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Exploring Enhanced Military Ethics and Legal Compliance through Automated Insights: An Experiment on Military Decision-making in Extremis

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Abstract

Numerous factors are known to impact human decision-making: fatigue, stress, fear, sleep deprivation, organizational culture, ethics, and even substances consumed, among others. Making decisions within the context of a military operation poses exceptional challenges. Time constraints are consistently tight, and military personnel often contend with physical and mental exhaustion, along with substantial stress and fear. Our proactive strategies for addressing these hurdles predominantly revolve around educating military personnel, incorporating both theoretical training and immersive simulations that may include different types of war games, role playing and VR applications that mimic real-world challenges. However, can we extend our efforts further to ensure that military personnel surmount difficulties and consistently make morally and legally sound decisions amidst exceptional situations? Moreover, where does trust lie: in the insights of a comrade, a commanding officer, or the guidance provided by sophisticated algorithms and Artificial Intelligence (AI) systems? Could AI potentially outperform human guidance when it comes to elevating the ethical and legal discernment of military personnel amid the intensity of combat situations?

Keywords: *moral enhancement; military decision-making; serious games; war games; Artificial Intelligence (AI); International Humanitarian Law (IHL); Just War Theory (JWT); Rules of Engagement (RoE)*

I. Introduction

Discussions on the possibilities and risks associated with human enhancement are a focal point in applied ethics.¹ Various fields, including medical ethics, military ethics, and technoethics, struggle with an expanding range of questions concerning the ethical and legal implications and practical applications of human enhancement.² However, the aspiration to augment human abilities is not a recent concept; throughout history, individuals have been pursuing means to enhance physical and mental capacities, whether through vision correction, dietary adjustments, or medical interventions. Recent advances in science, medicine, and technology have led to the tantalizing prospect of transcending traditional human limitations.³

In the military context,⁴ human enhancement has predominantly revolved around augmenting cognitive functions like memory retention, situational awareness, alertness, and individual decision-making. This encompasses the use of substances such as drugs, stimulants, and supplements, as well as tailored dietary regimes and specialized physical exercises that have evolved over time. Moreover, specialized devices designed to meet specific needs, like Heads-Up Displays (HUDs) for fighter pilots, are already actively being used. Concurrently, the digital landscape offers a multitude of applications accessible via computers, mobile devices, and online platforms that bolster cognitive efficacy. Simultaneously, wearable technologies such as augmented reality glasses, smartwatches, and intelligent textiles contribute supplementary data inputs that aid optimal decision-making.

This paper introduces a pilot experiment conducted at the War Games Lab of the Hellenic Air Force Academy, which seeks to probe the potential of moral enhancement⁵ in fostering effective decision-making during

¹ John Harris, *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton, NJ: Princeton University Press, 2007); Alberto Giubilini and Sagar Sanyal, "The Ethics of Human Enhancement," *Philosophy Compass* 10, no. 4 (2015): 233-243; also, Julian Savulescu and Evangelos D. Protopapadakis, "'Ethical Minefields' and the Voice of Common Sense: A Discussion with Julian Savulescu," *Conatus – Journal of Philosophy* 4, no. 1 (2019): 125-133, especially 127-129.

² Steve Clarke, Julian Savulescu, Tony Coady, Alberto Giubilini, and Sagar Sanyal, eds., *The Ethics of Human Enhancement: Understanding the Debate* (Oxford: Oxford University Press, 2016), 145-260.

³ Fabrice Jotterand and Marcello Lenca, eds., *The Routledge Handbook of the Ethics of Human Enhancement* (London: Routledge, 2023).

⁴ Ioana Maria Puscas, "Military Human Enhancement," in *New Technologies and the Law in War and Peace*, ed. William H. Boothby, 182-229 (Cambridge: Cambridge University Press, 2018).

⁵ Thomas Douglas, "Moral Enhancement," *Journal of Applied Philosophy* 25, no. 3 (2008): 228-245; Birgit Beck, "Conceptual and Practical Problems of Moral Enhancement," *Bioethics*

extreme conditions. The multifaceted realm of human decision-making is subject to an array of variables, including fatigue, stress, fear, sleep deprivation, organizational culture, ethics, and individual consumption habits. Within an idealized battlefield scenario, military personnel would have the luxury of time for nuanced decisions that align with both legal and ethical dimensions—a dynamic reminiscent of a strategic chess match. However, the reality is far from this ideal. Unyielding time constraints persist, and military personnel often grapple with physical and mental exhaustion, coupled with substantial stress and fear. Despite the significant roles played by education and simulation-based training in addressing these challenges, instances of ethical and legal non-compliance persist.

This provokes a central inquiry: when traditional educational approaches fall short, can supplementary measures ensure that military personnel consistently navigate challenges while making ethically and legally sound decisions? Within this context, it is pertinent to acknowledge the roles of the Just War Theory (JWT), the International Humanitarian Law (IHL) and the Rules of Engagement (RoE). These frameworks provide essential guidelines for military conduct, dictating when and how force can be ethically employed in conflict situations. The principles embedded within these frameworks emphasize the necessity of proportionality, discrimination, and minimizing harm to non-combatants. Importantly, the JWT, IHL and RoE play a pivotal role in guiding the ethical and legal calculus that military personnel must undertake in extreme circumstances.

Could the concept of human enhancement serve as a safeguard in aligning military decisions with these ethical and legal frameworks? Our interpretation of moral enhancement involves employing mechanisms that continuously remind individuals of the ethical and legal dimensions intertwined with their choices and actions. From the outset, our research sought to examine the feasibility of achieving moral enhancement through wearable devices. Our core hypothesis posited that even in the face of educational gaps, there are remaining avenues to evoke an individual's ethical and legal consciousness.

By exploring this experiment, we aim to discover whether wearable devices can effectively foster moral enhancement. Implicit in this inquiry is the belief that, even in scenarios where educational methodologies fall short, opportunities exist to reinforce an individual's commitment to ethical and legal obligations, thereby aligning their decisions with the principles

29, no. 4 (2015): 233-240. For key moral concerns that come hand in hand with the prospect of transcending the capabilities of human nature see Evangelos D. Protopapadakis, *Creating Unique Copies: Human Reproductive Cloning, Uniqueness, and Dignity* (Berlin: Logos Verlag, 2023).

of JWT, IHL and RoE. This research, thus, delves into the confluence of technological intervention and ethical decision-making within the intricate dynamics of military operations.

II. Methodological approach

a. Enhancing ethics and legal compliance in a typical class: The theoretical approach to military ethics

War literature⁶ and moral philosophy⁷ are widely incorporated in cadets' ethical training because they refer to warrior ethos, conduct of hostilities or other, specific aspects of war (such as the protection of civilians).⁸

On the one hand, war literature serves as a valuable tool in enhancing the teaching of military ethics. Through the narratives cadets are exposed to complex ethical dilemmas and moral challenges that often arise in the crucible of war. Literature provides a unique window into the personal and emotional dimensions of warfare, shedding light on the intricate interplay between duty, honor, compassion, and the demands of the battlefield, thus cadets gain insights into the multifaceted nature of ethical decision-making during combat situations. Narratives may highlight the tension between adherence to codes of conduct, protection of civilians, and the exigencies of warfare encouraging cadets to face questions of morality, empathy, and responsibility, fostering a deeper understanding of the broader implications of their actions. Through the lens of war literature, cadets are exposed to diverse perspectives and experiences, prompting critical reflection on their own values and beliefs. This exposure helps cultivate a heightened sensitivity to the ethical dimensions of military service, equipping them with the intellectual tools to navigate complex moral challenges. In essence, war literature enriches the education of military ethics by offering cadets a platform to explore the ethical complexities of war through the eyes of those who have experienced it first-hand. This engagement nurtures a more holistic understanding of the ethical considerations that shape military decisions and actions, ultimately contributing to the development of morally informed and ethically resilient military professionals.

⁶ Reed Bonadonna, "Doing Military Ethics with War Literature," *Journal of Military Ethics* 7, no. 3 (2008): 231-242.

⁷ Dragan Stanar, "Moral Education in the Military: Optimal Approach to Teaching Military Ethics," *Theoria Beograd* 66, no. 1 (2023): 37-51; Paul Robinson, "Ethics Training and Development in the Military," *Parameters* 37, no. 1 (2007): 23-36.

⁸ Jovan Babic, "Ethics of War and Ethics in War," *Conatus – Journal of Philosophy* 4, no. 1 (2019): 9-30; Oleg Konstantinovich Shevchenko, "Question About the Ethics of Yalta Agreements in 1945: Archaeology of Power in Historiographical Discourses," *Conatus – Journal of Philosophy* 4, no. 1 (2019): 99-108.

Moral philosophy, on the other hand, forms the bedrock of teaching military ethics,⁹ providing a robust framework to guide military personnel in navigating the ethical challenges inherent in their profession.¹⁰ By delving into various moral theories and principles, instructors equip individuals with the intellectual tools to critically analyze complex ethical dilemmas that arise in the context of armed conflicts. Teaching military ethics through moral philosophy encourages a deep exploration of fundamental questions about right and wrong, justice, and the intrinsic value of human life. It empowers military professionals to engage in thoughtful and informed discussions about the ethical implications of their decisions, fostering a culture of ethical awareness and responsibility within the armed forces.¹¹ Furthermore, teaching moral philosophy instills critical thinking skills that are invaluable in the dynamic landscape of modern warfare. Military professionals learn to assess the consequences of their actions by considering the broader impact on individuals, communities, and global stability. This heightened ethical consciousness equips them to make well-informed decisions that reflect their commitment to upholding ethical standards even amidst the complexities of contemporary conflicts. In summary, integrating moral philosophy into the teaching of military ethics enhances the capacity of military personnel to grapple with the ethical dimensions of their roles. By encouraging reflective analysis, critical reasoning, and a commitment to ethical principles, this approach contributes to the development of morally conscious and responsible military professionals who navigate the challenges of their profession with integrity and a commitment to ethical conduct.¹²

Nevertheless, while war literature and moral philosophy offer valuable insights to the instruction of military ethics, a more methodical approach is imperative to effectively address the intricate ethical predicaments inherent in warfare.

To this end, moral theories offer cadets a valuable framework to contemplate ethical challenges within a structured context. JWT,¹³ for in-

⁹ Peter Olsthoorn, "Educating for Restraint," in *Violence in Extreme Conditions*, eds. Eric Heinen Kramer and Tine Molendijk, 119-130 (New York, Cham: Springer, 2023); Peter Olsthoorn, *Military Ethics and Virtues: An Interdisciplinary Approach for the 21st Century* (London: Routledge, 2010), 132-140.

¹⁰ Jovan Babic, "Ethics of War as a Part of Military Ethics," in *Didactics of Military Ethics*, eds. Thomas R. Elßner and Reinhold Janke, 120-126 (Leiden: Brill-Nijhoff, 2016).

¹¹ Marcus Schulzke, "Rethinking Military Virtue Ethics in an Age of Unmanned Weapons," *Journal of Military Ethics* 15, no. 3 (2016): 187-204.

¹² Gerhard Kruij, "Values and Norms: Don't 'Teach,' Encourage Independent Acquisition!" *Ethics and Armed Forces* 2 (2019): 11-15.

¹³ Lonneke Peperkamp and Christian Nikolaus Braun, "Contemporary Just War Thinking and Military Education," in *Violence in Extreme Conditions*, eds. Eric Hans Kramer and Tine Molendijk, 101-117 (New York, Cham: Springer, 2023).

stance, delves into a range of topics, including the justification of war (*jus ad bellum*) and the ethics of conduct in war (*jus in bello*). While moral theories help cadets recognize the ethical implications of their decisions, they may not provide definitive solutions to every intricate battlefield scenario. A crucial aspect often absent in these teachings is situational training exercises (STX), which immerse cadets in officers' roles, prompting them to consider the pros and cons of their actions. STX also prepares them for addressing failures to make the right ethical choice at the tactical, operational, or strategic levels of warfare.

Additionally, adapting an interdisciplinary approach and incorporating IHL to enhance the military ethics education holds immense significance.¹⁴ IHL provides a comprehensive framework of rules designed to protect civilians and combatants during armed conflicts, fostering ethical conduct in the heat of battle.¹⁵ By integrating real-world legal principles into a military ethics curriculum, cadets gain a tangible understanding of ethical decision-making on the battlefield. The study of IHL equips future military leaders with the knowledge to navigate complex scenarios, promoting humane treatment and respect for international norms.¹⁶ Through IHL, cadets not only learn the ethical boundaries of warfare, but also cultivate the skills needed to uphold moral imperatives amidst the challenges of modern conflict.¹⁷ However, while IHL and moral theories collaboratively set the ethical parameters for military actions, they occasionally struggle with the complexities that arise in the dynamic landscape of modern warfare.¹⁸ Integrating these broad principles into on-the-ground decisions poses a challenge, as real-time constraints and interwoven factors complicate their straightforward application.

To prepare officers to face effectively the dilemmas of the complicated battlefield serious games and simulations step in to offer a virtual hands-on-training solution by simulating scenarios¹⁹ with rational partici-

¹⁴ Yitzhak Benbaji and Daniel Statman, *War by Agreement: A Contractarian Ethics of War* (Oxford: Oxford University Press, 2021), 116-162.

¹⁵ Jeremy Waldron, "Deep Morality and the Laws of War," in *The Oxford Handbook of Ethics of War*, eds. Helen Frowe and Seth Lazar, 80-95 (Oxford: Oxford University Press, 2018).

¹⁶ James Turner Johnson, "A Practically Informed Morality of War: Just War, International Law, and a Changing World Order," *Ethics & International Affairs* 31, no. 4 (2017): 453-465.

¹⁷ Henry Shue, "Do We Need a Morality of War?" in *Just and Unjust Warriors: The Moral and Legal Status of Soldiers*, eds. David Rodin and Henry Shue, 87-111 (Oxford: Oxford University Press, 2008).

¹⁸ Regina Sibylle Surber, "Military Training and Revisionist Just War Theory's Practicability Problem," *The Journal of Ethics* (2023): 1-25.

¹⁹ Jorge Brandão, Ferreira Tiago, and Vítor Carvalho, "An Overview on the Use of Serious Games in the Military Industry and Health," in *Handbook of Research on Serious Games as Educational, Business and Research Tools*, ed. Maria Manuela Cruz-Cunha, 182-201 (Hershey,

pants possessing limited knowledge about each other's capabilities-akin to real-world situations.²⁰ Leveraging simulations and gaming for the study of the ethical and legal challenges of war can be highly advantageous, equipping us with essential tools to delve into practical matters like the ramifications of war, assessing ethical quandaries linked to the use of force in battlegrounds or urban settings where safeguarding civilians is paramount. War games²¹ emerge as indispensable tools in shaping operational and tactical decision-making.²²

Undoubtedly, this constitutes a noteworthy advancement in adopting a practical approach to the teaching of military ethics. Nevertheless, the essential question persists: Does this development signify the ultimate stride in fully preparing officers to adeptly confront complex ethical quandaries on the battlefield and comply with the ethical and legal obligations?

b. Our approach: Simulating the battlefield

Instead of presenting the ethical parameters and the possible legal implications of making hard choices during a tactical operation in a theoretical manner, we opted for addressing this issue by simulating the ethical and legal challenges of the urban battlefield. Our experiment is primarily focused on:

- Whether moral enhancement through AI could be tested with the use of wearable devices; the players would be notified by the device that a course of action would be preferred in a specific situation or that a course of action should be avoided, and,
- If the players would be affected more by the guidelines of a human agent.

PA: I. G. I. Global, 2012).

²⁰ Savvas Veziridis, Ioanna Lekea, and Panagiotis Karampelas, "Learn by Playing: A Serious War Game Simulation for Teaching Military Ethics," in *2017 I.E.E.E. Global Engineering Education Conference (EDUCON)*, 915-920.

²¹ Denise Schmorrow, Joseph Cohn, and Dylan Nicholson, *The PSI Handbook of Virtual Environments for Training and Education: Developments for the Military and Beyond: Volumes 1-3* (Westport, CT: Praeger Security International – Greenwood Publishing Group, 2009).

²² Mark Herman, Mark Frost, and Robert Kurz, *Wargaming for Leaders: Strategic Decision Making from the Battlefield to the Boardroom* (New York: McGraw-Hill, 2009), 11-77; Reid Hastie and Robyn M. Dawes, *Rational Choice in an Uncertain World: The Psychology of Judgement and Decision Making* (London: Sage, 2001), 47-72; Ioanna Lekea and George Lekeas, "Balancing Between Ethics, Prevention, Non-Intervention and the Law When Mass Atrocities Happen: A Case for Syria?" *Annual Workshop, European Centre for the Responsibility to Protect* (Leeds: University of Leeds, 2018); Lucía Martínez Ordóñez, "Game Theory and the Decision-Making Process in Military Affairs," in L. M. Ordóñez, *Military Operational Planning and Strategic Moves*, 3-10 (New York: Springer, 2017).

To this end we created a war game which included two chapters:

- i. *Attacking the Christmas Spirit in London (1.3.1, 2023)*: participants were asked to design a tactical operation and they could get help from a legal advisor, and,
- ii. *Combat Conundrums: Precision Trials (1.2.1, 2023)*: participants engaged in a first-person shooting game having to choose who to shoot against in a very limited amount of time.

Both chapters of our war game are based on the principles of the JWT and the IHL and are suitable to explore the military decision making and the execution of the players' decisions; both ethical and legal dilemmas are included in our gameplay.²³

Under the rules of the JWT and the framework of IHL two key principles guide ethical and legitimate conduct: the principle of discrimination/distinction²⁴ and the principle of proportionality.²⁵

1. The Principle of Discrimination/Distinction: The principle establishes two fundamental rules in the field of both international and non-international armed conflicts. These rules are codified in Articles

²³ The emergence of new actors and activities has shaken the foundations of IHL, as they challenge its core values, especially regarding the distinction between combatants and civilians. Non-state actors and transnational armed groups involved in international terrorism show little regard for fundamental IHL principles. While some argue that terrorism should be primarily treated as a criminal activity, certain States view terrorist acts, like the events of September 11th, as acts of war, possibly invoking the application of IHL. Although not all aspects of the "war on terror" qualify as armed conflicts, some operations within it can be classified as such. Hence, our war game asserts that IHL is relevant and applicable to these conflicts.

²⁴ The term "principle of discrimination" is used mainly by philosophers in JWT (*jus in bello* and *jus ad bellum*), as the term "principle of distinction" is used in law texts; Jens David Ohlin and May Larry, "Necessity and Discrimination in Just War Theory," in *Necessity in International Law*, eds. Jens David Ohlin and Larry May, 67-90 (New York: Oxford Academic, 2016); Hanne M. Watkins and Simon M. Laham, "The Principle of Discrimination: Investigating Perceptions of Soldiers," *Group Processes & Intergroup Relations* 23, no. 1 (2020): 3-23; Quénivet Noëlle, "The 'War on Terror' and the Principle of Distinction in International Humanitarian Law," *Anuario Colombiano de Derecho Internacional-ACDI* 3 (2010): 160; Thomas S. Harris, "Can The ICC Consider Questions on *jus ad bellum* in A War Crimes Trial?" *Case Western Reserve Journal of International Law* 48, nos. 1-2 (2016): 282; ICC, Case v. Bosco Ntaganda, No: ICC-01-04-2/06 A2, 2020, para. 6.

²⁵ Amichai Cohen and Zlotogorski David "A General Overview of Proportionality in IHL," in *Proportionality in International Humanitarian Law: Consequences, Precautions and Procedures*, eds. Amichai Cohen and David Zlotogorski, 23-56 (New York: Oxford Academic, 2021); Ben Clarke, "Proportionality in Armed Conflicts: A Principle in Need of Clarification?" *Journal of International Humanitarian Legal Studies* 3, no. 1 (2012): 73-123; Patrick Tomlin, "Proportionality in War: Revising Revisionism," *Ethics* 131, no. 1 (2020): 34-61; Jeff McMahan, "Proportionality and Necessity in *jus in bello*," in *The Oxford Handbook of the Ethics of War*, eds. Helen Frowe and Seth Lazar, 418-439 (New York: Oxford University Press, 2016).

48, 51(2), and 52(2) of Additional Protocol I to the Geneva Conventions, pertaining to international armed conflicts, and in Article 13(2) of Additional Protocol II, pertaining to non-international armed conflicts:²⁶ The first rule designates that the parties to the conflict must at all times distinguish between civilians and combatants. The second rule designates that the parties to the conflict must always be able to distinguish between civilian objects and military objectives. Under these distinctions, attacks may only be directed against combatants and military objectives.²⁷ Attacks must not be directed against civilians²⁸ and civilian objects.²⁹ As a result, the principle delineates permissible targets in warfare, prohibiting direct attacks on non-combatants and their property. The morally and technically innocent civilians, who do not participate in combat, are to be spared intentional harm. IHL underscores the obligation to protect civilian lives³⁰

²⁶ The legal origin of the principle of distinction can be traced back to the Preamble of the 1868 Declaration of St. Petersburg Renouncing the Use, in Time of War, of Explosive Projectiles under 400 Grammes Weight (“[T]he only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy”); Adam Roberts and Richard Guelff, *Documents on the Laws of War: Second Edition* (Oxford: Oxford University Press, 1995), 30; Subsequently, it was incorporated into the Regulations annexed to the 1907 Hague Convention Respecting the Laws and Customs of War on Land under Article 25, which prohibits “the attack or bombardment, by whatever means, of towns, villages, dwellings, or buildings which are undefended.”

²⁷ Jean-Marie Henckaerts and Doswald-Beck, *Customary International Humanitarian Law Volume I: Rules* (Cambridge: Cambridge University Press, 2005), 3-77.

²⁸ Under the Statute of the International Criminal Court, “intentionally directing attacks against the civilian population as such or against individual civilians not taking direct part in hostilities” constitutes a war crime in international and non-international armed conflicts, ICC Statute, Article 8(2)(b)(i), (e)(i). The International Court of Justice in its advisory opinion in the *Nuclear Weapons case*, stated that the principle of distinction was one of the “cardinal principles” of international humanitarian law and one of the “intransgressible principles of international customary law” (ICJ, *Nuclear Weapons case*). The prohibition on directing attacks against civilians is also laid down in Protocol II [Article 3(2)], Amended Protocol II [Article 3(7)] and Protocol III [Article 2(1)] to the Convention on Certain Conventional Weapons and in the Ottawa Convention banning anti-personnel landmines (preamble).

²⁹ The Statute of the International Criminal Court does not explicitly define attacks on civilian objects as a war crime in non-international armed conflicts. It does, however, define the destruction of the property of an adversary as a war crime unless such destruction be “imperatively demanded by the necessities of the conflict,” Article 8(2)(e)(xii). Therefore, an attack against a civilian object constitutes a war crime under the Statute as much as such an attack is not imperatively demanded by the necessities of the conflict. It must be stressed out that it is argued that the rule contained in Article 52(2) of Additional Protocol I, which provides that “attacks shall be limited strictly to military objectives,” only prohibits direct attacks against civilian objects and does not deal with the question of incidental damage resulting from attacks directed against military objectives.

³⁰ The determination of whether an individual falls under the category of combatant or civilian holds immense significance in IHL. Additional Protocol II does not contain a definition of civil-

and property.³¹ While military forces and installations are justifiable targets, the principle mandates the avoidance of non-combatant casualties and the protection of essential civilian infrastructure. Medical personnel and equipment, both military and civilian, are also immune from intentional harm.

2. The Principle of Proportionality: The inescapable reality of civilian harm during conflicts prompts the question of ethical conduct in warfare. The principle of proportionality becomes pivotal in assessing the ethics of military actions. It guides decisions on how to engage and which weaponry to employ to achieve military objectives without causing disproportionate collateral damage. In complex situations where civilians are intertwined with combatants, the principle of double effect comes into play.³² It recognizes that sometimes the principles of distinction and proportionality yield to military necessity, such as when a nation's survival is at stake. However, such instances are distinct from the scenario under discussion.

For a military action to be permissible under the principle of double effect,³³ four conditions must be met:

ians or the civilian population even though these terms are used in several provisions (Articles 13-15 and 17-18). The term "civilian" is defined as persons who are not members of the armed forces. But there is a limit to this designation: According to the Article 51(3) of Additional Protocol I and Article 13(3) of Additional Protocol II civilians lose their protection against attack when and for such time as they take a direct part in hostilities; Noëlle Quéniévet, "The 'War on Terror' and the Principle of Distinction in International Humanitarian Law," *Anuario Colombiano de Derecho Internacional-ACDI* 3 (2010): 162.

³¹ The definition of civilian objects is set forth in Article 52(1) of Additional Protocol I and has to be read together with the definition of military objectives: Only those objects that qualify as military objectives may be attacked; other objects are protected against attack. This definition was not included in Additional Protocol II, but it has subsequently been incorporated into treaty law applicable in non-international armed conflicts, namely Amended Protocol II to the Convention on Certain Conventional Weapons. Moreover, according to the Article 8(2)(b)(ii) of the ICC Statute, intentionally directing attacks against civilian objects is listed as a war crime, provided that these objects "are not military objectives." See also Article 8(2)(b)(ix) and (e)(iv) concerning attacks against buildings dedicated to religion, education, art, science or charitable purposes, historic monuments, hospitals and places where the sick and wounded are collected and Article 8(2)(b)(v) concerning attacks against towns, villages, dwellings or buildings which are undefended.

³² Normative ethics presumes an absolute deontological proscription against harming the innocent. The loss of innocent life that is incidentally unavoidable by the armed conflicts of the war is a product informed by the doctrine of double effect; Bradley Gershel, "Applying Double Effect in Armed Conflicts: A Crisis of Legitimacy," *Emory International Law Review* 27, no. 2 (2013): 741-754.

³³ Joseph Boyle, "Just War and Double Effect," *Philosophy in the Contemporary World* 19, no. 2 (2012): 61-71; Joshua Stuchlik, *Intention and Wrongdoing: In Defence of Double Effect* (Cambridge: Cambridge University Press, 2021), 7-19.

1. The action itself must be morally legitimate.
2. The immediate effect of the action must align with ethical norms.
3. Any harmful outcomes must not be intentional.
4. The intended outcome must outweigh foreseen negative consequences, considering the good resulting from the military achievement.

Even when these conditions are met,³⁴ every effort should be made to minimize foreseeable negative consequences. This multifaceted approach strives to navigate the intricacies of ethical military decisions, offering a comprehensive perspective that transcends the complexities of the battlefield.

Besides the perspective of the ethical conduct in warfare, the same reality of civilian harm during conflicts arises the question of legitimate conduct in warfare.³⁵ As such, the principle of proportionality is codified in Article 51(5)(b) of Additional Protocol I to the Geneva Conventions, and repeated in Article 57(2)(a)(iii).³⁶ According to these provisions, launching an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated, is prohibited. In short, belligerents do not enjoy an unlimited choice of means

³⁴ Kai Draper, "Liberating Just War Theory from Double Effect," in *War and Individual Rights: The Foundations of Just War Theory*, ed. Kai Draper, 122-147 (New York: Oxford Academic, 2015), 122-147; Eduardo Rivera-López, "The Limited (But Relevant) Role of the Doctrine of the Double Effect in the Just War Theory," *Ethics & Global Politics* 10, no. 1 (2017): 117-139.

³⁵ Michael A. Newton, "Reframing the Proportionality Principle," *Vanderbilt Journal of Transnational Law* 51, no. 3 (2018): 878.

³⁶ While Additional Protocol II does not contain an explicit reference to the principle of proportionality in attack, it has been argued that it is inherent in the principle of humanity which was explicitly made applicable to the Protocol in its preamble and that, as a result, the principle of proportionality cannot be ignored in the application of the Protocol; Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law Volume I: Rules* (Cambridge: Cambridge University Press, 2005), 48; Michael Bothe, Karl Joseph Partsch, and Waldemar A. Solf, eds., *New Rules for Victims of Armed Conflicts* (The Hague: Martinus Nijhoff, 1982): 678; Thomas S. Harris, "Can The ICC Consider Questions on *ius ad bellum* in a War Crimes Trial?" *Case Western Reserve Journal of International Law* 48, no. 1 (2016): 286. See also the advisory opinion of the International Court of Justice in the Nuclear Weapons case and Nuclear Weapons (WHO) case, in which the Court acknowledged the applicability of the principle of proportionality, stating that "respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality." The principle of proportionality in attack is also contained in Protocol II [Article 3(3)] and Amended Protocol II [Article 3(8)] to the Convention on Certain Conventional Weapons. In addition, under the Statute of the International Criminal Court [Article 8(2)(b)(iv)], "intentionally launching an attack in the knowledge that such attack will cause incidental loss of life or injury to civilians or damage to civilian objects [...] which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated" constitutes a war crime in international and non-international armed conflicts.

to inflict damage on the enemy.³⁷ According to the Commentary on the Additional Protocols, the expression “concrete and direct” military advantage was used in order to indicate that the advantage must be “substantial and relatively close, and that advantages which are hardly perceptible and those which would only appear in the long term should be disregarded.”³⁸

III. War game implementation

The game design process has conformed to the stages proposed by Adams.³⁹ The concept stage was completed with the definition of the objectives and the outcomes of the war game simulation as well as the scenario. The next step was to start the elaboration stage or the development of the virtual platform. For the scenario to be as realistic as possible and attract cadets’ interest we decided that both chapters would have time limitations and we would simulate the urban environment using the following freeware applications: Google Maps, Google Earth and the Military Map App.

The implementation of the game has spanned over the course of two years (2021-2023) and has involved a diverse range of participants, totalling 183 individuals. This comprehensive participant pool was carefully selected to include a mix of cadets from various academic years and specialties at the Hellenic Air Force Academy and collaborating military academies, as well as postgraduate students specializing in Philosophy and Law from different universities in Greece and abroad. The integration of these distinct groups ensured a multifaceted exploration of the game’s objectives.

Among the participants were:

- 26 4th-year cadets,
- 18 3rd-year cadets, and
- 113 2nd-year cadets hailing from the Hellenic Air Force Academy and collaborating institutions.

These cadets were chosen due to their evolving knowledge of military ethics and their capacity to engage deeply with the game’s scenarios. Their

³⁷ Judith Gardam, “Proportionality and Force in International Law,” *American Journal of International Law* 87, no. 3 (1993): 391; Jasmine Moussa, “Can *jus ad bellum* Override *jus in bello*? Reaffirming the Separation of the Two Bodies of Law,” *International Review of the Red Cross* 90, no. 872 (2008): 976.

³⁸ Yves Sandoz, Christophe Swinarski, and Bruno Zimmermann, *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949* (Geneva: International Committee of the Red Cross – Martinus Nijhoff Publications, 1987), §2209.

³⁹ Ernest Adams, *Fundamentals of Game Design* (Thousand Oaks, CA: New Riders Publishing, 2009), 44-52.

diverse academic standings allowed for a cross-sectional analysis of how different levels of exposure to ethical training impact decision-making within the simulated military context.

Adding further depth to the participant pool, 26 postgraduate students specializing in Philosophy and Law from various universities in Greece and abroad were also involved. Their academic backgrounds brought a nuanced perspective to the experiment, enriching discussions about the ethical principles underpinning the game's scenarios. These postgraduate students brought their theoretical expertise to the table, allowing for a more robust examination of the intersection between ethical philosophy and practical military decision-making.

The cadets participating in the experiment were divided to facilitate focused exploration within the distinct chapters of the game. This division considered the varying academic levels and training specializations of the participants, ensuring a comprehensive investigation into the role of AI in shaping ethical decision-making in military scenarios.

For the 4th- and 3rd-year cadets, who encompass trainee pilots and air defence controllers, the *Attacking the Christmas Spirit in London* chapter unfolded. Engaging in a virtual war game, these cadets found themselves at the forefront of tactical decisions with far-reaching consequences. What set this chapter apart was the integration of legal advisors into the experience. These advisors stood ready to offer their insights whenever required, cultivating a collaborative environment that skilfully bridged the gap between instantaneous decision-making and the intricacies of legal considerations. This unique collaboration aimed to enhance the realism of the scenarios while providing cadets with valuable perspectives on the ethical dimensions of their actions.

In contrast, the 2nd-year cadets, also consisting of trainee pilots and air defence controllers, embarked on an individualized journey within the *Combat Conundrums: Precision Trials* virtual first-player shooting game. Immersed in this game, these cadets navigated a landscape where ethical decision-making intersected with tactical challenges. What made this chapter stand out was the reliance solely on AI assistance. As these cadets grappled with intricate ethical dilemmas, the AI provided a constant companion, aiding them in assessing their choices from an ethical standpoint.

Furthermore, the postgraduate students, already equipped with a robust foundation in applied ethics and international humanitarian law, were granted the freedom to tailor their participation. These students, who had attained an advanced academic standing, had the choice to engage either individually in the virtual shooting game or collaborate with AI. This flexibility acknowledged their expertise and allowed them to explore ethical decision-making in a manner aligned with their academic pursuits.

An overarching commonality among all participants was their successful completion of the Applied Ethics and International Humanitarian Law courses. For some 3rd- and 4th-year cadets, who had undergone the Military Ethics course as well, this experience enriched their understanding of ethics within an applied military context. This intricate division and thoughtful alignment of participants ensured a comprehensive exploration of the role of AI in moral enhancement, catering to the distinct levels of knowledge and experience among the cadets and postgraduate students.

The implementation process encompassed several phases. Initial sessions were dedicated to acquainting participants with the game's mechanics and providing a short briefing on the principles of the Just War Theory and International Humanitarian Law. Following this preparatory phase, participants engaged in gameplay sessions that progressively challenged their ethical decision-making prowess within complex military scenarios.

Participants' in-game actions were meticulously analysed examining both qualitative and quantitative facets of decision-making. Post-gameplay debriefing sessions were conducted, facilitating reflective discussions where participants shared insights, ethical considerations, and thoughts on the interplay between military objectives and ethical responsibilities.

In essence, the game's implementation has brought together cadets from different academic years and postgraduate students from various disciplines, creating a dynamic and intellectually stimulating environment. The extensive and varied participant composition has resulted in a comprehensive dataset that encapsulates a wide spectrum of perspectives, experiences, and ethical viewpoints. The analysis of this data will contribute valuable insights into the potential effectiveness of moral enhancement on the battlefield and its impact in promoting ethical decision-making skills among individuals with diverse backgrounds and levels of ethical training.

a. Chapter I: Attacking the Christmas spirit in London

The first group of participants (n: 44) embarked on a dynamic journey within a virtual war game, immersing themselves in a multifaceted tactical operation. Tasked with designing a strategic endeavour, these individuals were afforded the opportunity to enlist the guidance of a legal advisor, should they choose to seek counsel. As they set out to navigate the challenges of the game, they encountered a time-bound environment where their decisions would be crucial in accomplishing the mission's objectives.

Within the virtual platform, the cadets encountered a richly detailed backdrop that evolved in real-time, mirroring changes within the operational area. Variables such as traffic patterns, civilian presence, the enemy's escape routes, and other contextual dynamics were integrated into the scenario.

The setting of the virtual exercise was grounded in the context of November 2022, with the impending military operation slated between 2:00 p.m. and 3:15 p.m. As the game’s narrative unfolded, participants found themselves assuming the critical role of defenders tasked with safeguarding London.

The impending attack threatened a shopping area, renowned for attracting both Londoners and tourists alike. In this bustling locale, the adversaries took shape as members of the Taliban fundamentalist movement. Their modus operandi was meticulously defined by the rules outlined in “Taliban, A Book of Rules (2009).” The players, representing the British military forces, were expected to adhere to principles derived from the Just War Theory (JWT), Military Manuals, National Legislation, and International Humanitarian Law (IHL). The tactical complexities deepened as terrorists exploited the chaos of Christmas preparations and shopping, establishing their presence within an already crowded vicinity.

Their malevolent intentions were directed toward three prominent British and American establishments along Oxford Street: Marks and Spencer, Disney Store, and Apple Regent Street. Their plan included moving towards the London Central Mosque via Regent Street. Suspicious activities were detected in proximity to the Bond Street Metro Station and the Oxford Circus Metro Station, demanding astute decisions from the players.

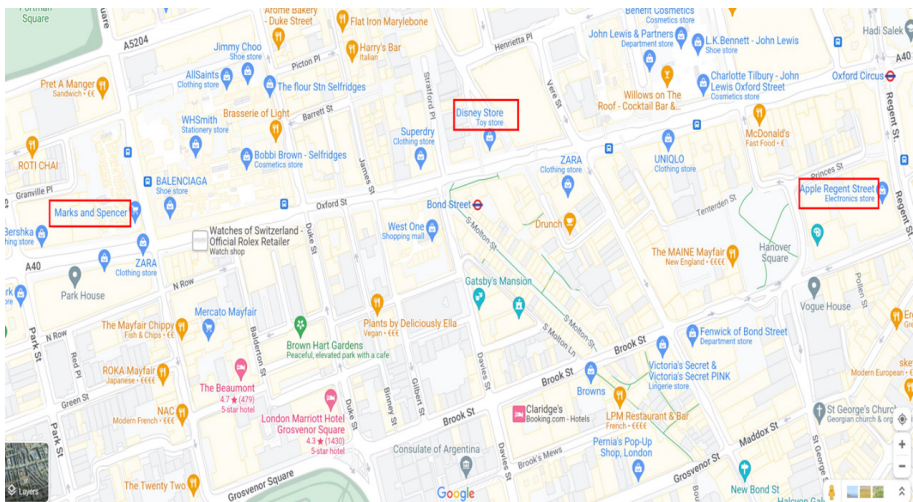


Image 1. The map of the operational area.

Amidst this intricate scenario, the cadets grappled with a multitude of decisions:

- Strategically deploying their forces across the given map.
- Selecting the most suitable weaponry for the task at hand.

- Devising an optimal approach for manoeuvring their forces.
- Determining how to apply the rules of engagement, considering the specific circumstances.
- Navigating the ethical and legal intricacies entwined within their tactical blueprint.

The overarching operational objective hinged on the precise disarmament and capture of the terrorists while minimizing collateral damage. This encompassed mitigating potential loss of resources and human lives, encompassing both military personnel partaking in the operation and the civilian populace. Players were presented with a range of resources, each playing a distinct role, as can be seen in the Table 1.

British Armed Forces	Terrorists
<ul style="list-style-type: none"> • Fighter Jets: 1 Eurofighter Typhon • Transport Helicopters: AgustaWestland AW159 Wildcat, capable of carrying 7-9 soldiers • Attack Helicopters: 2 Boeing AH-64 Apache • Patrol Helicopter: 1 Aérospatiale Gazelle • Transport Vehicles: 3 Land Rover Wolf, accommodating up to 6 passengers each • Infantry: 1 company comprising 4 platoons, each consisting of 30 individuals • Special Forces: 4 squads, each with 12 members • Informers and/or Spies: Inactive (Ø) 	<ul style="list-style-type: none"> • Improvised Explosive Devices (IEDs) • Martyr Terrorists • Car Bombs/Vehicle-Borne Improvised Explosive Devices (VBIEDs) • Rocket-Propelled Grenades (RPGs) • Individual/Squad Weapons: Including grenades, machine guns, rifles, and more • Use of Civilians as Human Shields • Informers and/or Spies

Table 1. Means and gears of the enemies

Amidst this complex scenario, the players were tasked with a multifaceted challenge: estimating the potential for collateral damage. Their strategic decisions would determine the fate of both resources and lives. Importantly, they were required to elucidate their Military Decision-Making processes using an appropriate document, thereby providing a comprehensive rationale for their chosen course of action.

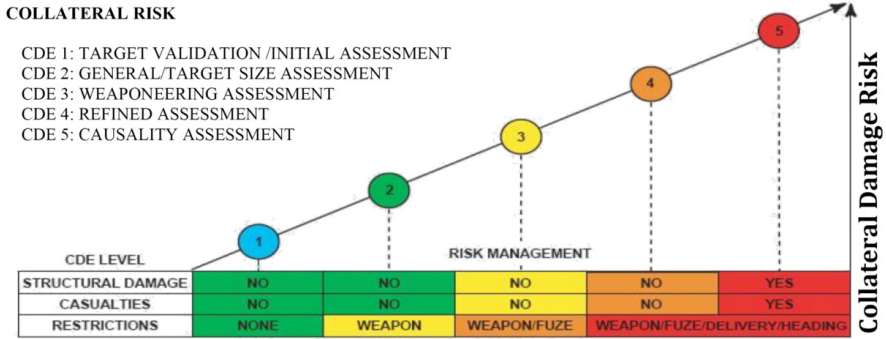


Image 2. The Collateral Damage Estimation Methodology

As the war game unfolded, participants were tasked with not only designing a military operation but also confronting the ethical and legal quandaries inherent to the battlefield. This immersive exercise provided a platform for testing their decision-making prowess within a complex and ever-evolving environment.

b. Chapter II: Combat conundrums: Precision trials

As stated, this is a first-person shooting game that immerses players in a dynamic and morally challenging environment. So, the second group of participants (n: 113) engaged in a distinct aspect of the experiment, involving a virtual shooting lab where decisions held the power to determine whether to open fire against images representing potential targets. Players were confronted with the task of distinguishing between legal and illegal targets, adding an intricate layer of decision-making beyond traditional gameplay. As players navigated through different images, they encountered a mix of combatants and civilians, each with unique visual cues and within different backgrounds.⁴⁰

The player’s objective was to engage hostile combatants while refraining from harming innocent civilians. Precision and quick decision-making

⁴⁰ The game’s design ensures that players must carefully assess their surroundings and the actions of characters to determine their status as either legitimate combatants or non-combatant civilians. Legal targets may exhibit hostile behaviour, wear distinct uniforms, or engage in aggressive actions that signify their combatant status. On the other hand, civilians might display fearful or defensive reactions, wear civilian clothing, and seek cover to escape the combat zone.

were critical, as players needed to evaluate each potential target within a very limited amount of time, simulating the high-stakes nature of real-world conflict scenarios. To add an additional layer of complexity, the game incorporated evolving situations.⁴¹ For instance, players encountered combatants who attempt to use civilians as human shields, testing the player's decision to target the combatants that may lead to eventually harming the non-combatants too.

Photos of potential targets were meticulously selected and divided into batches of 100, 250, and 500 images creating three levels of difficulty for the players. Each participant faced the task of making a rapid decision within a limited timeframe regarding the appropriateness of shooting the presented target. Notably, the transition time between images differed between the sets. For the initial batch of 100 photos, the transition interval was set at a more deliberate pace of 25 seconds per image, encouraging meticulous contemplation. In contrast, the third set of photos allowed only 15 seconds between transitions, demanding quick, instinctual assessments.

As the virtual simulation commenced, the cadets found themselves tethered to the control device, a virtual weapon wielded within the digital realm. Within this context, the participants were divided into two subgroups, each with a distinct approach to decision-making.

- The first subgroup (n: 52) of cadets confronted the task relying solely on their acquired knowledge and training. They assessed the images and swiftly determined whether to take action against the perceived targets based on their expertise and understanding of ethical and tactical considerations.
- In contrast, the second subgroup (n: 61) of cadets was equipped with an additional layer of assistance. Alongside their knowledge, they were provided with a wearable device, embodied as a headset. This device proved to be more than a mere accessory—it served as a virtual assistant for complex decisions. In scenarios where the appropriateness of targeting was not immediately evident, this wearable device played a pivotal role. It signalled its wearer through a sharp, distinctive alarm sound, notifying them that the situation likely called for restraint. This auditory cue acted as a support mechanism, leveraging technology to enhance the cadets' ethical discernment in the virtual environment.

⁴¹ As players progressed, their performance in distinguishing legal and illegal targets influenced the game's outcome. Successful discrimination between combatants and civilians led to mission success and positive outcomes, while harm to civilians (whether intentional or due to misjudgement, misuse of the equipment, overreaction, accidental shooting or other unintentional reason) resulted in mission failure or negative consequences.

The meticulous division and design of the second group's experience ensured a comprehensive exploration of decision-making dynamics, while simultaneously incorporating technology in an innovative manner. Through this intricate approach, the experiment delved into the realm of virtual shooting scenarios, dissecting the interplay between knowledge, rapid judgment, and technological assistance.

Through this game, players gain insights into the ethical complexities faced by military personnel on the ground. It prompts players to weigh the ethical implications of their actions, fostering a deeper understanding of the challenges inherent in distinguishing between friend and foe during chaotic conflict.

IV. Findings

In relation to *Attacking the Christmas Spirit in London*, a comprehensive analysis of the cadets' decision-making tendencies reveals several noteworthy trends. Predominantly, a significant proportion of cadets (89%) opted to consult the legal advisor prior to arriving at a tactical decision. This inclination toward seeking legal guidance underscores the cadets' recognition of the intricacies of ethical and legal dimensions within their decision-making processes. It's evident that they acknowledged the value of informed counsel when navigating the complex landscape of military operations.

Curiously, a minority subset of cadets (4%) exhibited a distinct willingness to deviate from the legal advisor's recommendations and make decisions that contradicted the provided guidance. This tendency suggests an internalized sense of autonomy in decision-making, wherein the cadets may have prioritized other factors over legal perspectives.

A marginal proportion of participants (2%) experienced challenges in their decision-making process, leading to delays that ultimately hindered their ability to complete the game. This subset reflects the potential impact of decision-making constraints in real-world situations, underlining the significance of prompt and effective responses in tactical scenarios.

Notably, the vast majority of cadets (92%) expressed a positive reception of the assistance they received in addressing ethical and legal quandaries. This response indicates a high level of appreciation for the external guidance, reinforcing the pertinence of offering informed advice in intricate military decision-making contexts. On the contrary, a minor segment (3%) perceived the advice as exacerbating the complexity of the situation. This discrepancy possibly reflects the challenge of simplifying intricate legal and ethical issues for practical application.

Lastly, a significant proportion of cadets (72%) conveyed a preference for discussing the situation with a fellow comrade as opposed to relying solely on the legal advisor's counsel. This inclination underscores the perceived value of a peer perspective in the decision-making process. This preference potentially stems from the camaraderie and shared experiences that are inherent in military training, suggesting that a collaborative approach could enhance both decision quality and the cadets' overall comfort in their choices.

In relation to *Combat Conundrums: Precision Trials*, an in-depth analysis of the cadets' performance within the two subgroups provides valuable insights into their decision-making patterns and psychological responses.

In the first subgroup, irrespective of the level of difficulty, a considerable proportion of cadets demonstrated a consistent tendency to miss targets, resulting in a failure to complete the game (easy level: 12%, medium level: 12%, difficult level: 22%). This outcome is significant as it indicates a challenge in accurately identifying and engaging targets in a very short time span and under stress. Furthermore, the data reveals that these cadets frequently engaged targets that should not have been targeted (easy level: 9%, medium level: 11%, difficult level: 17%), showcasing a difficulty to make ethical and legitimate decisions in the heat of the (virtual) battle. These observations collectively suggest that this subgroup struggled with target discrimination, potentially due to a lack of clarity or uncertainty in evaluating the legitimacy of targets.

An interesting psychological response emerged from this subgroup, with a notable percentage (14%) of participants expressing a sense of helplessness by the end of the game. Additionally, a portion (11%) attributed their decision-making difficulties to confusion or the need for more time. The latter observation is particularly intriguing, as it indicates that a considerable number of participants may have grappled with time pressure, leading to suboptimal decision-making outcomes. The data also points to a median rate of 14% across all difficulty levels, reinforcing the consistent challenge of time-related pressures.

In the second subgroup, participants generally exhibited a positive reception of the AI assistance provided by the device. A majority (62%) valued the support, highlighting the role of AI in aiding decision-making processes. However, a subset (16%) expressed concern about being overly influenced by the AI's suggestions, suggesting a potential inclination to blindly follow AI recommendations without thorough consideration. The data further indicates that a significant majority (78%) of cadets in this subgroup adhered to the AI's suggestions during the game.

Intriguingly, a substantial portion (28%) noted that they felt rushed and had insufficient time to contemplate their decisions. This observation raises questions about the balance between the AI's efficiency and the cadets' cognitive and ethical engagement in decision-making. Moreover, the post-game reflection revealed that despite initially accepting the AI's suggestions during gameplay, many participants contemplated alternate choices they might have made given more time or a second opportunity.

In conclusion, this analysis underscores the dynamic interplay between decision-making efficacy, psychological responses, and AI support in the two subgroups. While the first subgroup struggled with target discrimination and decision-making challenges, the second subgroup demonstrated a nuanced relationship with AI assistance, both embracing its guidance and later engaging in post-game evaluation.

Similarly to the second group, the third group of postgraduate students (n:26) also faced the task of determining whether to shoot or abstain from shooting at potential targets displayed in the virtual setting. The configuration remained consistent with Group no. 2, utilizing medium and hard levels of difficulty.

Among the postgraduate students who opted to use the AI device (n:10), a noteworthy pattern emerged. A significant percentage (84%) reported being influenced by the AI's suggestions, indicating that the device played a role in shaping their decision-making process. Interestingly, however, only 22% of these participants adhered to every suggestion provided by the AI. This observation suggests a nuanced relationship between the AI's guidance and the participants' independent judgment. This could imply that while the suggestions were influential, participants still exercised their discretion in final decision-making.

A substantial percentage (38%) of postgraduate students who utilized the AI device encountered challenges leading to a failure to complete the game. Many (62%) cited the limited time window as a significant barrier, expressing their inability to decide within the stipulated timeframe. Despite the hints received from the AI (34%), the constraint of time seemed to hinder effective decision-making, revealing the complexity of rapid ethical choices within a dynamic environment.

Conversely, postgraduate students who chose not to utilize the AI device (n:16) revealed distinctive patterns. Nearly half of them (49%) acknowledged their failure to complete the game. A substantial portion (34%) attributed this failure to a perceived lack of preparedness, while others cited an inability to recall the rules (39%) or a lack of relevant experience (18%) as contributing factors. Interestingly, despite these challenges, a notable proportion (87%) of this subgroup indicated their

reluctance to employ the AI hints. Their hesitancy seemed rooted in concerns about trusting AI for decisions involving ethical or legal implications.

In conclusion, the third group's dynamics exemplify the intricate interplay between AI assistance, decision-making influences, time constraints, and individual readiness. This analysis highlights the complexity of integrating AI into decision-making processes and underscores the significance of participants' willingness to rely on AI's suggestions, as well as their reservations in contexts with ethical and legal stakes.

V. Conclusion

The objective of our experiment was to investigate the potential effectiveness of moral enhancement as a safety net in extreme situations, along with the implications of utilizing AI for moral enhancement. Our primary question revolved around whether moral enhancement, facilitated by AI, could alter the way individuals make critical tactical decisions under high-stress circumstances. The outcomes, while preliminary due to limited data, provide valuable insights.

Interestingly, the reception of AI as a means of moral enhancement was mixed among the experiment's participants. The participants appeared to perceive AI less as a supportive tool and more as an opinion leader. This raises questions about the perceived role of AI in ethical decision-making processes, suggesting that the participants may have had reservations about AI's ability to genuinely enhance their moral considerations.

Another crucial aspect we sought to explore was the extent to which participants would be open to receiving advice from either a human agent or AI, as well as the implications of AI enhancement on their autonomy and decision-making freedom. The results revealed that a significant majority (68%) of participants across all three groups preferred human agents for discussions related to ethical or legal challenges. Additionally, a substantial 76% expressed an absence of trust in AI for decision-making, emphasizing the perceived necessity of human involvement in the decision-making process.

Interestingly, participants indicated a demanding threshold for accepting AI's suggestions, setting the bar at a proven success rate above 95%. This threshold signifies a cautious approach to AI assistance and underscores the participants' need for high levels of confidence in AI's accuracy before relinquishing their own decision-making authority.

An insightful perspective emerged from participants who expressed concerns that heavy reliance on AI could potentially lead to diminished

critical thinking and increased dependency on technology. This notion points to broader societal implications regarding the integration of AI into ethical decision-making contexts, highlighting the balance between leveraging technology and preserving human agency and cognitive capabilities.

In conclusion, our experiment delved into the intricate interplay between moral enhancement, AI, human agents, trust, autonomy, and critical thinking. The participants' responses underscore the complexity of navigating the role of AI in shaping moral considerations and decision-making processes, while also revealing their reservations and preferences for human involvement. These findings provide a foundation for further exploration and considerations when integrating AI into contexts requiring ethical and tactical judgments.

VI. Future work

Future research in this domain presents several promising avenues for exploration, building upon the insights gleaned from our experiment. The initial results have highlighted areas that require attention and refinement to enhance the effectiveness and credibility of AI-driven moral enhancement in decision-making scenarios.

One key focus for future work involves training the algorithm to achieve a higher success rate than the observed 86%. This lower success rate may have contributed to the participants' scepticism towards AI's suggestions. By improving the algorithm's accuracy, we can instil greater confidence among users, encouraging them to consider AI recommendations more seriously. This endeavor would require an in-depth analysis of the factors contributing to the algorithm's limitations and the development of strategies to mitigate them.

Furthermore, the complexity of ethical decision-making in extreme situations calls for the development of more intricate and challenging scenarios. Expanding the range of challenges presented to players can yield valuable insights into their decision-making processes and responses. These enriched scenarios should encompass a spectrum of moral dilemmas, legal considerations, and tactical complexities, allowing participants to engage with a wider array of situations.

In tandem with scenario development, there is an opportunity to enhance the platforms and interaction mechanisms used in the experiment. Refining the interfaces and mechanisms through which players interact with the virtual environment can create a more immersive and intuitive experience. This step involves integrating sophisticated technology to provide real-time feedback, adaptive challenges, and interactive ele-

ments that simulate the dynamic nature of ethical decision-making on the battlefield.

To gain a more comprehensive understanding of individual choices and responses, future research should focus on collecting a more extensive dataset. Gathering data from a larger and more diverse participant pool can yield nuanced insights into the factors influencing decision-making processes. This could involve analyzing participants' demographic information, personal beliefs, and prior experiences to ascertain potential correlations with their choices and preferences.

In summary, the current study's findings have paved the way for future research endeavors aimed at refining and expanding the implementation of AI-driven moral enhancement.⁴² Addressing the challenges of algorithm accuracy, scenario complexity, interaction design, and data collection will contribute to a more comprehensive understanding of the dynamics between AI assistance and human decision-making in complex ethical contexts. As AI technologies continue to evolve, these insights will be invaluable for creating effective and trustworthy tools for promoting ethical decision-making in high-stress environments.

Author contribution statement

The conceptualization and methodology of this research was conceived by I. K. Lekea. The software and its validation was performed by G. K. Lekeas. The interdisciplinary discussion on the ethical and legal aspect of the experiment was carried out by I. K. Lekea and P. Topalnakos. The respective legal part was documented by P. Topalnakos. All authors reviewed the results and approved the final version of the manuscript.

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⁴² For an interesting discussion on the use of AI as a means of moral enhancement in the context of the Machine Ethics Research Program, see Michael Anderson, Susan Leigh Anderson, Alkis Gounaris, and George Kosteletos, "Towards Moral Machines: A Discussion with Michael Anderson and Susan Leigh Anderson," *Conatus – Journal of Philosophy* 6, no. 1 (2021): 177-202.

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