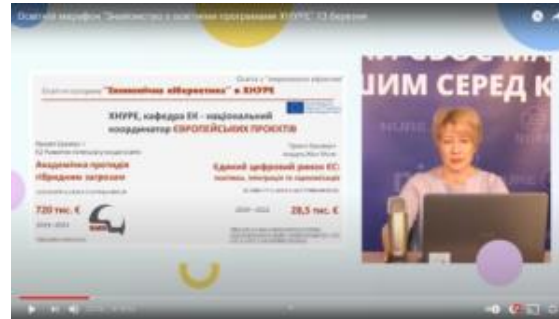


PROJECT WARN: Solidarity and Resilience



The First Blow (2020): The Challenge of the COVID-19 Pandemic

- **Blocking All Mobilities**
First F2F EU Training – May 2023
- **Collaboration Possible Only in Virtual Format**



PROJECT WARN: Solidarity and Resilience



The Second Blow (2022): russia's Full-Scale Invasion of Ukraine



PROJECT WARN: Solidarity and Resilience



“The WARN project is not about the changes that will happen after the war; it’s not about changes after Victory.

The WARN project is about the changes that **contribute to Ukraine's Victory.**”



Timo Tiihonen

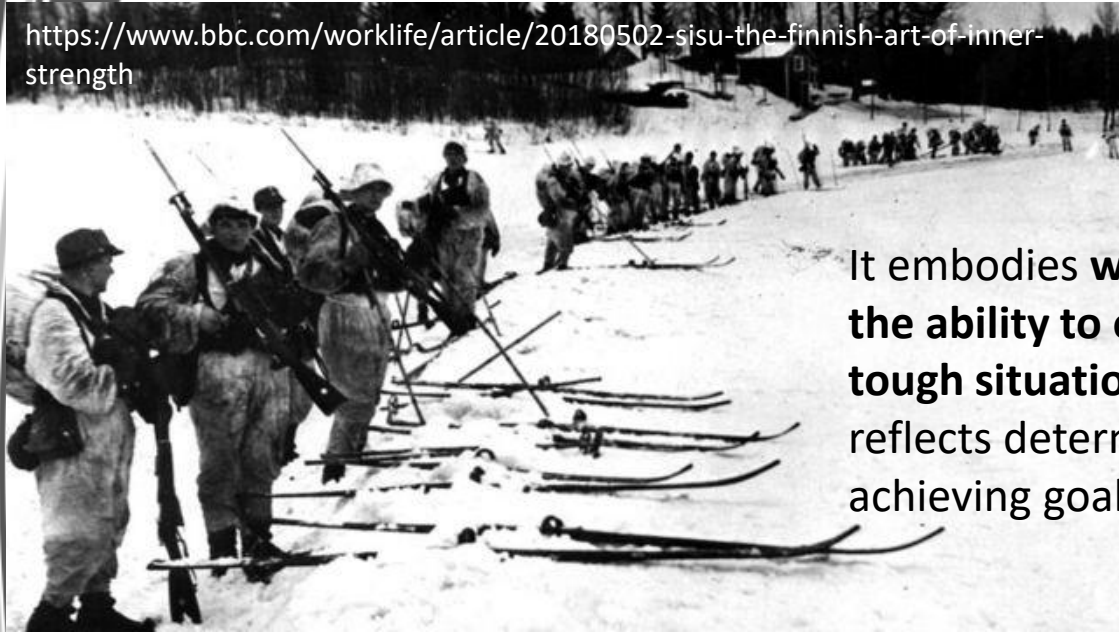
Project Coordinator



PROJECT WARN: Solidarity and Resilience



<https://www.bbc.com/worklife/article/20180502-sisu-the-finnish-art-of-inner-strength>



Sisu

Finnish culture of resilience

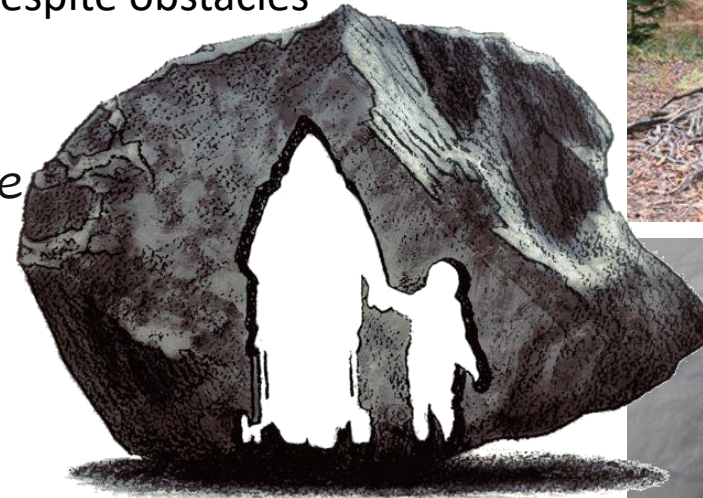
It embodies **willpower, resilience, and the ability to overcome challenges in tough situations**. More than endurance, it reflects determination and persistence in achieving goals despite obstacles



Finnish way of persevering through granite



Emphasizes not only **individual strength** and endurance but also the **collective spirit** of overcoming challenges.



PROJECT WARN: Solidarity and Resilience



PROVEN

the project can be adapted even to **extreme turbulence**

Change in project philosophy

- change agents turn into **resilience agents**

Emergency mode

- **Redesign:** refocusing on accessible resources, processes, and outcomes: home mobility, virtualization, continuous beta testing.
- Transition **from Waterfall to Agile**, MVP concept + fine-tuning.
- Resource **Mobilization** and **Mutual Support**.



Conclusions

The WARN project is an innovative response to modern challenges posed by hybrid threats

Effectiveness of Education

Proves that education can be a powerful tool for ensuring national security and resilience.

Proactive Approach

Demonstrates that focusing on practical skills, competitive practice, and multi-domain expertise is key to successfully countering hybrid threats.

Main Outcome – Resilience Ambassadors

Creation of a Ukraine-EU community of experts ready to collaborate in addressing ever-evolving threats.



