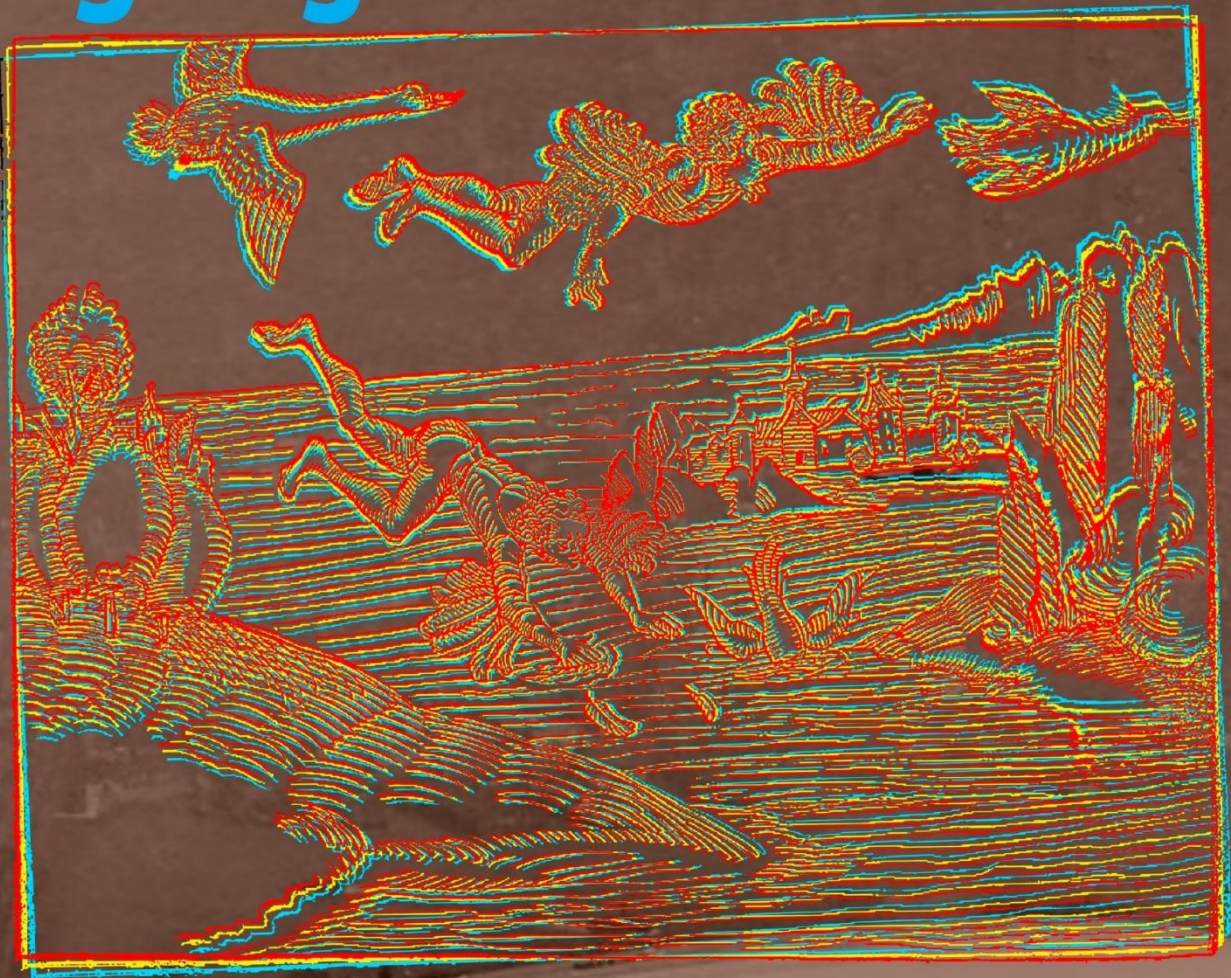


# Technology and Language



Oliver Schlaudt and Anonymous

Jan Grossarth and Armin Grunwald

Tiago Mesquita Carvalho

Anastasia Lisenkova, Victor Kukel, Svetlana Ulianova

Sercan Sever

Alexander Markov and Anna Sosnovskaya

Maria Jose Rios

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Yervand Margaryan

Anatolij Kashevarov

Hanan Al-Jabri and Sukayna Ali

Viola Larionova, Svetlana Berestova, et al.

Pavel Baryshnikov, Lolita Velis, Magomet Atakue

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## Technology as Tragedy



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Special Topic:  
**Technology as Tragedy**  
Guest editors  
**Oliver Schlaudt and Anonymous**





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Editorial introduction

## The History of Technology as Experiment and Tragedy

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### Abstract

This editorial proposes a conceptual clarification of what it may mean to speak of tragedy in relation to the history of technology. Rather than treating the tragic as a loosely evaluative label for catastrophic events, it reconstructs tragedy as a structured constellation centered on rational action under conditions of epistemic limitation. Against this background, the editorial contrasts two influential interpretive frames for understanding technological change: the experimental and the tragic. The experimental frame, prominent in twentieth-century risk analysis and technology assessment, interprets the history of technology as a learning process that generates knowledge through feedback from real-world experience and promises prospective intervention and control. The tragic frame, by contrast, foregrounds irreversibility, responsibility, and the loss of prospective agency, thereby questioning the assumption that historical experience functions as a reliable epistemic resource. The editorial argues that neither frame is sufficient on its own. While the experimental perspective risks cynicism toward victims and blindness to irreversible loss, the tragic perspective, taken in isolation, tends toward fatalism and political paralysis. The central claim is therefore not one of replacement but of complementarity.

**Keywords:** Technology; History of Technology; Tragedy; Social Experiments; Collingridge-Dilemma

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<sup>1</sup> If one of the editors of this special issue needs to remain anonymous, this is due to sanction frameworks in this time of fractured geopolitics. Academics and academic institutions are faced with the challenge to position themselves in regard to present conflicts and the prospects for peaceful cooperation in the future. In this case, it was the policy of an institution that prompted the under-cover involvement of Anonymous



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Редакторская заметка

## История технологии как эксперимент и трагедия

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### Аннотация

Данная редакторская статья предлагает концептуальное прояснение того, что может означать понятие трагедии применительно к истории технологий. Вместо того чтобы рассматривать трагическое как расплывчатый оценочный ярлык для катастрофических событий, в статье трагедия реконструируется как структурированная констелляция, сосредоточенная вокруг рационального действия в условиях когнитивной ограниченности. На этом фоне противопоставляются две влиятельные интерпретационные оптики для понимания технологических изменений: экспериментальная и трагическая. Экспериментальная оптика, заметная в риск-анализе и оценке технологий XX века, интерпретирует историю технологий как процесс обучения, который генерирует знание через обратную связь от практического опыта и сулит возможность перспективного вмешательства и контроля. Трагическая оптика, напротив, выдвигает на первый план необратимость, ответственность и утрату перспективной агентности, тем самым ставя под сомнение предположение, что исторический опыт функционирует как надёжный эпистемический ресурс. В статье утверждается, что ни одна из этих оптик не является самодостаточной. В то время как экспериментальная перспектива рискует скатиться к цинизму в отношении жертв и слепоте к необратимым потерям, трагическая перспектива, взятая изолированно, тяготеет к фатализму и политическому параличу. Таким образом, центральный тезис состоит не в замещении одной оптики другой, а в их взаимодополняемости.

**Ключевые слова:** Технология; История технологии; Трагедия; Социальные эксперименты; дилемма Коллинриджа

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<sup>2</sup> Если один из редакторов данного специального выпуска вынужден сохранять анонимность, причина этого кроется в действующих санкционных режимах в эпоху геополитической раздробленности. Перед академическим сообществом и научными учреждениями стоит сложная задача определить свою позицию в отношении текущих конфликтов и перспектив будущего мирного сотрудничества. В данном конкретном случае именно политика одного из учреждений обусловила скрытое участие Анонимного автора.





Linking the concepts of *technology* and *tragedy* is, at first sight, far from obvious. Tragedy is an aesthetic category rooted in antiquity; technology is commonly taken to be a signature of modernity. Where the two are nevertheless brought together, this often happens in the mode of polemics: technology is portrayed as a hubristic enterprise that must, by its very nature, end in catastrophe. But does the tragic really lend itself to a serious analysis of technology? What does it mean, in the first place, to call something “tragic”?

At a closer look, the tragic is not a simple, intrinsic, or irreducible quality, as it may seem when we describe an event as “tragic.” Rather, it refers to a complex constellation defined by at least two constitutive elements. First, the object of the tragic is not an event but an action – specifically, an action that is rational, coherent, and responsible. Second, speaking of the tragic presupposes a spectator. The tragic is, indeed, always also an aesthetic category. This introduces a distance between the acting subject and the observer, a distance that crucially involves an epistemic asymmetry. From within the actor’s horizon, the decisions made are rational and well-grounded; from the observer’s broader perspective, however, it can already be seen that these very decisions will, by inner necessity, lead to ruin. In the extreme case of Oedipus, the agent seeks the guilty party without grasping that he himself is guilty – precisely because he acts responsibly and rationally (Ghirardello & Isetti 2023).

Historically speaking, the tragic is an ancient category and, as Kierkegaard suggested, an intrinsically premodern one. The epistemic limitation that is constitutive of the tragic is, according to him, closely tied to a premodern conception of agency. Actors are not understood as fully free individuals who hold their fate in their own hands, but as embedded in what Kierkegaard (1843/1944) called the “substantial categories” of state, family, and destiny. As he famously wrote: “Our age has lost all the substantial categories of family, state, and race. It must leave the individual entirely to himself, so that in a stricter sense he becomes his own creator; his guilt is consequently sin, his pain remorse; but this nullifies the tragic” (p. 35). Once this happens, aesthetic guilt loses its “gentleness” and collapses into ethical guilt.

By contrast, technology is commonly taken to be a hallmark of modernity and therefore seems, as expected, ill suited to tragedy. When the terms “technology” and “tragedy” are brought together, this typically reflects residual premodern assumptions, most notably the accusation of hubris, according to which technology is portrayed as an enterprise that must, by necessity, end in catastrophe. Yet it is far from clear how such an accusation is to be understood within a secular worldview – one that no longer operates with the idea of a god whose omnipotence could be challenged. Why, then, should we not at least attempt to extend our technological capacity to shape the world? Planetary boundaries are real, but they are not transcendent.

And yet, the category of the tragic may help us think about the role of technology in the modern world beyond these tensions, which may turn out to be merely superficial. There is, after all, a basic categorical fit between them. Technology is embodied practical rationality – instrumental reason made operative. We are therefore dealing with human action, not with events. In the tragic, the rationality of action is not suspended but presupposed. Moreover, technology realizes in a distinctly modern way the very



epistemic limitation required by the tragic. Technological action takes place in a space between complete knowledge and its complete absence, between total control and its total lack (Coeckelbergh, 2010). In this sense, technology operates under conditions of guilt without blame, as demanded by tragedy. A difficulty arises, however, from the fact that this category implicitly presupposes a collective, all-embracing subject – society – hereby rendering problematic the distinction between observer and observed, audience and protagonist.

In order to locate a possible place for the tragic within the analysis and assessment of technology, we contrast this perspective with another one that gained prominence in the twentieth century. In his 1969 *Science* article “Social Benefit and Technological Risk: What Is Our Society Willing to Pay for Safety?” Chauncey Starr argued that the history of technology can be read as a historical experiment in which a society’s implicit preferences become visible as the operative standards of a social cost–benefit analysis of technological innovation (Starr, 1969). Put simply, societies introduce technologies – such as motorized transport or nuclear energy – and over time it becomes apparent whether they are willing to bear the risks associated with them.

Starr’s account presupposes a learning process that operates as an effective feedback loop within society. In the end, the distinction between actor and observer collapses into a process of collective self-knowledge. This is why his approach can appear somewhat naïve. Is actual history really a learning process or epistemic site? Does and can one genuinely intervene in technological development and innovation dynamics on the basis of the insights gained from history?

Starr’s reading of the historical process is also one-sided. Once a technology is deployed, its factual risks become visible and are recorded in national accident statistics. But what about its benefits? Here, Starr falls back on a naïvely individualistic framework when he measures benefit in terms of individual acquisition costs or contributions to income. This already raises problems, as the widespread adoption of a technology and its infrastructural effects can place individuals under structural pressure to adopt it as well – as is evident in the case of automobiles or smartphones. From a more distanced perspective, one may therefore ask whether we truly benefit from technological progress at all.

Against this background, the tragic perspective may promise a way out of these “naïve” presuppositions. It opens up a space for more fundamental questions and objections, such as the one identified by Rolf Peter Sieferle (1984) as the central critique of all narratives of progress: since needs are continually reshaped and expanded by the evolving means of their satisfaction, technological progress fails, in principle, to translate into an increase in subjective well-being – and this even irrespective of rising ecological costs. From a tragic perspective, the history of technology unfolds before our eyes as a process of fateful necessity, even as we already sense that it is heading toward catastrophe.

The tragic operates without the burden of an effective epistemic feedback loop. But it pays a price for this. It must dismiss as illusory any claim to political steering or control. “Tragedy” and “experiment” thus name two contrasting interpretive frames. An experiment is not a tragedy and excludes this narrative frame, insofar as it understands



history as a productive learning process – one from which we can, first, derive epistemic gains and, second, intervene prospectively, deliberately, and correctively on the basis of these insights. Tragedy reads history differently. From its perspective, the experimental interpretation is cynical toward victims, blind to irreversible damage, and naïve in its technocratic optimism.

The two frames also diverge in their understanding of time. The experimental perspective conceives of history as iterative, adaptive, and open-ended. The tragic perspective, by contrast, understands time as directed, irreversible, and fateful. Insight does not arise prospectively and correctively, but retrospectively – always too late. Indeed, insight emerges only after the reversal; it is itself part of the catastrophe and constitutes its tragic character. Applied to technology, this means that we do not recognize risks before catastrophe, but through it – and that such recognition can no longer correct what has already occurred. We may learn, but only *post festum*, under conditions that are not repeatable and at the cost of damage that cannot be compensated – thus pushing the Collingridge (1980) dilemma to its extreme, where learning and progress are only possible at the price of irreversible loss. The genie cannot be put back into the bottle once the bottle itself has been shattered.

In this case, tragedy would be anti-experimental. It is not an experiment but opposed to it. It dispenses with the assumptions that underwrite the experimental frame and instead permits us to acknowledge and articulate responsibility, inevitability, and moral overload. At the same time, however, it cannot offer guidance for action. Where the experimental perspective appears cynical, blind, and naïve from a tragic point of view, the tragic perspective itself risks becoming fatalistic, politically disabling, and normatively blocking. It confines us to the position of spectators, from which we may at best hope for an individual and perhaps even elitist form of catharsis.

Both perspectives – the experimental and the tragic – come with their own difficulties and blind spots. We do not propose to replace the experimental frame with the tragic one. What seems crucial to us, rather, is the observation that the two are complementary: while each has characteristic limitations, each also illuminates and partly compensates for the blind spots of the other. Tragedy confronts us with irreversible developments that are real and cannot be undone. At the same time, the narrative framework of the experiment continues to sustain the hope that it may still be possible to overcome the fatal flaw implied by tragedy – and perhaps even our own hubris. Each new technology might offer an opportunity: to break with the capitalist logic that often drives innovation against social interests; to escape the dual-use dilemma by deciding against the weaponization of emerging technologies; or to invest in environmentally sustainable technologies on a scale comparable to current investments in artificial intelligence, in order to mitigate climate change and secure the conditions of human existence on this planet. The question of tragedy and technology thus ultimately becomes the question of whether humankind is capable of acting against its own fatal flaws and of transforming itself – or whether it is condemned to assume the role of the tragic hero or heroine, whose “deficiency in character or awareness prevents them from reaching the goal” (Booker, 2005, p. 330), leaving us only to witness the unfolding of an inevitable tragic destiny.



For these reasons, it appears worthwhile to supplement interpretations of technological history framed as experiment with a tragic perspective and to hold both in a provisional balance. The present special issue therefore invites contributors to reassess the suitability of the tragic as a category for the analysis and assessment of technology.

Setting the stage, Jan Grossarth and Armin Grunwald differentiate the ways people ordinarily associate technology and tragedy (Grossarth and Grunwald, 2025). Suggesting that the awareness of the tragic dimension may be on the increase over the course of technological development, they consider the many facets of the tragic in the history of human flight, starting with Daedalus and Icarus – again and again, hubristic visions and the phantasma of technical control are frustrated by reality.

Tiago Mesquita Carvalho (2025) considers the dialectic of technical controllability and tragic inevitability from quite another angle. To the extent that technology is committed to finding solutions and repairing problems, it lacks a sense of the tragic. According to philosophers of technology like Günther Anders our situation might be characterized as tragic since we find ourselves incapable to fathom even our own destructive powers – but with a technological mindset we lack the awareness even of this deeply disturbing discrepancy.

In their essay Anastasia Lisenkova, Victor Kukel, and Svetlana Ulianova mobilize “the tragic” to help us become aware of a new kind of disproportionality in the digital world, namely the gap between algorithmic procedures and lived experience (Lisenkova et al., 2025). Sercan Sever argues similarly but focuses instead on the gap between our hopes for resonance and their disappointment (Sever, 2025). Discussing three case-studies from Japan, he speaks of a tragic miscalculation when we confidently expect that technical flaws will produce greater resonance in human-world relations – instead, they lead to a deterioration which leads us to look for „non-technology“ as an alternative.

Turning the question on its head, Alexander Markov and Anna Sosnovskaya do not buy into the separation between ancient conceptions of the tragic and the technologies of the modern world. Instead, they reconceptualize tragedy and consider it an existential mechanism. As the human will runs up against and becomes entangled with the recalcitrance of people and things, tragedy dramatically reenacts this conflict, representing it as the clash of human agency and some super-human system which may carry the name of destiny or fate (Markov and Sosnovskaya, 2025). But once representation comes into view, the question arises why we should privilege tragedy as the lens through which to view struggles of and against the will. Maria Jose Rios (2025) therefore seeks to show that there are numerous non-Western framings for stories about technological disruption.

This inter- or transcultural dialogue features centrally also in Irina Berezovskaya’s contribution. Following her argument, one might say that the tragic spirit rebels against instrumental rationality or technocratic thinking. But the rebellion against alienated reason in a technologically fashioned world takes very different forms – it becomes communicative rationality and a defence of public reason in liberal democracies, whereas Martin Buber counters the tragedy of technorationality by an attempt to humanize technology even by way of a radical religiosity. The Russian cosmist Nikolai Fedorov,



finally, seeks to escape technical reason by transforming it into a universal project for the salvation, even resurrection of the soul (Berezovskaya, 2025).

In the midst of this multiplicity of narratives – all of which arising in response to a possibly tragic human condition – Yervand Margaryan (2025) turns to a very old and very powerful myth, namely an early medieval story about the Armenian people. He uncovers in this myth the dramatic technology that resides within narratives. This is not to claim that tragedy represents tragic social mechanisms, but rather, that narratives evoke the theater and its dramatic machinery: the birth of tragedy is in the technology of the theater. And this rounds off our discussion of technology and tragedy – even as it calls for another special issue on the relentless execution of theatrical machinery.

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Research article

## The Weightlessness of Flying: Toward a Phenomenological Theory of Tragedies in Technology

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### Abstract

Tragedy can be understood as a pre-modern narrative form used to make sense of real-world experiences. Tragic experience has long been part of humanity's engagement with technology. However, recent developments such as digitalization, the rise of AI, and advances in biotechnology significantly increase the potential for harmful unintended consequences. In this paper, we (1) distinguish categorically between first-order and second-order tragedy in relation to technology. With the first category, we refer to a direct reversal of the technological consequences, which turns against the value originally associated with the use of the technology. With the second category, we refer to gradual changes in quality of life that cannot be captured "objectively" but can only be attested from a first-person perspective. We focus on second-order tragedy, as it is closely connected to language, narrative forms, and hermeneutic interpretation. To deepen our understanding, we (2) provide a phenomenological reading of allegories of human flight in literature and the arts, examining them as examples that illuminate both first- and second-order tragedy. Drawing on myths, fairy tales, plays, and novels such as "Daedalus and Icarus", "The Snow Queen", "Christmas Eve", "The Satanic Mill" and "Homo Faber", we show that experiences of weightlessness, exhilaration, and rapid ascent frequently appear as narrative motifs that precede and foreshadow later tragic technological consequences.

**Keywords:** Ambivalence of technology; Hermeneutics; Gradual disruption; Dialectics; Digital transformation; Human flight

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Научная статья

## Невесомость полета: К феноменологической теории трагедии в технике

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### Аннотация

Трагедию можно понимать как досовременную повествовательную форму, используемую для осмысления реального мира. Трагический опыт давно является частью взаимодействия человечества с технологиями. Однако недавние разработки, такие как цифровизация, развитие искусственного интеллекта, и достижения в биотехнологиях, значительно увеличивают потенциал для вредных непредвиденных последствий. В этой статье мы (1) категорически различаем трагедию первого порядка и трагедию второго порядка в отношении технологий. Под первой категорией мы подразумеваем прямое обратное действие технологических последствий, которое обращает вспять ценность, первоначально связанную с использованием технологии. Ко второй категории мы относим постепенные изменения в качестве жизни, которые невозможно зафиксировать “объективно”, а можно только наблюдать от первого лица. Мы фокусируемся на трагедии второго порядка, поскольку она тесно связана с языком, формами повествования и герменевтической интерпретацией. Для углубления нашего понимания мы (2) предлагаем феноменологическое прочтение аллегорий человеческого полета в литературе и искусстве, рассматривая их как примеры, которые освещают трагедии как первого, так и второго порядка. Опираясь на мифы, сказки, пьесы и романы, такие как “Дедал и Икар”, “Снежная королева”, “Ночь перед Рождеством”, “Крабат, или Легенды старой мельницы” и “Хомо Фабер”, мы показываем, что переживания невесомости, восторга и стремительного подъема часто выступают в качестве нарративных мотивов, предшествующих и предвещающих последующие трагические технологические последствия.

**Ключевые слова:** Амбивалентность технологий; Герменевтика; Постепенное разрушение; Диалектика; Цифровая трансформация; Полет человека

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## INTRODUCTION: “TRAGEDY” IN HUMAN LIFE AND IN A TECHNOLOGICAL SOCIETY

Debates about technologies such as artificial intelligence (AI), unmanned drones, genetic editing, and climate engineering are shaping perceptions of technology in the third decade of the 21st century. It is striking that their social perception is often expressed in linguistic patterns of ambivalence and, repeatedly, of tragedy. Earlier technological upheavals, such as the invention of the railroad, the radio, or the robot, were accompanied by a discourse that oscillated between promises of salvation and disillusionment. In this context, the term “tragic” refers to a culturally deeply-rooted pattern of interpretation that linguistically frames experiences of failure, the reversal of expectations, and the inevitability of adverse developments (Trautsch, 2020b; 2023).

Technological consequences can not only contradict the intended goal, but also reverse it – even to the point of existential and deadly consequences (Barbour, 1983). Tragic technological consequences are a subset of unintended technological consequences (Grunwald, 2019) with existentially negative effects.

This article examines the connection between technology and tragedy as a discursive figure in the context of technology ethics, technology assessment, and anthropology of the human-environment relationship. The focus is on the question of under what conditions it appears linguistically and conceptually justified to speak of “tragic” technological consequences and what this means. Discursively, two forms can be distinguished: First-order and second-order tragedy. While another publication (Grossarth & Grunwald, 2026) focused on tragic technological constellations of the first order, this article focuses on more detailed definitions of second-order tragedy.

The “first-order tragedy” refers to immediate reversals of intended effects of technology, e.g., when technologies designed to combat hunger actually exacerbate it. A current example is the use of air conditioning systems. In order to keep houses, offices, and entire cities habitable in the face of accelerated climate change, air conditioning systems are being installed at a rapid pace worldwide. However, their energy consumption further accelerates climate change – at least as long as a large proportion of the energy required is obtained from fossil fuels, currently more than 80 percent worldwide. Air conditioning systems currently account for about 7 percent of global electricity consumption and around 3–4 percent of greenhouse gas emissions – and the trend is rising (Ritchie, 2024). In this way, air conditioning systems are exacerbating the very problem they are supposed to solve.

The “second-order tragedy” refers to creeping, qualitative changes in social conditions, such as a reduction in human scope for action to the point of losing the freedom to shape one’s own life (cf. next section). These qualitative changes affect, for example, the role of the individual in decision-making processes dominated by technical experts in business, science, or government. For example, sensory or atmospheric impressions may lose their legitimacy. This category cannot be grasped “objectively” from an outside perspective, but rather reveals itself in experience reports, and personal and literary testimonies as interpretations of such experiences. A striking example is the smartphone: It offers the freedom to shop anytime, anywhere, but can also remove the



spatial and temporal boundaries of “shopping addiction,” thereby significantly reducing the quality of life of susceptible individuals. The latter would be a tragedy of the second order. Here, a distinction must be made analytically between the external attribution of a pathology, which should always be viewed critically in terms of power, and the first-person experience of this phenomenon.

While tragedy is generally a cross-epochal human experience, each era produces its own forms of tragedy and ways of addressing it. Candidates for tragic downfalls currently include information technology revolutions such as automated writing and intelligent image and text generation by AI in the form of DeepSeek or ChatGPT. They are changing the division of labor between humans and machines and are much more than mere tools, as their use influences people and leads to changes in their perception and behavior. There is widespread concern – and this marks the tragic fall height of these technical developments – that they not only devalue learned skills and render acquired social and cultural capital obsolete, but also automate combinatorial, comparative, and analytical thinking. This would touch on central anthropological questions of freedom, sovereignty, and autonomy, far beyond the established topics of data protection, control, and the definition of intellectual property (*cf. next section*).

Other areas of possible tragic falls can be found in the field of human enhancement through AI-based medicine, biotechnological processes, or the utopian “flight project” of colonizing Mars. Elon Musk’s plans to colonize Mars with a million people (Fig. 1a), which are steeped in salvation history, appear to be doomed to spectacular failure. Musk argues that a “multi-planetary species” would be more crisis-resistant, but he also speaks hedonistically: “It would be quite fun to be on Mars [...] We just need to change the populations because currently we have seven billion people on Earth and none on Mars” (Musk, 2017, p. 46).



**Figure 1a.** Before departure to a better life on Mars? Musk wearing an “Occupy Mars” shirt during the American election campaign (Image Citation from Daily Mail)





At present, we can therefore observe a renaissance and radicalization of salvation-historical expectations (e.g., Grunwald, 2021), but at the same time, we see gloomy diagnoses of multiple crises, some of which relate to the same technological visions. The line between expectations of paradise and apocalyptic fears seems to have become so narrow that it appears almost impossible to navigate it in an epistemologically valid manner. With the inflationary expansion of expectations of salvation into the immeasurable, the potential fall into existentially tragic developments grows, even to the point of the repeatedly discussed end of humanity, for a variety of reasons.

Against the backdrop of this contemporary diagnosis, this article is dedicated to the analytical clarification of second-order tragic developments in the context of current technology debates. To this end, we will first develop the analytical tools and refine our theses on second-order tragedy in the digital transformation (next section), before turning our attention to the subject area of tragedy perceptions in literary narratives of flying (subsequent section), and discussing the results of our work with regard to their relevance to the discourse (final section).

## **TRAGEDY OF THE SECOND ORDER: GRADUAL DISRUPTIONS IN THE DIGITAL TRANSFORMATION**

We see the phenomenon of negatively experienced qualitative changes in living conditions as a second-order tragic effect. These cannot be “read” from history as clearly and objectively/quantifiably as the first-order consequences.

### **Characterization of Second-Order Tragedy as Gradual Disruption**

Second-order tragic effects are not immediately obvious. They manifest themselves in the ambivalence of technology use, particularly in the devaluation of sensory impressions and traditions that shape human life. This ambivalence can affect various areas: Individual lifestyles, the socio-political context, or economic power structures (cf. Schelsky 1965).

For this reason, they are also the subject of conflicts of interpretation and are rarely consensual. They can be attested to, lamented, and described by people. These effects concern factors such as changes in language habits or scope for action, accepted lifestyles, working methods, the social legitimacy of leisure time or forms of expression, or other qualitatively measurable factors. Their existence, gravitas, or technology-related causality is not as clear-cut as in the case of first-order technological consequences. To quote Hans Blumenberg, one could say that metaphors are needed to describe them – such as a loss of “depth”, “brightness”, or “breadth” (Blumenberg 1971). This is not about individual values, but rather more complex and diverse ideas about the good life and the possible threats to it.

Second-order tragedy cannot therefore be satisfactorily defined, but it can certainly be captured narratively. Narratives require a narrator’s perspective. The perception of tragedy can be sharpened and reflected linguistically through literary, historical, or biographical analogies. In other words, this requires a cultivated sense of tragedy, a “trained eye”. In this context, one can speak of an epistemic function of physical-personal



feeling. Using a term from psychology, this could be described as “intermodal perception” (Lewkowicz, 1999). Second-order tragedy can be linked in a specific way to the concept of disruption. This term is used to describe the breakdown of stable social conditions. In mass media communication, catastrophic narratives often come into play, such as the takeover by an AI algorithm, the fear of nuclear war, climate change as the end of the Earth’s habitability, the end of democracy, or the collapse of the labor market due to massive automation. Expectations of stability, assumptions of continuity, and planning certainties are shattered, making the future appear uncertain.

However, second-order tragedy does not manifest itself as sudden disruption, such as the rapid spread of the Covid-19 virus or new military conflicts, but as gradual or incremental disruption. Yet, this constellation of words seems conceptually absurd or paradoxical. Of course, it should be remembered that even when they occur suddenly, discontinuations and breakdowns can build up slowly over long periods. For a long time, everything remains stable, no one suspects the coming disruption, and it is only later and unexpectedly that the sudden and frightening effect occurs.

Examples of this type of disruption are known from the technical world, especially material fatigue and wear. The daily stress on many technical objects, such as bridges or components in automobiles, gradually leads to the degradation of materials and components. Nevertheless, they continue to function reliably for a long time until the wear-and-tear reaches a point where something fails from one moment to the next, such as a V-belt in a car that suddenly breaks, or a bridge collapsing without warning as a result of corrosion damage, as happened in Dresden in 2024, or near Savona, Italy, in 2019. In hindsight, people often ask whether one could have known beforehand.

The disruptive effect in processes of this kind is inherent in incremental processes that are difficult to recognize. It can remain undetected for a long time and escape early intervention or preventive measures, such as renovation in the case of the bridge. However, when the disruption suddenly occurs, it can have far-reaching consequences. From the perspective of the dialectic of enlightenment (cf. Adorno & Horkheimer, 1947/1997), this can be described as a gradual, initially barely noticeable reversal, similar to the shift in roles in the dialectic of master and servant. This is precisely the mode of second-order tragedy.

### **Second-Order Tragedy as a Possible Gradual Disruption in Digitalization**

The term gradual disruption can be used analytically to address possible developments in digital transformation with the potential for second-order tragedy. Fears of gradual disruption can be found at various levels in the debates on digitalization. The following should be mentioned: Stories about the end of freedom, the loss of individuality, the loss of the future, the loss of human encounter, and the reduction of human life to measurable data. It should be emphasized that these stories do not represent predictions of future developments, but rather address current contested concerns, or those which are dismissed as irrelevant and are therefore only accessible hermeneutically.



### *Loss of Freedom and Individuality*

If flying is an allegory for freedom (next section), then tragedy of the second order means loss of freedom. Promises of security through accident prevention or counterterrorism repeatedly provide arguments for infringing on civil liberties through surveillance and control. Regulation, the legal system, and security agencies are supposed to ensure that people do not exercise their freedoms at the expense of others. Technical surveillance and control systems are used to promote security or enforce it completely. Digitalization provides powerful tools in this regard. Comprehensive surveillance by cameras, automated facial recognition, location tracking and movement profiling, pattern recognition in offender profiles, technical specifications in operation, and even the removal of the “human factor” from technical processes such as autonomous driving offer far-reaching possibilities for technical prevention of the misuse or abuse of human freedoms – but also for abolishing freedoms. Gradual disruption in this field would be an unnoticed slide into a world in which the security interests of individuals and the state become the supreme purpose and value and are no longer weighed against other values. This would lead to ever-increasing digital standardization of human behavior, and thus to the demise of individual freedom and the erosion of the democracy based upon it, in favor of systems that are controlled by digital means and are secure but unfree. Typical of a second-order tragedy here is that the excessive emphasis and enforcement of an undoubtedly desirable value – security, i.e., “freedom from interference” – can imperceptibly and insidiously render the equally desirable value of positive freedom obsolete. If the omnipresence of surveillance cameras in a city center area, for example, led to unsuspecting people increasingly avoiding them over time because they “feel monitored”, that would be a tragic second-order technological consequence. If a dictatorial government were to use them to suppress freedoms (of speech, assembly, demonstration), it would be a tragic first-order technological consequence.

Digital networking has become an integral part of life, without which many people feel incomplete, disconnected, and empty. Silence and loneliness – culturally-historically often seen as quite positive states – are then perceived as difficult to bear. Individuals enjoy the potential for individualization offered by digital transformation and increasingly tailor their network environment to their needs, thus appearing to become more and more “individual”. However, this harbors the potential for second-order tragedy. According to Georg Simmel (1890), individuality arises from the intersection of social circles and continues to develop in this way. It is true that the internet greatly increases the possibilities of intersections with the “circles” of others and thus indeed creates new opportunities for further individualization. However, if the circles and the connections created by these intersections were calculated digitally based solely on past profile data, there would be no new intersections. Instead, only those circles that match the existing intersections would intersect. Looking at the internet, for example via a search engine or by querying ChatGPT, would then yield nothing new, but rather reproduce one’s own data from the past. The other, the potentially surprising and irritating, the foreign and the new, which according to Simmel further develops individuality, would be digitally filtered out. Even in the digital global network, one would only meet those one always meets anyway. This would be a world in which meaningful further individualization



through friction “with the other” (cf. Levinas, 1963/1986) would no longer be possible. Individuality would become solipsism in the filter bubble (Ross Arguedas et al., 2022). This narrative of the end of individuality can be addressed as a gradual disruption: The dignity of the individual and the value of individuality, prerequisites for a vibrant democracy, could gently disappear in this way, while keeping people under the illusion that they are still individuals.

#### *Loss of the Future*

Digital technologies operate based on past data. This means that digital twins only ever represent yesterday’s world, e.g., by creating customer profiles based exclusively on past consumption patterns. The same applies to forecasts that extrapolate patterns based on statistical premises. Big data technologies can only evaluate past data and recognize past patterns. AI systems can only be trained using data from the past. Data from the future is not available. Forecasts created with the help of AI and big data are based on pattern recognition in past data. When these correlations and patterns are used to make predictions about the future, past conditions are carried over into the future, are imposed on it, so to speak. The future as an at least partially open space of alternative paths and possibilities is replaced by a data-based extension of the past. For many areas of application, this is likely to be unproblematic, as it corresponds to learning from the past for the future. However, learning from the past is often motivated by something quite different than the desire to extend it into the future. On the contrary, it could also be intended to ensure that certain past conditions, such as previous discrimination, are not continued in the future, but rather changed. This distinction would be lost if digital evaluation and decision-making processes were uncritically entrusted with the future.

In light of multiple anthropological definitions of humans as beings with a future and the ability to visualize and reflect on possible futures (e.g., Kamlah, 1973), not only as an extension of the past but also as a new creation in a space of many possibilities, a gradual disruption may occur: The replacement of openness and the malleability of the future, or of thinking in alternatives in favor of a data-driven orientation toward the past. What would be tragic here is the imperceptible shift from the belief that digital technologies open up the future to a world that is increasingly digitally driven and oriented toward the past.

#### *Loss of Personal Encounters*

Global trading platforms such as Amazon are standardizing capitalism and thus creating new freedoms. Online shopping and large digital trading platforms give consumers the freedom to order and find almost any goods and services anytime, anywhere. Even in the smallest villages on the periphery, it is now possible to conveniently order any label, any fashion brand, any electronic device, and any rare delicacy, and to stream any niche film. This “cultural participation” would have been unthinkable decades ago. Customers are gaining opportunities to rate products and thus a new form of consumer power. On the other hand, however, commerce is no longer based on personal contact, as is the case when shopping in an owner-operated store. Shopping is becoming depersonalized and delocalized. In a figurative sense, the technological possibilities of online shopping enable people to shop in an emotional and mental state



similar to that of the engineers in the literary works of Robert Musil or Max Frisch: As one-sided, number-crunching calculators who experience their “shopping adventures” in a fundamentally disoriented manner. However, we no longer see the retailers or the product in its haptic and sensory form, but only as a photo and in the abstract formulas and stars of product ratings. This category of technological consequences appears not only ambivalent but also as second-order tragic consequences. Of course, the question of what this means remains open. The disappearance of the so-called “corner shops” from the 1950s onwards in favor of supermarkets, often located on greenfield sites on the outskirts of towns, was lamented as a loss of quality of life and connectedness in villages, districts, and neighborhoods. Certainly, those who lamented this development usually also took advantage of the new shopping opportunities and only used the corner store to meet spontaneous needs. So they disappeared – are they still missed today? Has the quality of life declined as a result of their disappearance? These are questions that require a hermeneutic approach.

#### *Loss of Quality in Favor of Measurable Data*

The digital transformation, with its dependence on data, has further exacerbated the primacy of technical thinking: As soon as problems arise, there is a reflexive call for technical solutions (techno-solutionism), while other strategies, such as changes in human behavior, the economic order, or new political regulations, tend to be less likely to be discussed. This primacy is linked to the expectation that technology will then solve the problem. This attitude may obscure tragic developments or hermeneutic debates about the possibility of tragic second-order developments in favor of a belief in technology.

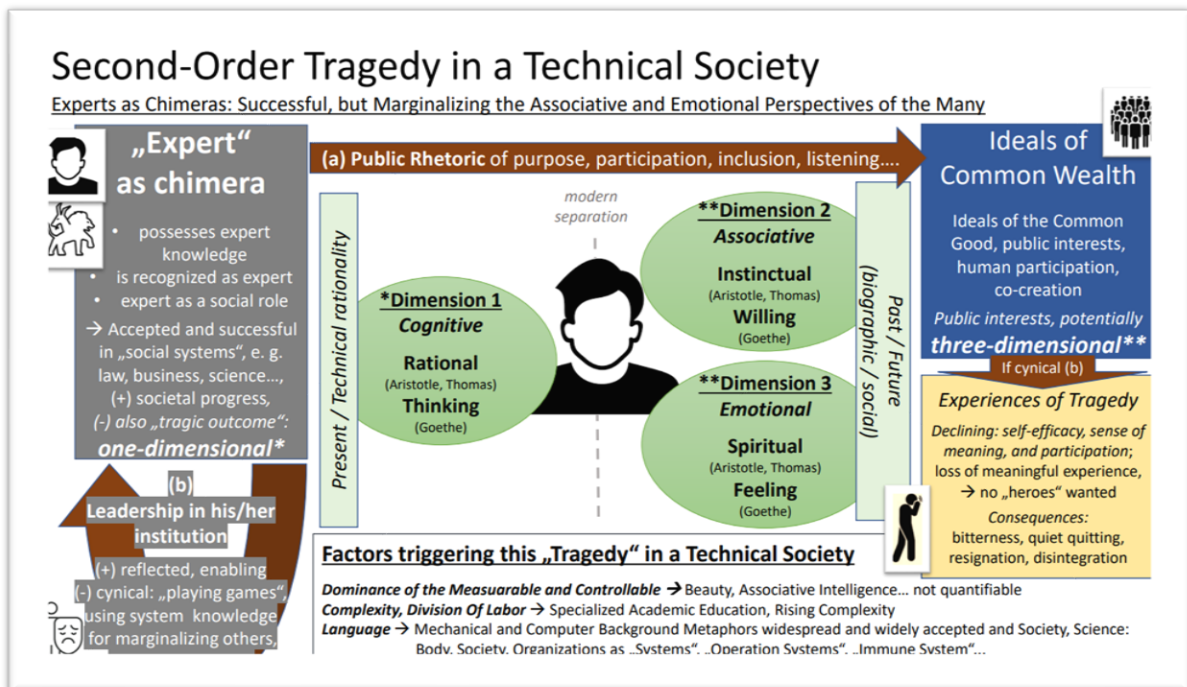
One aspect of this is that technology not only produces new tools, but also, through the undeniable multiple successes of many technology projects, creates an increasing dominance of the measurable and controllable in relevant decisions. The widespread belief in data that has emerged in the course of digital transformation is an expression of this, while the qualitative and interpretation-dependent aspects are finding it increasingly difficult to be accepted at all. In many cases, this is only discussed in terms of deficits. This influences, for example, academic and professional expert training in a way that in turn has a second-order tragic potential. There is no doubt that technical experts are needed to exploit the potential of technology for problem solving, prosperity, security, progress, etc. While they – metaphorically speaking – leverage, exploit, and establish potential, they also use technical language. Metaphors for human communities as “networks” – such as “social networks” or “career networks” – are also becoming established in general language use (Knox et al., 2006; August, 2022). As background metaphors, they influence thinking and action (Lakoff & Johnson, 2020) and promote ideas of people as links in mechanical chains rather than creative individuals.

In this way, technical and information technology background metaphors find their way into general thinking and speech. Thus, the successful work of experts can promote a “one-dimensionality” in the sense of the primacy of mechanistic thinking (see above) via the detour of language and cultural metaphors, marginalizing other forms of expression and modes of cognition such as the associative, the hermeneutic, the emotional, and experiences of historicity, questions of meaning (see Fig. 2). Tragic





experiences can arise here if technology, with its promises of progress, was also linked to emancipation (or even happiness) – but if the forms of expression in which these can be described fall victim to the primacy of “mechanistic speech and interpretation”. The expert appears here as a chimerical figure. They make an irreplaceable contribution to social, economic, and technical progress, but create a dichotomy in public discourse and, above all, within organizations, where accepted and “embarrassing” rhetoric can no longer be expressed: Cognitive-rational argumentation supplants associative, emotional, and intuitive argumentation. Public trust can dwindle in this way. At the same time, the expert can “mutate” into a cynic who uses their privileged role to gain internal power and has effectively abandoned the ideals of the common good (Fig. 1b).



**Figure 1b.** Tragic second-order technological consequence (JG)

## FROM FLIGHT TO CRASH: LITERARY FIGURES OF (PRE-)TRAGIC EXPERIENCE

Aristotle defined the effect of tragedy on the viewer as “pity and fear”. However, this is not yet relevant to the phase preceding the “tragic fall” – the experience of the “successful use” of a new technology. This idea fits with the thesis that the tragic consequence of the second order does not occur as a sudden disruption, but rather gradually. This means that the “technical cause” of the tragedy is already present in the world before the tragic consequence occurs, let alone before it is generally noticed, feared, or publicly debated.

Thus, it is not the crash, but the experience of flying that appears to be a suitable metaphor for technological success, which already contains second-order tragedy. In this



section, we will examine the allegory of the experience of flying in more detail and interpret it as a specific experience of technological consequences using six literary or art-historical examples from different eras.

Why do we propose such hermeneutics? Because second-order tragedy arises in socio-historical constellations and experiences of them. It is not technology as such that leads to second-order tragedy, but rather its combination with human behavior. But the “key” is the perception of the actors (and/or observers). That is why second-order tragedy is “readable” in narratives about (experienced or literary) socio-technical constellations. The term “constellation”, commonly used in sociology, refers to the interaction of various historical, social, political, and technical factors that, in specific combination, enable or shape a particular development (Heidegren, 2024). The technical possibilities and cultural perspectives of a specific time also shape a constellation, which focuses on the interdependence of actors and structures. From this perspective, technology does not appear as an isolated artifact, but as part of a network of relationships in which people are both acting subjects and actors shaped by technology. Second-order tragedy often arises in concrete constellations or figurations (Elias 1992/2018) where the scope for action of individuals and collectives is unintentionally restricted by technical developments.

This section explores such tragic consequences by attempting to understand the literary “internal perspectives” of the experience of weightlessness, but also of “thrust reversal”, from an observer’s point of view. The following subsections take closer looks at those tragedies:

- *Icarus* wants to expand his scope of action with a flying machine, but this forces him in one direction: Falling into the sea.
- *Kay* in Andersen’s “Snow Queen” wants to understand the world from a purely materialistic perspective, but in doing so loses his heart and his childhood – the direction is old age, and death.
- Preussler’s *Krabat* learns magic and wants to expand his scope of action materially – but he gets caught up in the mechanical and power apparatus of a mill, where death seems inevitable in the medium term.
- *Vakula*, on the other hand, succeeds in mastering a “flying machine” because he climbs aboard already knowing the dangers in Korsakov’s “Christmas Eve”.

The texts – apart from the myth of Icarus itself – are taken from the opera libretto of Korsakov’s “Christmas Eve” (1895/original novella 1835), Andersen’s fairy tale “The Snow Queen” (1844), Max Frisch’s “Homo Faber” (1957), and Ottfried Preußler’s young adult novel “Krabat”, known in English as “The Satanic Mill” (1971). We also look at Brueghel’s painting of Icarus from 1550, thus taking a comparative look at works from different genres and eras.

In particular, the four “newer” texts do not deal with “technology” per se. However, they contain allegories or metaphors about flying that can be interpreted against the backdrop of the technological history of their times. They originate from different periods, during which different technological developments and discourses were at work in the background: In the 1830s, the Industrial Revolution provided decisive impetus, leading to the spread of steam railways in continental Europe and Great Britain. Around 1845, telegraphy made its breakthrough, enabling rapid transmission of messages over



long distances for the first time. Homo Faber is considered a parable of so-called technocratic high modernism: In the 1950s, especially in 1955, the beginnings of computer technology and the first civilian jet aircraft for mass transport were at the center of technical innovation. But the Second World War, with its devastating technological applications (bomber planes, submarines, developments in atomic weapons, Hiroshima, poison gas), was still fresh in people's memories. Finally, the 1970s were marked by microelectronics, the spread of personal computers, and the early beginnings of digital technology, which laid the foundations for today's information society. Preußler's "Krabat", on the other hand, is read more as a reworking of the Nazi dictatorship and the entanglement of a young person in its political-technical apparatus (Fritz, 2002, p. 48).

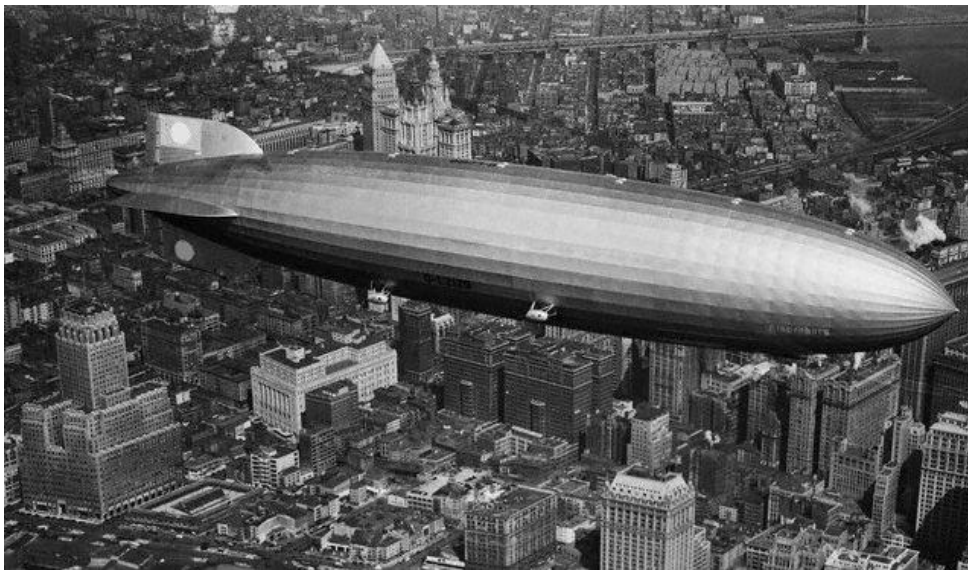
Flying is not only a metaphor for an experience, but also a central subject of the history of technology in the 19th and 20th centuries. Toward the end of the 19th century, the dream of flying gained significance when modern aviation linked social and national hopes to modern science. The "scientific balloon flights" undertaken by German aeronautical associations from the 1880s onwards were used for meteorological or geographical exploration (Höhler, 2001). In 1919, British pilots John Alcock and Arthur Brown succeeded in making the first manned flight across the Atlantic. The aviation history of German zeppelins ended in disaster. The crash of the Graf Hindenburg zeppelin (Fig. 2) in New Jersey on May 6, 1937, which killed 37 passengers, was seen by the media and the public as a warning sign, as the flying machine was considered a symbol of Germany's technological and military strength. A newspaper in Germany wrote the day after the accident: "The airship was more than a technology [...], children came to school with sad, pale faces." (De Syon, 2002, p. 196). The pale face – was it just an expression of "fear and pity" in the face of tragedy, or also an expression of an Icarus experience, that "the feathers melt"?

The flight (and crash) as a metaphor for the experience of technology would, in Hans Blumenberg's words, be an example of an absolute metaphor, i.e., one that cannot be completely dissolved into conceptual speech (Blumenberg, 2010). The metaphor of flying reflects – even beyond the technical context – the ambivalence of freedom. Only "the phantasm of being able to fly, which in dreams succeeds with the pleasure of effortlessness over vast spaces, allowed the idea of overcoming not only certain obstacles to earthly locomotion, such as rivers, seas, deserts, or mountains, but ultimately all of them – even the limitation imposed by the earthly, i.e., the body itself." (Trautsch, 2020a, p. 23). In extreme cases, it is a metaphor for victory over death. Modern flight technologies not only contribute to increasing the range of modern humanity, but also to the implicit project of "overcoming fear" through technical progress (cf. Blumenberg 2007/2018, p. 33). Also Saint-Exupéry's "The Little Prince", written by a long-distance pilot who died in a flight accident in 1944, can be read as an artwork that frames the dangers and technical uncertainties of aviation through the fairy-tale figure of the little prince. In the form of the fairy tale, this danger is not downplayed but reflected. Real threat, childlike joy, and the sensation of "weightlessness" are held in a lyrical tension with one another.

At the same time, modern flight technologies open up a greatly expanded space for fear of consequences. For 21st-century psychiatry, fear of flying is a clinical picture that



requires treatment in severe cases (Donker et al., 2023). In this context, we can see the reasons why the myth of Icarus is frequently taken up in 20th-century literature – by Salman Rushdie, Toni Morrison, and James Joyce, among others (Salis, 2016). As Natascha Adamowsky (2010) highlighted, in many visual figures of flying “premodern” images of “wonder” are still present.



**Figure 2.** Weightless over New York: The zeppelin “Graf Hindenburg” a few hours before the disaster (U.S. National Archives, Public Domain)

### Daedalus and Icarus

The ancient myth of Icarus is particularly relevant. How does Icarus experience his flight (Fig. 3)? As a sudden occurrence:

“[...] suddenly he found his feet were no longer on the ground ... he was in the air ... [...] He couldn’t believe it! As he looked down at the sea below, his heart fluttered with excitement.

It was as though his body was weightless. The wind whistled against his ears. He felt like a bird! Higher and higher, faster and faster he flew!

Suddenly, Icarus realized he could hardly see his father. He had flown so high his father resembled a small dot below him. At the same time he noticed a feather drift past and float downwards towards the sea. And then another... and then another. Too late Icarus realized his wings were melting. [...] With every desperate swoop of his arms, more feathers fell and soon his arms were almost bare.” (Ovid 8/2012, p. 21)

The feeling of flight triggers excitement, heart palpitations, and a sense of weightlessness and exhilaration. But then his own father is out of sight, seemingly





unreachably far away. The flyer is caught in turbulence, a downward vortex. The aircraft is dysfunctional; his arms are “almost bare”. The feeling of nakedness heralds disaster, the fatal crash, but also the loss of the “human scale”: His father, whom he is searching for, is now only visible as a distant dot. Weightlessness gradually leads to disaster – the realization comes “too late”.

Instead of or in addition to interpreting the myth of Icarus as a consequence of hubris, the Icarus experience can be interpreted as the disappointment of placing hope in a technical device. Icarus does not want to “become like God”, as Lucifer does in the biblical myth of flying high (Pini, 2013). He flies out of sheer youthful joy. The shock sets in when he realizes that the technology does not deliver what it promises – when the wings fail. Icarus had not disregarded his father Daedalus’ advice not to fly too close to the sun out of “malicious intent”, but simply did not listen to him properly: “Icarus nodded quickly. In truth he was barely listening”. The excited anticipation of the flight had distracted him.

Historical examples, but also the literary figure of flying, capture the ambivalence of technology. It embodies the empowerment of intelligently transcending what were previously experienced as “natural” limitations on movement. But it also embodies pure joy, pleasure, playfulness, and the rush of endorphins. However, talk of flying often already contains references to experiences that allude to the Icarian fall. Flying therefore means the feeling of:

- Losing the ground beneath your feet (metaphorically speaking, with regard to expectations of flight technology: Overestimating the strength of the device)
- Becoming weightless (i.e., losing sight of the consequences of one’s actions)
- Seeing the Earth as nothing more than a distant point (i.e., losing one’s earthly perspective)
- Gaining power, overcoming gravity (i.e., the temptation to keep going)
- Looking down on the world and others from above (i.e., hubris).

Real-life “flying adventurers” such as Elon Musk are seen as ambiguous figures who inspire both fear and hope. But many “modern Icaruses” do not attract attention. Humanity’s “small flying machines” are commonplace and, for a humanity in need of mobility, there is no alternative – the automobile, the holiday plane, the flight simulator game on the iPhone, the toy drone. This means that flying is normal. A certain modern Icarus ignorance can be observed.





**Figure 3.** A calm fall to his death: Icarus by Albrecht Dürer, 1493 (British Library, London, Public Domain)

### **Brueghel the Elder: Landscape with the Fall of Icarus (1555)**

The figure of Icarus is suddenly marginalized in Bruegel's early modern pictorial composition. Here, he appears barely larger than one of the sheep (Fig. 4). In contrast, the foreground is dominated by the plowing farmer, a shepherd, and the merchant ships on the sea. They all seem to go about their work unmoved, as if the fall of Icarus deserved neither attention nor significance. Here, the tragedy is ironically intensified: It is no longer even recognized: "None of those present, except the tragic flier, participate in his accident or share his tragedy" (Wilkoszewska, 1986, p. 29). On the one hand, the observers' reaction – pity and fear – is absent. On the other hand, Icarus' fate thus appears to be quite normal and everyday. This Renaissance depiction can also be interpreted as follows: In the "age of technology" the fall of exposed heroes becomes the fate of all. Think of sailors in a Spanish merchant ship that sinks, of growing cities that can be better fed thanks to new plant varieties from America, but are also more susceptible than ever in the event of pandemics. At the center of Brueghel's humanistic view is not the spectacular fall, but the continuity of everyday, useful activities such as plowing and sailing around the world – the technical achievements whose effects prove to be beneficial and promising. In a sense, the story of Icarus does not disturb us. Tragedy does not appear here as a moral warning against "hubris" but as an everyday companion to humans, whose actions are irrevocably ambivalent in a complex field of tension between knowledge, uncertainty, and acute (technical) necessity for action.



**Figure 4.** The beginnings of Icarus’ ignorance: Painting “Landscape with the Fall of Icarus” (Bruegel the Elder, attributed – Royal Museums of Fine Arts, Brussels, Public Domain)

#### **Gogol / Korsakov: Christmas Eve (1832/1895)**

Rimsky-Korsakov’s libretto for the opera “Christmas Eve”, based on a novella by Nikolai Gogol, is staged as a single flight sequence – as in the Frankfurt Opera’s production in the 2021/22 season. The play shows in a fairy-tale-like, comical form how a witch and the devil try to spread chaos and temptation on Christmas Eve, of all nights, by flying through the night. But the blacksmith Vakula, the heroic antagonist, also flies: Courageously on the devil’s back, straight to the Tsarina, to steal her shoes and thus win the love of the village beauty Oksana. Here, the witches’ flight is to be understood in the early modern symbolism of Christian interpretations (Zika, 1989), as a mythical representation of the temptation of evil to override divine laws. Korsakoff states:

DEVIL: Don’t stop the devil leading honest people astray.  
We’ll fly, we’ll fly!  
Oo hoo!

SOLOKHA: We’ll fly, we’ll fly!  
Oo hoo!

SOLOKHA: We’re going to hide the moon and stars.  
We’ll unleash snowstorms,  
the streets will be  
full of snowdrifts. (Rimsky-Korsakov, n. d.)

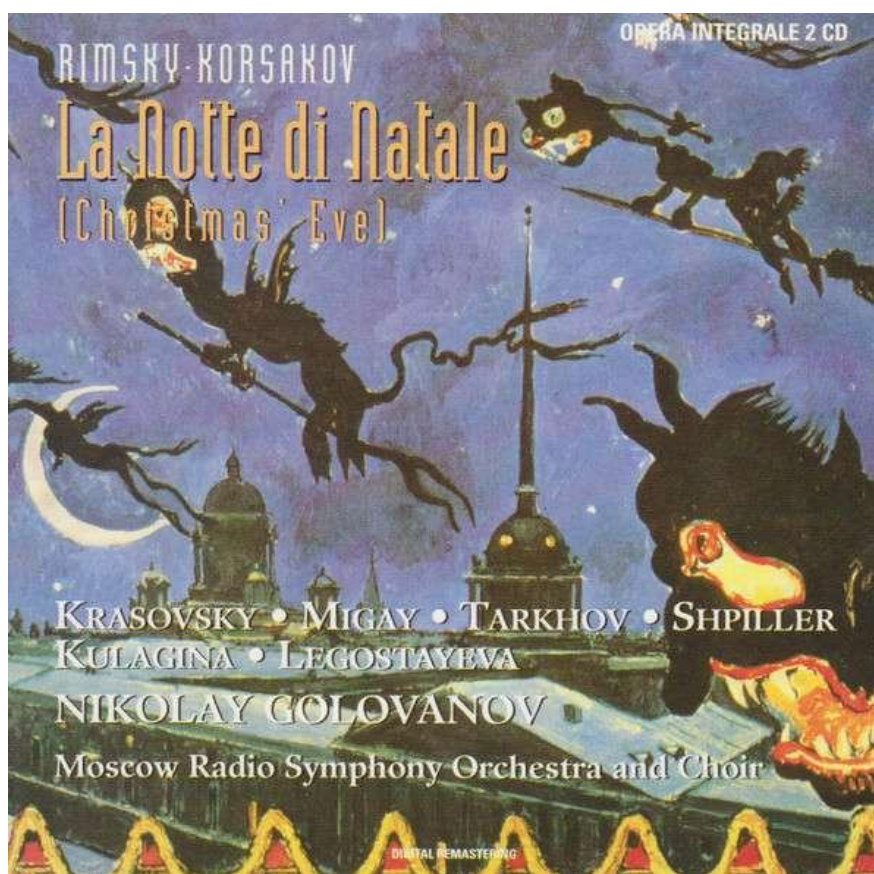




It is the flight of the devil and the witch themselves that wreaks havoc, that “feels” like intoxication (“Oo hoo!”) to the two of them, that removes the moon and stars from their places (Fig. 5). And the conqueror of the devil is the Orthodox hero, and his heroism is also a flight – the prudent, heroic flight, the flight on the back of a winged horse into which the devil has transformed himself. As a blacksmith, Vakula embodies creative power, but as someone dependent on Oksana’s wishes, he also embodies dependence on “technology”: He needs the devil himself as a “superhuman” means of transport.

On the night before Christmas, the still devoutly religious and superstitious pre-industrial man in Russia finds himself caught up in the mechanics of the coming, eerily technical order. Gogol’s text can thus be read as an allegorical anticipation of the experience that the technical apparatus is both a means of liberation and an instrument of subjugation (cf. Sect. 2.2). The ambivalence of the flying allegory culminates in the fact that the hero of the story, Vakula, escapes the foolish superstition of his village by using the devil as his mount. He controls his flying object with a whip: “Wakula rushes across the stage on a flying horse, a whip in his hand, and disappears.”

The story ends as a good, slightly ironic Christian heroic fairy tale. Its optimistic punchline: Humans remain free; it depends on the “how” of flying.



**Figure 5.** Everyone flies, and it depends on the “how”: Witches and heroes in the opera “Christmas Eve” (Picture Citation, MRS CD Cover undated)



### Andersen: The Snow Queen (1844)

The end of the first chapter of Hans Christian Andersen's fairy tale "The Snow Queen" opens up an allegorical interpretation that shows a person under the spell of a technical apparatus of power. The person here is Kay, who grows from a child into a teenager, whose childishness disappears as he adopts the "adult" view of purely technical, objectifying rationality. The emotional cooling – caused by the intrusion of a splinter from the devil's mirror – culminates in the experience of flying on the Snow Queen's sleigh:

Kay looked at her; she was very pretty; he could not imagine a more clever, fairer face. She did not seem to be made of ice now, as she was when she sat outside the window and beckoned him. In his eyes she was perfect, and he felt no fear. [...] He gazed up into the immense spaces of the air, and she flew on with him, flew high among the dark clouds, and the storm wind whistled and roared as if it were singing old ballads. They flew over forests and lakes, over sea and land: below them the cold blast whistled, the wolves howled, the snow sparkled; above them flew the black cawing crows, but over all shone the moon, large and bright; and by its light Kay watched through the long, long winter night; by day he slumbered at the feet of the Snow Queen. (Andersen, 1844)

The feeling of flight is not conveyed from Kay's inner perspective. But that is only logical. His view as a flyer is transformed into complete emotional detachment, entirely devoted to mathematical reason, as symbolized by his love for the Ice Queen. The cold, the clouds, the altitude of the flight are described in a sober and inwardly impassive manner, reinforcing the atmosphere of horror and chill; Kay "feels no fear", observing the events coolly in the cold white moonlight (Fig. 6). His inner coolness is expressed through the allegory of the "long long winter night". The winter world rushes past him as if in a frenzy, with only one strange signal: The storm howls "as if it were singing old ballads". This may be Andersen's hint towards the end of this fairy tale: The narrative forces, the events of love, reconciliation and tears will provide the final punchline, not just the cool arithmetic of the Snow Queen's empire.

But first, the sleigh will take him to the Snow Queen's palace. There he must play a mechanical game for many years: The endless laying of pieces of ice that are supposed to form a meaningful whole. But he cannot succeed. He fails to lay the word "eternity". The tragedy of the second order lies in this combination of mechanical-technical promise (rational knowledge, higher order) and actual alienation, his insensitivity. But that is not the end of the fairy tale. His childhood friend Gerda finds Kay and redeems him with love and tears. But both have lost something on this journey: Their childhood. But they have also gained something: Experience, insight, and a sense of responsibility. On the one hand, this fairy tale can be seen as a variation on the "old" biblical story of the expulsion from paradise. On the other hand, it is full of allusions to the positivist, scientific-industrial hopes of salvation of the late 19th century. The experience of flight has changed from a joyful intoxication to a cool fascination. This suppresses the levels of awareness of compassion and beauty, as well as the playful approach to the world – a true "tragedy of the second order".



**Figure 6.** Kay's flight through the cold as an allegory for his inner life (Picuture Quotation Elena Ringo, Fairytale Wiki / Fandom)

### **Frisch: Homo Faber (1957)**

Max Frisch presented the novel "Homo Faber" as a literary caricature of "homo technicus". The story begins with a flight. Homo Faber, the engineer, flies to South America as an ordinary passenger. The first-person narrator succinctly describes flying as a completely everyday experience with impressions such as: The flight is "rigid in empty space, no swaying", completely "motionless":

As I could see out of my right eye, we were somewhere over the Mississippi, flying at a great height and absolutely smoothly, our propellers flashing in the morning sun; the usual window panes, you see them and at the same time look through them; the wings also glistening, rigid in empty space, no swaying now, we were poised motionless in a cloudless sky, a flight like hundreds of others; the engines running smoothly. (Frisch, 1997/2006, p. 3)

Soon after, he suffers the same fate as Icarus: His plane crashes. Ironically, even after surviving the crash, the passenger remains completely calm. His comment is laconic: "there was no serious damage":

Without waiting for an order, we all gathered in the shade under the wing; not a word was spoken, as though talking in the desert was forbidden. Our Super Constellation was tilted slightly forward, there was no serious damage, only the

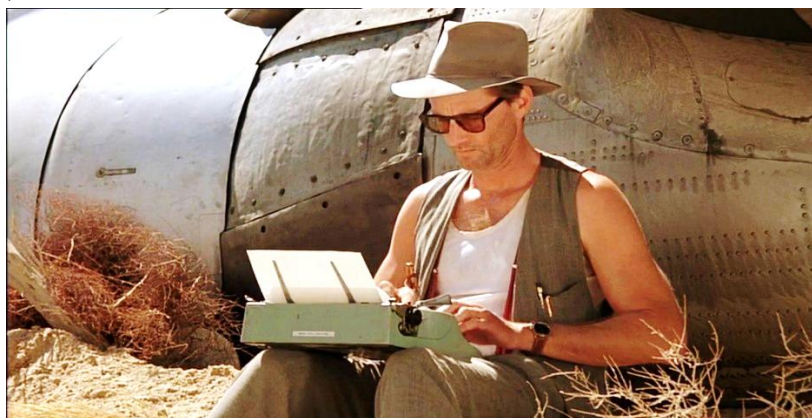




front undercarriage was jammed, having sunk into the sand, it wasn't even smashed up. The four propeller crosses gleamed in the glaring blue sky; so did the three rudders. No one moved, including me. (Frisch, 1997/2006, p. 9-11)

Not only flying, but also crashing becomes somehow normal here (Fig. 7). The enlightened engineer simply takes note of it with a shrug, as if he knew that it was a possibility with a certain probability. The mode of being affected – necessary in order to be able to interpret tragedy at all – has been lost to this modern type. Homo Faber, as a caricature of the technically rational engineer, does not allow this experience to distract him from his thoughts; he accompanies the crash with reflections on technical details, objectively, like an observer of a laboratory experiment. The engineer Faber embodies a modern world in which “tragedy” is presumed impossible. Yet he unknowingly falls in love with his own daughter (a kind of Oedipus story), she is bitten by a snake (like Eurydice). Ancient tragedy breaks into the modern world, but Walter Faber testifies a complete blindness to tragedy because he lacks the sensitivity for it. Ironically, this persists in Frisch's novella itself after a literal Icarus experience, his own plane crash.

The engineer – as an almost naive developer of technology – is, in this sense, the tragic figure of modernity. On the one hand, the engineer is even a savior figure of the era of “technocratic high modernism”, as historians Uwe Fraunholz and Sylvia Wölfel have called it. Until the mid-1970s, the engineer embodied the competence to solve the great questions of humanity – energy supply and world food supply – in the public eye. On the other hand, however, the engineer is also increasingly portrayed as a problematic figure in literature. Max Frisch's novel “Homo Faber” not only alludes to Icarus, but is also read primarily as an adaptation of ancient myths: Precisely because “his” protagonist is incapable of any other approach to the world than a technically rationalized one, Max Frisch allows this character to be caught up in a whirlwind of tragic events in the course of the narrative, ranging from incest (Oedipus) to suicide and his own death. The punchline is that it is precisely in the completely demythologized technical approach to the world that myth regains ground: “Myth and technology are thus not opposites, as the narrator sometimes suggests, but are similar in their function of alleviating fear” (Roehl, 2020, p. 267).



**Figure 7.** Homo Faber, detached participant-observer of a plane crash (Image Quotation of Volker Schlöndorff's 1991 movie)

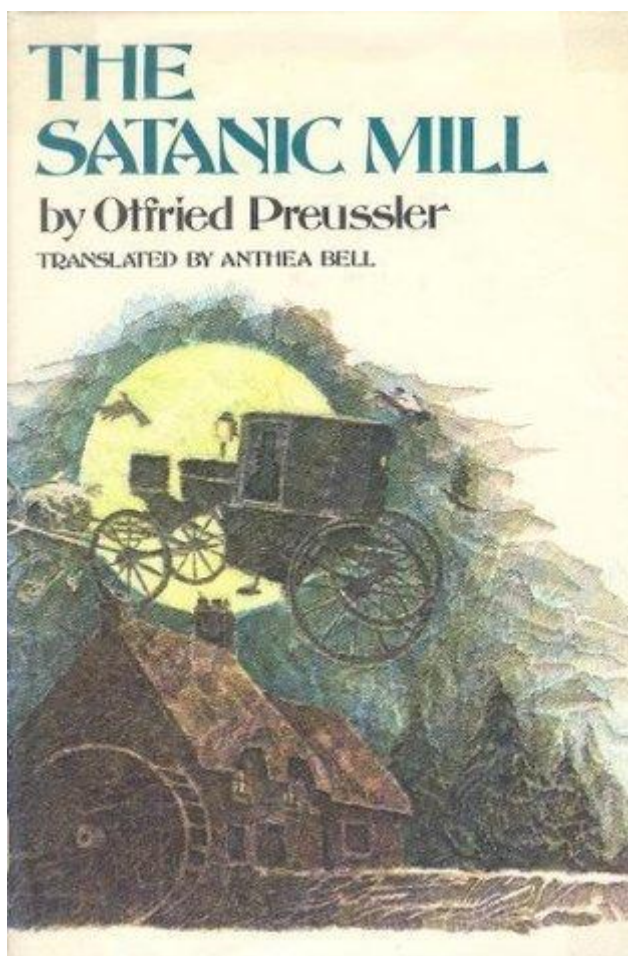


### **Preussler: Krabat / The Satanic Mill (1971)**

The young adult book *Krabat*, which is very well known in German-speaking countries and translated into English as “The Satanic Mill”, describes the story of a poor young man who hopes for a better life by entering a dark mill (Fig. 8). There, one learns magic and flying, but the price is high. The sorcerer is directly subordinate to the devil and must sacrifice one of his students once a year. There, the young Krabat not only learns magic and enjoys a privileged life, but is also suddenly “thrown” into adulthood. This is also associated with the experience of near death. His thirst for adventure and desire for a life without material poverty turns into a life of bondage and fear. Behind the magic course lies a totalitarian system in which everyone fears being denounced by the others. In this story, hope (a life without poverty) and tragic consequences (death and constant fear of speaking freely) are tragically opposed.

Flying is also to be understood allegorically here: The children learn to transform themselves into ravens through a magic spell. The mill where Krabat is apprenticed can be understood symbolically as a strictly functional system. The mill grinds incessantly, its processes are determined by a rationality that leaves little room for individual action. In this setting, humans become “functions” of the apparatus. They gain power and abilities, but pay for them with autonomy and vitality (cf. the section about “Second-Order Tragedies”). The tragedy lies in the dual experience: On the one hand, entering the mill promises progress, power, and security; on the other hand, the apparatus binds the individual into structures that increasingly curtail their options for action. In this reading, “Krabat” appears as a narrative depiction of second-order tragedy. Here, flight is portrayed as a brief, bumpy attempt – paradoxically as an expression of bondage and imprisonment by death:

Krabat, the raven Krabat, obediently spread his wings and took flight. Fluttering awkwardly, he flew around the chamber, circled the table, and brushed against the book and the skull. Then he settled down with the other ravens and clung to the perch. (Preußler 1971, p. 40; translation JG/AG).



**Figure 8.** Flying over the Satanic Mill (Image Quotation of Mc Millan book cover 1973)

## DISCUSSION AND CONCLUSION

Second-order tragedy in the context of technology has been described in this article as experiences of loss of freedom and individuality, the future, personal effectiveness, or a loss of relevance of qualitative data in decision-making processes. Such tragedy does not arise suddenly, but gradually. It emerges in historical or literary constellations from the feelings of those involved, in the interpretation of the observer, and in hermeneutic dialogue.

In considerations of the consequences of technology, for example, the view of digitalization and AI must not be narrowed down to a purely objectivist view of technology, but must take into account the interactions with human behavior. The possible constellations of application are in principle infinite and unpredictable. Knowledge of historical and literary cases broadens the corridor of expected consequences in the “first and second order”. The often only vaguely tangible human



factors in terms of convenience, adaptation, and overestimation of digital systems, perhaps most strongly the “sweet temptation” of convenience, adds another layer to the usual difficulties of recognizing gradual processes and assessing their relevance for action. This shows that the tragedy of technology is actually a tragedy of humanity.

Speaking of technology and tragedy together also has several implications with regard to the quality of public discourse:

- This perspective removes it from one-sided scandalization.
- It places it in the larger context of meaning, experience, and history of the tragedy of humanity in general.
- It has a definable, “objectifiable” side
- It has an “inner” subjective side, which we call “second-order tragedy”.
- It is precisely this narrative structure of the tragic experience with technology that differentiates the usual dichotomous discourse patterns between “rejection” and “approval”, between “fear of technology” and “technological euphoria”.
- It expresses ambivalence from an experience-based perspective.

Second-order tragedy was received and interpreted using the example of literary descriptions of flight. This provided an example of hermeneutic technology assessment. In doing so, we have responded to a methodological research postulate: To strengthen a hermeneutic science of technology assessment (Grunwald, 2014; Mehnert & Grunwald, 2024).

However, we must also mention the possibility that people are projecting the tragedy of general life experience onto technology in a monocausal manner. Statements such as “robots are taking our jobs” (instead of “managers who decide to use these robots”), or “my child has ADHD because of tablets” (instead of “because we gave them a tablet too early”, or “because we don’t have the energy to deal with him appropriately”), or “I am sick because of industrially-processed ready meals” (instead of “because of my one-sided dietary choices for these meals”) would be examples of this. Here, we could speak of technology-related exculpation narratives. Our idea of a dual relationship between tragedy and technology does not imply a one-sided negative focus on technology. Embedding technology in human history as the history of technology allows us to recognize “technological progress” as part of the provision for a better life. For tragedy would exist even without technology, only in a different form.

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Research article

## Taming the Tragic – Agency and Catastrophe

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### Abstract

In this article, some points of contact between tragedy and technology are presented. The main point of contact is the way in which both treat human action and issues related to knowledge, ignorance, responsibility, and tragic error. To define tragedy in general terms, some attention will be devoted to the works of Aristotle. From there, a comparison with our current predicaments can be drawn. We will argue two points. The first is that the tragic spirit that animates representation in Greek tragedies currently arises in various eras under new determinations that have a bearing on human agency. In our era, various events, such as disasters, calamities and catastrophes, attest to the role of technology in structuring, thwarting, and curtailing actions. At first glance, the return of the tragic spirit would seem obvious, owing to errors and the unintended effects of widespread technological use and innovation. The second point draws on the work of various authors in philosophy of technology to argue that it is difficult, if not impossible today for an event to be recognized or represented as tragic. In particular, the Promethean Gap between our faculties of production and our faculties of representation and feeling signifies that we are unable to grasp the effects of our everyday technologically mediated actions. Additionally, the spirit that animates the accelerated adoption of technology shifts responsibility away from human beings and towards a lack of knowledge and optimal planning of technical systems. In the original sense, an event is never acknowledged as tragic since it is never something definite, but a step towards a perfected future state of affairs.

**Keywords:** Tragic; Technology; Gunther Anders; Promethean gap; Aristotle

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Научная статья

## Укрощение трагического: агентность и катастрофа

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### Аннотация

В этой статье представлены некоторые точки соприкосновения между трагедией и технологией. Основная точка соприкосновения – это то, как оба явления рассматривают человеческие действия и вопросы, связанные со знанием, невежеством, ответственностью и трагической ошибкой. Для общего определения трагедии будет уделено внимание работам Аристотеля. Оттуда можно провести сравнение с нашими нынешними проблемами. Мы выдвинем два тезиса. Первый заключается в том, что трагический дух, лежащий в основе изображения событий в греческих трагедиях, в настоящее время возникает в различных эпохах под влиянием новых факторов, влияющих на человеческую деятельность. В нашу эпоху различные события, такие как катастрофы, бедствия и катастрофы, свидетельствуют о роли технологии в структурировании, препятствовании и ограничении действий. На первый взгляд, возвращение трагического духа кажется очевидным, обусловленным ошибками и непредвиденными последствиями широкого использования технологий и инноваций. Второй тезис опирается на работы различных авторов в области философии технологии, утверждая, что сегодня трудно, если не невозможно, признать или представить событие как трагическое. В частности, прометеевский разрыв между нашими способностями к производству и способностями к представлению и чувствованию свидетельствует о нашей неспособности осознать последствия наших повседневных действий, опосредованных технологиями. Кроме того, дух, движущий ускоренным внедрением технологий, перекладывает ответственность с людей на недостаток знаний и неоптимального планирования технических систем. В первоначальном смысле событие никогда не признается трагическим, поскольку оно никогда не является чем-то определенным, а лишь шагом к совершенному будущему положению дел.

**Ключевые слова:** Трагический; Технология; Гюнтер Андерс; Прометеевский разрыв; Аристотель

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## INTRODUCTION

This work revolves around two points. The first examines the hypothesis that there is a significant convergence between the tragic spirit and the issues raised by technology today. Specifically, Greek tragedies and the works of Aristotle serve as fertile ground for exploring the dynamics of technology. Not all Greek tragedies align with technological themes, and not all are relevant for understanding and framing technology in the modern world, but many shared affinities exist between the two. Historians and philosophers of technology could gain valuable insights from studying these connections, and specialists in Hellenistic studies would recognize how philosophers of technology address concepts and problems related to human action that are similar to those raised by tragedies. Although I disagree with some of their conclusions, the works of Jos de Mul (2015) and Mark Coeckelbergh (2012) on these topics demonstrate a promising intersection. While Hellenistic studies certainly require a thorough understanding of Greek to interpret the original texts, their overall conclusions still support and encourage fruitful interdisciplinary dialogue.

What explains this convergence between tragedy and technology? The significance of Greek tragedies today lies precisely in how human action becomes a central theme that is continually examined within the specific epistemic circumstances of the characters' contexts when they make decisions and face the consequences. Greek tragedies raise questions about *ananke*, the necessity surrounding human life, as well as freedom and responsibility. They essentially pose dramatic questions that extend the Sphinx's inquiry about what it means to be human. These questions are increasingly relevant today, but they are now influenced by new factors, especially by technology. The link between tragedy and technology is thus connected to the idea that tragic events hold a hidden wisdom that can shed light on aspects unique to our era. In the tragic spirit, there exists a claim to truth that often remains beneath the surface. The second main point of this work is recognizing that, despite a notable convergence between the tragic spirit and technology, this relationship cannot be fully understood in our current historical context. I will outline several reasons for this, mainly relating to the nature of technological mediation, the opacity between users and the effects triggered, and how technology's formal dynamics – its kinetic character beyond mere technical content – prevent the emergence of the tragic spirit in Modernity. Technology is embedded in a secular narrative aimed at fulfilling a redemptive promise, and this faith prevents the reemergence and solidification of the tragic spirit and its representation.

Thinking about the tragic spirit against the backdrop of our era implies thinking about how human action is and always has been intertwined with multiple powers that subordinate and shape it. The reversal of expectations, the unpredictability of the future, and the obsolescence of familiarity and stability make the study of tragedy relevant as a model of human action where harmful consequences, mistakes, freedom and necessity, responsibility, knowledge and ignorance intersect. Even if today we no longer believe in gods as an explanation for the powers that condition and explain the harmful consequences of human action, it is undeniable that human action today seems to be constrained by increasingly narrow limits imposed by powers that only sometimes





manifest themselves. Geopolitical games, market fluctuations, and the turmoil of war shape the everyday lives of ordinary people without them having any say in the matter. García's thesis is that the old gods do not die (2006, p. 26). Regardless of their specific historical origin, gods refer to something transversal and timeless in human lives. Fortuna is one of these enduring symbols, undergoing metamorphoses through which its sphere of influence contracts or expands while it may or may not be recognised as a cultural power. And according to Rosset (1971, p. 16), what defines the tragic thought is the affirmation and acceptance of chance meddling in human affairs.

Similarly, we could say that the tragic spirit does not fade away, but merely recedes, and may or may not retain its transformative cultural power. The recognition of lasting constraints conditions the field of possibilities for action without determining it. Today, technology is, among other things, one of the main factors constraining the field of individual and collective human action. Furthermore, thinking about the relation of technology to human action is particularly acute because its promise is precisely to alleviate and facilitate human life. Recognising this role in technology does not mean demonising or sanctifying it, but rather thinking about its ambiguity. This is, in fact, the tragic worldview, namely, that of seeing in the dependence of human action on multiple powers the possibility of a timeless wisdom that involves the awareness that humans are simultaneously free and determined, knowing how their own actions are grafted onto multiple other chains of events.

## WHAT IS TRAGEDY?

It is no easy task to define tragedy. However, some elements seem common to various dramatic works. In a tragedy, it is common for the instability and fragility of human life to lead to the conclusion that the hopes of mortals are just vain illusions that accompany them in their brief existence. The transition from fortune to misfortune of a protagonist who arouses goodwill is easily attributable to tragedy, so is atrocious and undeserved suffering, the impotence of choice in charting a path of escape, or the existence of an insoluble conflict (Lesky, 1978, p. 11 and Mandel, 1961, p. 20). However, tragedy, despite being painted in broad strokes, is one of those notions that “due to its inexhaustible richness cannot be delimited, petrified, conceptualised” (Serra, 2018, p. 24). Rather than asking for a definition of tragedy, it is perhaps more interesting to ask how the tragic reveals itself, that is, what justifies equating an event with a tragedy. The question and answers about “what tragedy is” thus transitions from a substantial concern to an open and dynamic one, alongside the acceptance that the tragic spirit, in what it reveals as paradigmatic of human action, can reveal itself through various forms of expression, that is, through theatrical conventions and dramatic representations, but also through disasters, calamities and catastrophes.

With this reformulation of the question, we can ascertain whether technology lends itself to being framed as a tragic experience. Similarly, knowing whether and how different historical contexts allow or prevent the emergence of the representation of tragedies is central to ascertaining their connection with technology. The tragic, as Max Scheler points out, is not essentially an aesthetic phenomenon, but something more,



something constitutive of the universe itself and to which we have access through the experience or representation of events (Scheler, 1955, p. 151). That Greek tragedies have, until now, been the ideal locus of this revelation is merely a most fortunate historical accident. In this sense, each era is led to an attempt to recognise its own form of the tragic spirit, to define it accordingly to its worldview, and to give it an expression.

## TRAGEDY IN ARISTOTLE

If we dwell a little on Aristotle's considerations on tragedy, we can establish a frame of reference that will become all the more visible in contrast and similarity to our own era. To this end, it is important to note that, contrary to the Socratic-Platonic thesis, Aristotle believed that the good exists in the world and is not given in advance in rules or principles, as is mathematical knowledge or the procedures for playing a melody. The good is not a permanent quality, but an action, which is why contextual elements are crucial for the agent to act well (Aristotle, 2011, 1140a20-21).

Furthermore, tragic poetry, for Aristotle, does not respect, as history does, the particularities of human action, but rather expresses the universal, using concrete elements and people for this purpose. Tragedy brings together an accumulation of human experience and knowledge unrelated to any historical individual. It is this tension between the universal and the particular that allows tragedy, through the mimesis of action, to arouse terror and compassion and enable catharsis. Tragedy, as we have said, summons and exposes the audience to a kind of truth that is not immediately accessible, but which relates to praxis. Additionally, this revelation of truth to the public has pedagogical and educational value. Taking these assumptions and the importance of social life for learning how to act well into account, it becomes clear how, through the mimesis of action, tragedy demonstrates its proximity to the question of the ends that guide human life and how it attempts to show the way mortals seek to achieve them (Aristotle, 2013, 1450a16). All this leads to tragedy as confirming, in general, the vulnerability and fragility of human lives (Nussbaum, 1986, p. 20).

In his definition of tragedy, Aristotle also refers to his preference for plots of relative complexity. The reason for this preference is that in such plots there is a change of fortune (*metábasis*) that occurs due to a reversal (*peripéteia*) or a discovery (*anagnórisis*). Discovery consists in the transition from the unknown to the known regarding the identities of the protagonists, while a reversal refers to the shift of actions to their opposite. These are the most effective means of generating the desired emotional effects. For tragedy to be properly understood, the audience must also feel that misfortune does not discriminate against anyone. Aristotle also mentions how tragedy, in order to elicit the aforementioned emotions, must refer to the fall from fortune to misfortune of an individual who, not distinguished by excellence or justice, that is, an ordinary person, suffers the consequences not because of wickedness or perversity, but because of a mistake that causes the tragic change, the *hamartia* (Aristotle, 2013, 1452 b30-1453 a12). *Hamartia* also has the function of ensuring the transition from ignorance to recognition (Kim 2010, 37).



What is meant by this term? Although there are differing interpretations, ranging from ignorance of the facts to moral defect, we adopt the position of authors who emphasize (Kim, 2010, p. 40) that the term does not refer to a moral failing or guilt, but an epistemic error, a mistake or deception about the details surrounding the context of the action. *Hamartia* in tragedy is a cognitive error based, first and foremost, on ignorance of the relevant facts or an incomplete view of them. It is not a generic, universal ignorance, a simple lack of knowledge, but an ignorance relative to the context of the agent, a type of contextual knowledge such as the highly situated *phronesis* (Aristotle, 2011, 1110b28-1111a2). In tragedy, misfortune is therefore caused by blameless errors, that is, by actions that are not attributable to the bad temper of the characters (Aristotle, 2013, 1453a 13-16). The most moving tragedies, for Aristotle, are hence based on a cognitive failure, on this tragic and involuntary error in the face of the density and complexity of the chain of events surrounding the circumstances of the action. The fall is not the result of intentional deliberation but rather presents the precariousness and instability of the circumstances surrounding action.

In order to explore the relationship between tragedy and technology, it is also important to highlight the connection between voluntary and involuntary acts as analyzed by Aristotle in the *Nicomachean Ethics* (2011, 1111a2-3). An act is voluntary if the agent is aware of all the circumstances of the action (2011, 1113a23-24) and involuntary if certain circumstances are ignored. The question remains as to what this awareness consists of. Some acts can be committed out of ignorance of the circumstances, objects, place, or instruments used. In any case, the agent is unaware of the particulars of the context in which they perform their action. They act but are not fully aware of what they are doing and therefore may, in retrospect, regret the act and be forgiven. Tragedy thus immerses us in the very passivity of the protagonist. Innocence in the face of an irreparable mistake and fear in the face of the triggered situation that is hence out of control with destructive effects must be captured (Aristotle, 1998, 1382a 27-30) for there to be terror and compassion. With the help of definitions from *Nicomachean Ethics* (2011, 1135b16-19), the *hamartia* of *Poetics* (2013, 1453a10) is redefined as a dangerous act committed by an agent who is unaware of an essential relevant fact. These agents act out of ignorance, without malice and without being aware of their surroundings, causing damage that can be traced back to their action, yet was not to be expected. Such is their ignorance that agents end up harming themselves and their community. And it is precisely because the error has not been understood as such that the structure of the action leads to a discovery of how the underlying causes lead to a reversal of fortune.

From this perspective, tragedies highlight the extreme nature of a human condition or disposition to act in ignorance of all the relevant facts, which necessarily leads to tragic, i.e., adverse or horrible, incidents. If the *hamartia* of tragedy, according to Aristotle, is a universal element of human action that exposes its limits, one would expect that in the industrial age, this structure would not disappear.



## THE PROMETHEAN GAP

Tragedy's reversal (*peripéteia*) and discovery (*anagnórisis*) find echoes in the contemporary performance of technology. Both correspond to the moment of unexpected revelation of technology's unforeseen consequences (Nye, 2006 p. 21) at the ecological or social level, which usually remained hidden until the moment of their belated emergence, out of step with their spatial and temporal origin. It is the moment when we realise that there is a gap between the purposes and intentions of engineers, promoters, and stakeholders and the actual unintended effects. The philosophy of technology abounds in examples and is familiar with these cases of deviation of proper function from the designer's original intentions, as grounded, for instance, on the multistability of artifacts (Ihde, 1990, p. 144). Nevertheless, it is worth exploring more in depth the parallels between the role of *hamartía* in Greek tragedies and involuntary acts in contemporary society. As we have seen, *hamartía* is at the heart of the tragic spirit, rendering agents responsible but at the same time innocent. They are the source of a catastrophe, but without any intention. How similar and relevant are these remarks for thinking about the present day? Are there invariants in the structure of human action that remain regardless of historical and geographical variations?

The scale of contemporary technology, its pervasiveness and omnipresence, has completely altered the unconcerned state of proportionality in which the agent practised voluntary actions. Virtually any human action is now permeated by technology upstream and downstream while implying and being implied by its ubiquitous presence. Every individual is surrounded and dependent, in their work, leisure, and social relations, on technological devices, structures, and mediations whose profound effects and symbolic shifts on the understanding of themselves, others, and nature are not known at the outset.

If the condition for a voluntary act, according to Aristotle, is that the action starts in the agent, that is, in a person who does not act under compulsion and is aware of the particular circumstances in which they act, today this condition seems to be too demanding. Using Aristotelian vocabulary, we would say that the sense of opacity in action, when mediated by technology, is defined by agents being in a permanent state of ignorance, as they find themselves involved in actions that they believe to be their own, that is, voluntary actions, but which often are in fact involuntary. Moreover, agents are not confronted with opportunities to discover and overcome their structural ignorance.

In Günther Anders, we find a theoretical elaboration about the persistence of this structural ignorance and of how action, in contemporary times, is above all involuntary. Anders identified that what we can now do is much greater than what we can imagine. A gulf has opened up between the faculty of production and the faculty of representation, and this gap widens day by day. The objects we create and the effects they trigger are so large and explosive that we can no longer understand them or even identify them as ours. According to him, "the technification of existence is the fact that all of us (without knowing it and indirectly, like parts of a machine) find ourselves involved in actions whose effects we are unable to predict and which we could not approve of. Technology has brought with it the possibility of being innocently guilty in a way that did not exist in our parents' time, when it had not yet advanced so far" (Anders, 2013, p. 3).



Beyond all the historical and geographical specificities of its roots, it was industrialisation which, according to Anders, produced an epoch-making aura which surrounds technology due to the inexorable chain of events that led to the slaughter at Auschwitz and the dropping of the atomic bomb on Hiroshima. These two events have left their mark on an entire era and herald the possibility of humanity's self-destruction. However, his works offer an account for the fact that the conditions for a tragic spirit are present today, but are not recognised, i.e., such events do not inspire compassion or terror commensurate to their magnitude. There is a discrepancy between, on the one hand, our faculties of making, controlling and producing things and, on the other, our faculties of comprehending, feeling and imagining the consequences of these things. This “Promethean gap” states how “the performance of our hearts – our inhibitions, our fears, our concerns, our remorse – develops in inverse proportion to the extent of our actions” (Anders, 2020, p. 262). This analysis is especially relevant if we want to think about the possibilities of representing the tragic in contemporary times.

Why does this happen? According to Anders, the procedures by which agents adopt self-censorship or refrain from acting due to foreseeable consequences that arise from a certain course of action harmful to others or ourselves are, in our time, fragmented. Thanks to the complexity of administrative or technological structures and the division of labour inherent in them, we can commit atrocities with “hellish innocence” (Anders, 1956, p. 151). Before Hannah Arendt analysed the trial of Adolf Eichmann, Anders had already identified how what characterised the exterminations of the Shoah, the atomic bombings of Japan, and other phenomena in the current machine age as not exactly a monstrosity linked to technological apparatus, but above all the compartmentalisation of awareness due to the complexity of interactions with devices. Human consciousness does not fully grasp everything that it triggers and it does not realise the implications of the circumstances in which it finds itself involved. It is the basic premises of agency and moral responsibility on which any ethical reflection is based that become unsuitable for thinking about human existence in the industrial age. According to Anders, bad faith has been transferred to machines and electronic oracles, so that the most terrifying thing is this disagreement between action and consciousness through machines that relieve us of effort, lamentations, and complaints (*klaglos*) (Müller, 2015, p. 53). The current condition is that we mortals are “smaller than ourselves” (Anders, 2020, p. 272), that we are Titans, but at the same time, due to our blindness, we are also moral dwarves (Anders, 1956, pp. 147-148).

In other words, Günther Anders foresaw how a series of seemingly trivial actions places agents in a causal responsibility detached from moral responsibility while being blind to that condition. The Baconian equation between knowledge and power has shifted, and with it another modern equation that corresponds to the secular faith in the Enlightenment, namely that there is a strong overlap between advances in freedom and advances in knowledge. The equation, a continually postponed promise that illuminated the historical march of the West in search of the realm of freedom, is now being reversed, resulting in ignorance, impotence, and a generalised sense of disorientation. The more knowledge about the world abounds, the faster that knowledge is fed back, through its





technological applications, into social organisation and nature, generating new and pernicious opacities and predicaments.

Anders' *pars construens* proposal aims to expand the imagination in conjunction with a pedagogy of fear regarding the plausibility of an occurring worst-case scenario. In other words, it is about an attempt to overcome the motivation gap by supporting action with emotional and volitional contents about its effects, so that agency can be somewhat regained. The appeal to remedy the Promethean gap focuses on the role of imagination as a form of moral enlargement (Anders, 1961/1983):

Thus your task consists in bridging the gap that exists between your two faculties: your faculty of making things and your faculty of imagining things; to level off the incline that separates the two. [...] you have to violently widen the narrow capacity of your imagination until imagination and feeling become capable to grasp and to realize the enormity of your doings. In short, your task is to widen your moral fantasy. (p. 131)

It remains to be seen whether his proposal is plausible for reinstating the representation of the tragic.

## TECHNOLOGICAL Gnosticism AND THE CATASTROPHE

Before addressing the possibility of Günther Anders' proposal to overcome the Promethean gap and thus determine whether it is possible to recognise *hamartía* in the technological age, it is useful to outline, in general terms, the rationale behind the drive for technological innovation as a contemporary article of faith and the role of the pursuit of knowledge in this endeavour. We will thus be able to identify a narrative that, by justifying permanent acceleration, casts doubt on the tragic spirit resurfacing through technology, and whether it can be apprehended and represented as such.

Hermínio Martins described contemporary technology as being driven by a latent Gnosticism. The expression 'technological Gnosticism' refers to

the marriage of technological achievements, projects and aspirations with the characteristically Gnostic dreams of radically transcending the human condition [...] Transcending the basic parameters of the human condition – its finitude, contingency, mortality, corporeality, animality, existential limitation – appears as a motive and even as one of the legitimations of contemporary technoscience, at least in some areas" (Martins, 2011, p. 18).

Similarly, John Gray (2015) points out how the unconfessed creed of contemporary society is imbued with a Gnostic faith (p. 9) that sees in the salvific quality of knowledge the only guarantee of human emancipation from the shackles of the material world.

All these observations translate into the realisation that contemporary life is under the spell of a Promethean rebellion defined as a march to remove all obstacles, an undertaking to correct the world and the human body as evil entities subject to corruption. Transhumanists and other futurists are a case in point. To this end, it is necessary, in other words, to combat ignorance and increase knowledge. The basic assumption is that evil



can be banished and expelled from the world through human action, a task for which science and technology hold the Promethean power to remake the world according to a rational model. By this faith in the liberating power of knowledge, “Gnosticism has conquered the world” (Gray, 2015, p. 165).

When we compare the contemporary narrative framework of technology and related developments to the Gnostic worldview, we encounter distant echoes of the past. Socratic-Platonic philosophy, from the outset, revealed its profound incompatibility with tragedy, as it advocates that knowledge could erect an impenetrable wall around human lives (Nussbaum, 1986, p. 330). The intellectualism of this position shifts responsibility for human unhappiness away from the gods – in accordance to the right use of reason, human action thus becomes appointed to tame external constraints. Just as reason can tame the passions, humans, endowed with knowledge, can impose themselves on chance. The attainment of virtue and happiness is a path that can overcome ignorance. The general adoption of this account is, in our view, undeniable nowadays.

There is a prevailing belief that progress in theoretical and technological knowledge necessarily and spontaneously translates into progress in practical knowledge, that is, an immediate translation between *theoria* and *phronesis*. We therefore live more in the shadow of Platonism than Aristotelianism. The equation between truth and goodness is an ancient premise that is difficult to erase and corresponds to the continuation of an ancient vocation of the West. In fact, according to Edmund Husserl (1954/2008, p. 32), what describes European humanity, in contrast to other humanities, is that it has been forever infected by the appeal of an absolute, universal vocation given by the adventure of knowledge in the search for untimely beauty, goodness, and truth. During the Anthropocene, the underlying logic of such appeals to truth is revealed, whereby knowledge loses its sterile and contemplative character to become the primary and abundant source of domestication of all the powers of nature and chance.

It must be appreciated how the permanent state of catastrophe introduces into contemporary life an echo of the ancient world where tragedy prevailed: things do not happen as planned, and our earthly dwelling is subject to being shaken. The persistence of catastrophe attests to how today's dependence on technology and the accumulation of capital are linked to the reappearance of the tragic, which seemed to have been banished from our culture due to the hypertrophy of optimism and technical rationality (Mul, 2015, p. 62). The combination of various links and entanglements between society, nature, and technology is a fertile ground for brewing future disasters. This provides reasons for enacting a contemporary tragic awareness about the underlying logic that binds the present. Catastrophe is therefore immanent to the dynamics of our tightrope-walking culture, always in search of imminent stabilisation, in the precise sense of its ability to generate catastrophes the more it seeks solutions to stop them. Technology is an epistemic tool for bridging the present to a better world while excluding randomness or chaos (Kurtov, 2023, p. 123)



## THE IMPOSSIBILITY OF REPRESENTING THE TRAGIC

As we have pointed out, awareness of the harmful effects of everyday actions is often truncated by technology. This does not mean that technology alone prevents the reappearance of the tragic spirit, but rather that awareness is hindered of the fact that human actions cause unforeseen effects and, in their cumulative banality, constitute a planetary power. According to Anders, due to the mediation of devices and their effects being spatially and temporally at distance, the representation and formation of feelings based on emotionally charged images is not possible, nor do we see or feel ourselves as the source of these unacceptable effects. As technology spreads, the world and the human endure a process of co-mechanisation – (*mitmaschinisierung* – Anders, 2025, p. 60). Climate change, for instance, is a demonstration of how we may even know that we are its source, but not feel responsible for it. As Pulcini (2013) states:

[...] the information that enters our cognitive system can only produce real effects on our behaviour if it manages to create emotionally charged images in our psyche. This means that, although we are perfectly aware of the existence of specific threats, this does not involve our emotions; and only if our knowledge is transformed into the ability to “feel”, react emotionally and imagine the possible effects can we consider ourselves to be truly aware of the risk and therefore properly mobilise ourselves. (p. 135)

By accessing catastrophic events through social or mass media, they are quickly subsumed into the world of entertainment. The very structure present in tragedy, where ignorance and error feature, is hence not seen as paradigmatic of human action. This prevents the emotions of terror and compassion associated with tragic events from being cultivated and from providing clarification on the essence of human beings. The opportunity to understand the tragic fades away and, with it, the resonance of its deeper implications is lost, blurring the opportunity for learning that is intrinsic to catharsis. The educational and pedagogical value of tragedies consists, after all, in providing a view of the naked reality of human beings, a view according to which the concurrence of emotions is indispensable for virtue. Satisfying the desideratum formulated by Anders, tragedy aims, at its core, to broaden imaginative feeling (Serra 2018, 129-130). The Promethean gap then ultimately suggests an irretrievable loss of the tragic spirit. Our actions have become so much greater than ourselves that we cannot even represent them. Tragedies, on the other hand, whether they involved war, plague, infanticide, or regicide, were still commensurate with the horror caused by involuntary actions and human passions. Despite Anders' suggestive attempts at moral imagination exercises, we do not have an aesthetic theory to bridge the gap between our immense powers of making and our stunted capacity for imagining.

The difference between the *peripéteia* of tragedies and the *peripéteia* involved in technology is therefore the way in which the former awakens an acute awareness of the connection between action, error, and consequences. The meaning of action in tragedy, when manifested in all its breadth and incalculable effects, is grasped and felt by the protagonists, who acknowledge themselves to be the involuntary source of the catastrophe



of the events. In tragedy, humans discover themselves to be the unwitting tormentors of themselves and their loved ones and realize that their predictive gaze achieves little, making their actions deleterious to the very end that guided them. As mentioned, *anagnórisis* and *peripéteia* are related as they reveal a new awareness of events not as distant, but as close. In tragedy, through discovery, illusion, and tragic error are revealed.

Moreover, tragedy illustrates, in a way that is immediately grasped by the audience, how issues vaguely orbit around human action that relate to responsibility and guilt, what is attributable to the gods and what to humans. By representing, in its imprecise contours, how human action is extremely fallible and generates monsters whose meaning and genesis were not foreseeable, the *peripéteia* of tragedies differ from the current paltry technological *peripéteia*. Radical discovery, in the latter, is not possible, as catastrophe is embedded in everyday life. The relative autonomy of human action, the way in which events surpass the agent, is called into question in both cases, but only the former represents an awareness of the tragic spirit, laying it bare to the public sphere.

### THE TRAGIC AND THE TELEOLOGY OF MODERNITY

The tragic spirit is radically alien to a comprehensive vision of the future and of an agency – divine or eminently Promethean – which, having access to the entirety of temporality, keeps account of all just and unjust acts and can offer final redemption, a kind of promise of compensation for suffering. The postponement of the rational demand for justice to its fulfilment by such an agency somewhere in the course of history deprives catastrophes of their definitive and fatal character. Such events, although tragic, are to be viewed from the perspective of the future and the consummation of justice, whether providential or utopian in nature. By making tragic events dependent on a future resolution, the evidence of their absurdity and irreversibility is diluted.

It is ultimately due to the tragic spirit that Greek tragedy was based on the way in which the circumstances of action are ultimately unfathomable to reason, and also that humans suffer and inflict unintended consequences of their own actions. Recognition (*anagnórisis*) and tragic change (*peripéteia*) occur precisely because of an opacity of the circumstances of the action, which is only clarified in retrospect, after the act. By assuming that there are areas impenetrable to reason and knowledge, by maintaining the existence of a blind and active necessity in human lives whose logic we are entirely ignorant of, the tragic worldview is therefore profoundly alien to the Jewish and Christian worldviews (Steiner, 1980, pp. 4-5). For the believer, we may not understand God's designs, but we know God to be just, and so an infinite hope becomes the formula for believing that no event is definitive and that a new beginning is always possible.

Similarly, the secular transmutations of the Jewish spirit, including Marxism and other eschatological philosophies of history and millenarianism, express their faith in reason to understand and tame the forces of necessity. The past and the present become a preparation, a path towards the future (Löwith, 1949/1991, p. 16-19). Now, even though Marxism has declined today, the function of technology in liberal democratic societies remains animated by a Gnostic spirit, tasked with removing all obstacles that oppress humans and prevent their true emancipation (Jonas, 1984, p. 201). Hence, one of the



premises of Modernity is the profession of faith that ever more science, technology enable control and can remedy the epistemic flaws that have triggered failures or errors. Hence, it is expected that the sources of fragility and unpredictability, namely, nature and ignorance, are likely to be repaired in the near future through advances in knowledge and technology (MacIntyre, 1981/2007, p. 103).

In other words, in Modernity and the modern world, the space for tragedy has been shrinking. Knowledge and technology are embedded in a philosophy of history that sees the future as the space for resolving all the hardships of the present. Since Rousseau, following the Lisbon Earthquake in 1755, nothing is therefore definitive or impossible for human ingenuity (Rousseau, 2020, p. 3): physical evil is reduced to natural evil, and this becomes a matter of improving social organisation, aided by a growing scientific, technological, and administrative arsenal. In attempting to defend the optimism of theodicy, Rousseau ends up including physical evil in moral evil, and this in the sphere of human responsibility. By dethroning God as the source of natural evil, it is humanity that takes his place. For Jean-Pierre Dupuy (2005, pp. 46-57), Rousseau thus leads the conversion of natural evil into moral evil and the entry of theodicy into anthropodicy. The confusion between *being* and *being made* and the exacerbation of humanity's Promethean powers is also the terrible reaffirmation of the term responsibility and the total task it entails (Cera, 2023). Belief in human ingenuity and its power to shape the world according to its own will becomes the basic premise of the contemporary world. The claim that a better world without uncertainty can be made is based on the assumption that nature and society are raw materials and are available to be reconfigured according to human designs.

The causes of human suffering are thus generally conceived as deriving from social and technical malfunctions that are still deficient or incomplete. Each disaster or catastrophe is, of course, dramatic, but its etiologic justification is often attributed to a lack of planning and applied knowledge in technical, social, or institutional areas. Victims and their families may also be compensated legally or materially through monetary equivalence. All the circumstances that justify the causal occurrence are seen as obstacles that justify accelerating the march of human ingenuity towards their elimination, so that the misfortune of some will be reintegrated into the bliss of those to come.

However, the tragic spirit does not empathise with these arrangements and maintains the naked singularity of what has happened as being irreparable. The responsibility of the protagonists in tragedy is always immeasurable and disproportionate to the damage and punishment received. From a tragic perspective, no advance or progress in knowledge or justice can suffice to broaden the human order and eliminate the unknown circumstances surrounding action and its unpredictable consequences. Due to its pre-modern origin, the tragic spirit is thus alien to Prometheism. This is precisely the point. Modernity, with its attempt to emancipate humans from the circumstances that bound them to their lot, established a historical promise to install paradise on earth based on the alliance between knowledge and power as a way out of ignorance. Against the thesis that *hamartia* only occurs due to ignorance, the tragic spirit demonstrates how some errors are not avoidable.





In short, the constant drive to improve technology and create a social system based on efficiency makes it impossible for each mistake to be seen as a human limitation or as something definitive and transcendent. Responsibility for mistakes, powerlessness, and factors beyond control are seen as temporary institutional failures and insufficient technical planning. Terror and compassion are not aroused in this way, as *hamartia* and ignorance are subsumed by always yet another future world in which human ingenuity will nullify the flaws of the present. Aristotle refers to how those who consider themselves above fortune, because they are arrogant and can extinguish the source of all terrors, cannot feel or suffer the emotions aroused by tragedies (Aristotle, 1998, 1382b 34 – 1383a 5). When the public feels terror and compassion for the fate of the protagonists, they will experience, through *mimesis*, the misfortune of others as their own, feeling close to them, and will understand how their own situation is quite as fragile as the one they are watching. In this case, the staging of the tragedy echoes in the spectator. Today, *anagnórisis*, recognition, is refracted, as we have seen, by the Promethean hiatus, distancing the agents from their own actions and making catharsis impossible.

### FROM NECESSITY TO CHOICE

Another issue involving the connection between the tragic spirit and technology concerns the nature of necessity and possibility. Technology, in ontological terms, unveils being. Likewise, when the planet becomes the object of human responsibility, the boundaries of nature and necessity recede. What defines the human condition, such as birth, ageing, illness, and death, can now be rewritten according to new determinations. Hence, another of the issues that technology confuses in relation to the tragic spirit is the instability of what was previously considered necessary and immutable. The more technology penetrates everyday life, the more the field of what we consider natural recedes, and the more choice expands, making the identification of necessity a more arduous task. Today, there can be no reliable oracles like those of Tiresias or Cassandra. We have no way of identifying, as fortune tellers did, the fatal necessity or the designs of the gods. This means that every potentially tragic event becomes not something irremediable, but an understandable, manipulable, and, therefore, potentially resolvable issue. The tragic becomes a difficulty to be overcome and not a condition to be endured. For example, until the 1980s, birth was the occasion when the sex of the baby and its possible ailments were discovered. With the availability of various prenatal diagnoses, parents now have the possibility not only to find out the sex of the baby before birth, but also to choose to terminate the pregnancy if congenital malformations are identified. This historical process of rationalising the limits of human action led to the naturalisation of the gods and, later, through technology, to the possibility of choice.

### THE WORK OF ART AND THE END OF THE COMMONS

There is yet another issue intrinsic to tragedy in its connection to both technology and the tragic spirit that we should dwell on. In Marxism and Christianity, as well as in the current optimistic utopian-technological thinking of a Gnostic nature, there are



certainly failures and setbacks. However, there is never tragedy, since the respective fatality is reabsorbed by a comprehensive rationality that will one day control nature and other sources of chance. The metaphysical balance is always in favour of humanity, even if evil is not understood. The time of tragedies, in this sense, belongs to the pre-Enlightenment human self-imposed immaturity, just as animism was part of an ancient and remote ignorance. Tragedy, in short, concerns the acceptance of an untameable hidden power, and as a literary form therefore could not withstand Modernity and industrialisation with their domestication of all powers and their disposition to serve humankind.

Literature is a seismograph of social and political energies, attesting to their vigour or decline. The disappearance of tragedy and the tragic spirit may perhaps be an indicator of the withering of the vital forces of social life. In the past, periods of great dramatic richness corresponded to periods of abundant national energy (Steiner, 1980, p. 109). Dramatic arts are the most social literary form because of their public presentation (p. 113). The social and political community is, in turn, inseparable from the conditions of public reception and, therefore, from the nature of dramatic art itself. The possibility of the tragic spirit being widespread in a community is based on the inseparability of its representation in the public sphere. Any community presupposes a minimum implicit agreement on the nature and meaning of human action and the events that affect existence. There must also be, for each community, a tacit and consolidated shared consciousness of the imaginary and criteria regarding virtues and vices and how to praise or censure actions, as well as to attribute agency and responsibility.

However, social fragmentation and the erosion of a vocabulary and common references pertaining to tragic error, evil, human failings, fate and redemption, play a fundamental role in the impossibility of perceiving the tragic in theatres and in everyday life in general. When a citizen goes to the theatre, to the cinema or follows news of a catastrophe far from their whereabouts, they are simply making consumption and entertainment choices as part of their own process of subjectification. They are not immersed in a civil religion, nor are they seeking a catharsis that reconnects them to the worldview of public participation in the polis, as in the era of Greek tragedies. The status of the public sphere in Modernity means that humans no longer consider themselves helpless at the mercy of the natural and social powers that once constrained them (Taylor, 1991, p. 14). They now know that they can make their own history. If there is a limiting condition, it is not due to the fall from the Garden of Eden or to human finitude, to a tragic tension within ourselves, but above all to structural, social, or gender inequalities.

To consider, as Anders does, whether an expansion of moral imagination is feasible in order to fully represent the effects of our actions, we must briefly consider the former role of tragedy and poetry which they have lost in the public sphere. Modernity, to disenchant and mathematize the world of nature had to rely on the creation of subjectivity as a reference for entities. The individual in liberal democratic societies is the result of this process of corrosion of communities, that is, the human configuration of a subjectivity torn from its historical, professional and family ties (Taylor, 1991, p. 3). The individual now becomes free and driven to seek the satisfaction of their desires according to their



particular vision of the good life. The shift of poetry to the private sphere, therefore, echoes the emergence of individualism.

Any understanding of technology in a tragic spirit or its dramatic representation is barred by the narrative of a techno-utopia that disrupts human action and rushes to correct and optimise it through state-of-the-art devices. In other words, in order to be understood, the tragic spirit once required a corresponding worldview that was at home in Antiquity and the Middle Ages, until the Renaissance. At the same time, the power of the word and its spell-binding attention have weakened. The abundance of technological mediations and processes of control to which the word is subject has robbed it of its brilliance and power. By turning it susceptible to manipulation and empty of symbolic meaning, our sensitivity has become increasingly dulled and overcharged by stimuli (Gehlen, 1949/1973, p. 76). At the same time, and here we touch directly on the core of Anders' concerns, the horrors guaranteed and normalised by technology, such as Auschwitz and Hiroshima, Fukushima, the new war involving drones, or climate change, seem, due to their scale and magnitude, to exacerbate and go beyond our expressive capacities.

The very means of disseminating information about technological catastrophes, calamities, and disasters makes it impossible for them to arouse terror or compassion and to convey knowledge about human action in a technological world. It is not just the fact that the events are distant and cannot be lived or experienced. Television and social media are not, like theatres, places for public and face-to-face encounters, but spaces for competing for the minimal attention of users. In the theatre, the spectator knows that they are watching something that is being performed and that, although it is not real, it nonetheless offers a plausible analogy to their own lives. In this way, there is a guarantee of intelligibility concerning something universal about the human condition.

The challenge of art in the Anthropocene is to transcend individual public consciousness toward a shared destination, even when societies are ever more individualized and fragmented, lacking a unifying sense of the common good or shared beliefs. Representing tragedy requires, above all, prior efforts to foster social cohesion and develop a language that enables artists to communicate ideas and implicit references to a common horizon simply by mentioning a word. Whether this is even achievable remains uncertain. The mythologies that Greek and Elizabethan tragedies were based on were not consciously crafted by their creators but inherited from their ancestors and contemporaries. All artists and philosophers tend to be receivers rather more than creators. Myths, images, language, and history – in short, culture – are the products of long histories. They need a lengthy incubation period to take root and flourish through expressive talent.

In short, the playwright and the poet once shared with the public the same life and a broad range of assumptions and expectations about action, belief, and images of existence. Their social lifeworlds were largely the same. Liberal democratic societies, by atomizing subjectivity and separating it from a common whole as a means of human emancipation, make it difficult, if not impossible, to create a work where shared habits and sensibilities can come together. Today, the recreation of a tragedy by Aeschylus or Shakespeare on stage is experienced with detachment by the audience, as the pagan and Christian worlds are no longer obvious or captivate with the same vigour as before. To



revive the tragic spirit, it would seem to need a new mythology that includes and surpasses the redemptive role now given to science and technology. The tragic worldview primarily depends on the understanding that certain powers remain beyond human grasp and that there is no future reward. However, industrial society tends to avoid these powers, even as it constantly deals with the unpredictable consequences of technology. For liberal democratic societies, the future and history are shaped by their own will.

This is why, even if an author today were to craft a tragedy for the Anthropocene era that showed how the catastrophe resides within us and our lifestyles, it would not be perceived as tragic, because in our time, nothing is definitive or fatal. The decline of Christianity and the death of God were not followed by a complete reinvention of culture, but rather by a secular and Promethean transformation of its assumptions about redemption. The point is that the individual will to create and build is largely powerless to determine how the work is received. For art to surpass the barriers of personal vision and connect with something universal to audiences, nothing less than a new mythology and imagination seems necessary. Can we recreate this and make it align with the role of the scientific and technological worldview of our time? Or are we doomed to reuse and renew old myths, knowing that the image of life they present is rooted in a worldview fundamentally different from our own?

## CONCLUSION

Tragedy declined as advances in science and the expansion of rationalism into all areas of human activity dethroned an organic view of reality. The cosmos, where being and value, nature and society were aligned and fixed in a preordained harmony, became reconfigurable and subject to design (Taylor, 1991, p. 5). Once, sensitivity and imagination still perceived natural phenomena as the workings of an autonomous power beyond human control. The order of the future was generally inaccessible to ordinary human beings, making *hamartía* the equivalent of something unknown.

In this sense, with the tacit admission that progress in theoretical and instrumental knowledge is moral and political progress, the teleology inherent in Western history subsumes any event in the history of the future to come (Jonas, 1984, p. 163). Just as a compass guide one through space and allows us to conquer it, an eschatological compass guides one towards the Kingdom of God as a final destination (Löwith, 1949/1991, p. 31). Every tragic event is removed from the responsibility of the agent to be explained by causes external to it. By becoming remediable, tragic action loses its weight. In tragedy, precisely, the accidental becomes essential to the outcome of the plot and to the protagonists' new self-understanding. *Hamartía* is the mismatch between action and the world, the indication that human dwelling on Earth is temporary, fragile and that the more familiar world contains unknowable powers that hang over human lives. *Hamartía* is not something that can be banished through knowledge. Similarly, the tragic spirit does not provide answers to inscrutable questions, but thrives in their absence. Applying the principle of sufficient reason proves inadequate because there is no answer. The tragic spirit exhausts the spirit of future justice. There is no compensation, and human beings are reduced to their impotence as a puppet of powers they do not understand. Tragedy



thus resists the accounting of providence in theodicy and anthropodicy, disobeying the logic of compensation to be settled by the reward of paradise to come. Evil cannot thus be accommodated and understood. It simply remains inexplicable.

Following our thesis that disasters, calamities, and catastrophes caused by technology are tragic, but we cannot fully understand them because we are prisoners of Prometheism's desire to fix everything, we can expect future contemporary calamities and disasters to be traced back to a lack of institutional and technical planning rather than an error or fault rooted in necessity. It is also likely that there can be no full acceptance of the tragic dimension because of the strong belief that a tragic event happens not because of the inherent nature of reality and its unstoppable powers, but because of moral or social failure, criminal behaviour, or more often, systemic failure. Today, tragedy is impossible because the conditions to accept it are absent, as progress and the belief in perfectibility are now widespread.

No innovation can address the contingencies or externalities that the tragic worldview recognizes. The tragic is fundamentally anti-progressive, not because it claims progress is impossible, but because the journey toward progress comes with too many unforeseeable harmful effects. In tragedy, there is no forgiveness, no cure, no reform, and no future. It is always too late. Since every rational and moral interpretation is rendered mute, only silence is left (Rousset, 1971, p. 57) Yet, through this silence and an immense and overwhelming suffering, human beings somehow discover their dignity and greatness. Despite being broken by circumstances, they are not defeated. Tragedy conveys a mixture of pleasure and pain that awakens the spirit. Catharsis represents a reconciliation of humanity with itself beyond Promethean constructivism and boundless responsibility for the planet's future.

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Research article

## To the Structure of the Tragic Experience of Digital Reality: Interface and Algorithm

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### Abstract

The object of this study is the interface as both a technological and an ontological form through which algorithmic procedures are rendered into user experience. This experience is connected to diagnosing a new contour of the tragic within the digital environment – namely, the disproportionality between the “measure of life” and the “measure of procedure” manifested in personalization and access protocols. The methodological framework combines conceptual analysis, an actor-network approach to rationality understood as reproducibility within a network, semiotic examination of the interface, and a hermeneutic interpretation of extra-subjective regimes of meaning. Borges’s “Library of Babel” is employed as a thought experiment. Results: (1) A definition of algorithmic predetermination is proposed as a regime in which a principle becomes operationalized into a repeatable procedure and is consolidated through interface infrastructure; (2) a three-stage architecture of predetermination is described: operationalization, network standardization, and interface exposition; (3) it is demonstrated that the interface makes the measure of procedure affectively tangible and translates probabilistic expectations into practical necessity; (4) levels of the tragic are identified – humanity, creator, and the “little man” – each with characteristic modes of recognizing predetermination; (5) the analytical value of Borges’s model is substantiated for describing normalized pathways of attention and the loss of surprise. Conclusions: The interface functions as a key mediator between the algorithm and lived experience, while tragedy serves as an analytical operator that clarifies already perceptible yet diffuse problems of digital predetermination.

**Keywords:** Interface; Algorithm; Subjectivity; the Library of Babel; Digitalization; Identity; Predetermination

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Научная статья

## К структуре трагического опыта цифровой реальности: интерфейс и алгоритм

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### Аннотация

Объектом исследования выступает интерфейс как технологическая и онтологическая форма, через которую алгоритмические процедуры становятся опытом пользователя. Данный опыт связан с диагностикой нового контура трагического в цифровой среде: несоразмерностью “меры жизни” и “мерой процедуры”, проявляющейся в персонализации и протоколах доступа. Метод исследования включает концептуальный анализ, акторно-сетевой подход к рациональности как воспроизводимости в сети, семиотический разбор интерфейса и герменевтическую интерпретацию внесубъектных режимов смысла. В качестве мысленного эксперимента использована “Вавилонская библиотека” Х. Борхеса. Результаты: (1) предложено определение алгоритмической заданности как режима, где принцип операционализируется в повторяемую процедуру и закрепляется инфраструктурой интерфейса; (2) описана трёхступенчатая архитектура заданности: операционализация, сетевая стандартизация, интерфейсная экспозиция; (3) показано, что интерфейс делает меру процедуры аффективно переживаемой и переводит вероятностные ожидания в практическую необходимость; (4) выделены уровни трагического – человечество, творец, “маленький человек” – с типовыми формами узнавания предопределённости; (5) обоснована аналитическая ценность борхесовской модели для описания нормированных маршрутов внимания и утраты неожиданности. Выводы: интерфейс является ключевым посредником между алгоритмом и опытом, а трагедия служит аналитическим оператором, позволяющим яснее увидеть уже заметные, но размытые проблемы цифровой предопределённости.

**Ключевые слова:** Интерфейс; Алгоритм; Субъектность; Вавилонская библиотека; Цифровизация; Идентичность; Заданность

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## INTRODUCTION

In Western thought, tragedy has traditionally unfolded along two trajectories: as a promise of salvation and as a premonition of catastrophe. At the same time, it remains an aesthetic category – that is, a mode of experiencing a limit situation. The tragic manifests at various levels: from the fate of humanity that has generated something non-natural (Goethe, 1808/1998), to the tragedy of the creator or the “little man” who becomes a functional option. The notion of the unnatural as a tragic excess finds powerful expression in twentieth-century philosophy of technology, for example in Günther Anders’s concept of the “Promethean gap” which points to the disproportion between the human capacity to act and the human capacity to comprehend. This raises the question: can the classical understanding of tragedy as retribution for ὑβρις (hubris) still be applied today?

Contemporary cultural forms suggest that conflict arises not only between the human and a transcendent order, but also between the rhythms of life and the procedural logic of technology. The Japanese Akira demonstrates the rupture between techno-procedures and the urban fabric that “splits at the seams” (Napier, 1993, p. 330). Chinese platforms with hyper-personalization illustrate a situation in which “retention” replaces “understanding” (Liu et al., 2022). Indian digital identification systems simultaneously expand access and produce exclusions: algorithmic procedures multiply, yet their tempo does not coincide with people’s life rhythms (Dixon, 2017, p. 542), and their logic does not always lend itself to human understanding, creating the effect of a “black box.”

We choose tragedy – rather than alienation or absurdity – because of its structural specificity. Tragedy describes not loss or meaninglessness but a fundamental, unavoidable conflict between forces that are equally justified yet mutually incompatible. In an algorithmically organized reality, such conflict appears as a divergence between the “measure of life” – its rhythms, uncertainty, and contextuality – and the “measure of procedure” expressed in the regularity and reproducibility of algorithmic operations. The algorithm, no longer a neutral instrument, shapes a new rationality by prestructuring the field of choice and the modes in which situations are perceived.

The experience of the algorithm becomes possible through the interface. The algorithm as such remains invisible; it manifests only in the form of steps, routes, priorities, and permitted transitions – that is, in the forms encountered by the user. The interface organizes the accessibility of the world, distributing attention and shaping the probabilities of action. In doing so, it translates procedural predetermination into a mode of lived experience, rendering it affectively and practically real.

Therefore, the key object for analyzing the tragic in the digital environment is not only the algorithm itself, but also the interface as a sign-technical layer that sets the limits of the possible. The interface is simultaneously a technological model and a space of meaning-making in which relations between subject and object are redefined. As McLuhan (1964/2001) noted, “the medium is the message”: the medial form itself determines the modes of perception (pp. 3–9). To avoid conflating analytic levels, it is essential to distinguish among several planes of interface operation.

At the technological level, the interface is determined by algorithms and protocols that specify the set of possible operations. At the semiotic level, it is a system of signs





that converts algorithmic structures into readable distinctions and meanings. At this point, the interface becomes an experiential field formed by rhythms, routes, and distributions of attention. Only by considering these levels can one address the ontological dimension of the interface – understood as a regime of existence that determines what becomes accessible to the user and in what form.

The interface thus functions as an invisible mediator that defines the very structure of what appears. In the digital age it ceases to be neutral and becomes a matrix shaping the chronotope of human experience (Bakhtin, 1975). The algorithm determines the measure of procedure; the interface renders this measure experiential – and it is in this transition that a contemporary form of the tragic emerges.

The aim of this study is to conceptually clarify the possibility of a new understanding of tragedy under conditions of algorithmically organized reality and to demonstrate how the misalignment between the measure of life and the measure of procedure structures the tragic today. Here the algorithm is considered as an operator of rationality that determines the pace and predetermination of action, and the interface as the mechanism through which they take shape in lived experience. A related question concerns whether the digital interface can aspire to extra-subjectivity – not as a closed mechanical system, but as a functional circle comparable to Uexküll’s *Umwelt*, within which a self-sufficient yet expandable system of meanings is formed.

The methodology is built around distinguishing analytic levels, each revealing a different aspect of the tragic. The nature of the algorithm is examined simultaneously as a formal computational scheme, a dynamic procedure, a model that translates natural, social, and cognitive processes into optimization rules, and as a practice of rationality that sets the measure of procedure – its tempo, discreteness, efficiency criteria, and admissible trajectories of action. In this capacity, the algorithm functions as an operator of the contemporary world, structuring the space of the possible, distributing probabilities, and consolidating norms of behavior through infrastructural repeatability.

The concept of algorithmic predetermination shows how a formally neutral procedure turns into a regime of experience. Principles condense into repeatable steps, steps into standardized routes, and the measurable gradually pushes aside the experiential, so that probability comes to be felt as necessity. What engineering discourse describes as stability, optimality, and control over complexity appears, from a humanities perspective, as a narrowing of the horizon of the possible. In this view, the logic of computability displaces the human measure of life. In this context, the tragic emerges not as catastrophe or punishment for ὑβρις, but as the gradual compression of real choices, when the algorithmic measure begins to substitute for the measure of life – softly, non-violently, through infrastructures and interfaces.

It is precisely at the level of the interface that the algorithm becomes experienceable: it translates abstract predetermination into steps, routes, notifications, and codes. If the algorithm sets the measure of procedure, the interface converts it into a measure of experience, structuring the chronotope of digital reality and forming artificially produced *Umwelten*. Hence the analytical focus of this study shifts from the algorithm to the interface as a technological, semiotic, and ontological model in which



the tragic disproportion between the rhythmic, contextual measure of human life and the regular, optimizing measure of algorithmic procedure becomes discernible.

To reveal the structure of this predetermination and its tragic dimension, we turn to Borges's metaphor of the "Library of Babel" which allows us to analytically model the interaction of rule, space, and practice: the fixed combinatorial rule corresponds to the algorithmic norm; the architecture of the library to the interface-based organization of accessibility; and the behavior of the librarians to social responses within a world where meanings are distributed infrastructurally. This metaphor demonstrates how, under conditions of complete predetermination, surprise disappears and action loses its cathartic conclusiveness – precisely where a new form of the tragic becomes visible, arising at the intersection of algorithmic measure and interface experience.

Thus, different theoretical traditions are not blended but distributed across analytic levels: formal structure, procedural measure, semiotic organization of experience, dynamics of understanding, and regimes of existence. Such an architecture makes it possible to integrate heterogeneous approaches without eclecticism, since they operate on different analytic "floors" producing a multilayered account of the contemporary tragic.

## THE NATURE OF THE ALGORITHM

When we turn to the question of the algorithm, we must first clarify the methodological standpoint from which this study proceeds. One line of research – developed by Kukel (2025a; 2025b; 2025c) – shows that the definition of the algorithm is not merely a technical description but an ontological gesture. In this perspective, the algorithm is not a minimal sequence of operations designed to solve a problem. Instead, it appears as a structured practice that brings together reproducibility, finiteness, and the possibility of formal specification (Schmidhuber, 2009; Porter, 2016; Markov, 1954; Brouwer, 2011). It also includes an internal measure that makes a procedure not only operational but normative (Grosman & Reigeluth, 2019; Martin, 2018; Mittelstadt et al., 2016; Seaver, 2017). The algorithm therefore combines two roles: it is both a method and a principle. It shapes action and also establishes the norm of that action. It organizes thought yet is not reducible to it, because it contains rhythm, order, and measure – elements that are often experienced before they are consciously articulated. This line of reasoning also intersects with reflections on practice as such: practice, as a form of meaningful action, involves transforming the world. Such transformation does not follow from pre-given "human essences" but always emerges through self-overcoming and encounters with limits. This is why action becomes an act of self-formation, a becoming – "a man becomes what he makes of himself" (Sartre, 1946). The algorithm collects this practice into a procedural structure, turning experience into something transmissible, skill into something stable, and the measure of action into something explicitly defined.

This definition may appear excessive at first glance, yet it serves a different purpose in the present argument. It reveals the structural link between the algorithm and the problem of the tragic, which is central to this article. The algorithm is not an external mechanism imposed on human activity. It is a form of practice in which a principle of rationality becomes visible. It is not an accidental tool but a point of condensation within



broader cultural processes that shape how subjects experience the world and how forms of interface interaction become constituted. This expanded definition provides the basis for the next steps of the analysis, allowing us to connect algorithmic normativity with the aesthetic experience of tragedy in the digital age.

When we speak of practice, we refer to a field of action in which knowledge becomes experience, experience becomes skill, and skill becomes a way of transforming the world. In this field, practice shows its deeper structure: it is reproducible, systematic, and open to formalization, yet formalization does not eliminate its living character. For this reason, we cannot claim that the algorithm “replaces” practice with procedure. Rather, it embeds practice within a structure of reproducibility in which the logic of rationality becomes apparent. Practice, once proceduralized, does not lose its orientation toward understanding. Instead, it demonstrates how rationality takes shape through repetition, verification, and consolidation – through the processes that produce what Kuhn (1977) called a paradigm, Foucault (1994) an episteme, and Lakatos (2008) a research programme. The algorithm emerges when practice recognizes its own measure and becomes a norm. This norm, in turn, begins to structure new practices and set the principles of rational action within a given paradigm.

The algorithm thus occupies a unique position between lived action and rational structure. It is a form through which culture reproduces itself, and at the same time an instrument through which new forms emerge. This duality – method and principle, practice and norm, transformation and reproducibility – contains the latent tension that will unfold later in the analysis of the tragic. It is important not to draw conclusions too quickly. At this stage we merely fix the point that the algorithm is a form of human action that has become a structure of rationality, and it is precisely this duality that explains why the algorithmic organization of the world produces new modes of aesthetic experience, including the experience of loss and its possible overcoming.

Turning to the Greek notion of τέχνη, we encounter another duality. Technē refers to art, technique, production, and the capacity to order the world through reproducible practices. In this sense, the algorithm may be regarded as the culmination of technē: a point at which practices reach a high degree of formalizability and become both actions and norms of action. Yet in Greek thought technē never exhausted the human horizon. It was accompanied by cosmos (Tulchinskii, 2013), which implies responsibility and belonging to an ordered world, and by poiesis, the disclosure of being that does not reduce itself to operational steps but opens a different way of existing. Algorithmic rationality, developing on the basis of technē, also shows what remains outside its reach: the non-technē dimensions of experience without which a sense of fullness is impossible. In this opening, the space of experience – and the space of tragedy – begins to appear.

When the algorithm becomes a principle of rationality, that is, when it acquires the status of a structuring norm, the risk arises that these non-technē horizons will be lost. Formalized practice frames more and more areas of life, and although the algorithm does not erase what lies beyond its measure, it often creates the impression that such dimensions are excluded. This effect is not total, but it is perceptible: the subject experiences not threat but loss, and this loss becomes the point at which the tragic emerges. Here we encounter the tension that we will describe as tragic: the measure of



procedure, becoming a dominant form of rationality, enters into disproportion with the measure of life – with its rhythms, dispersion, unpredictability, and openness. The mismatch between these two measures shapes a condition in which experience takes on a tragic tone, and the interface becomes the space in which this disproportion is rendered tangible.

### ALGORITHMIC PREDETERMINATION

The tragic in the digital environment does not emerge suddenly; rather, it develops as a gradual displacement of human experience under the influence of procedural norms embedded in algorithmic systems. This displacement arises through the force of predetermination produced by algorithms. By algorithmic predetermination, we refer to a regime in which a principle becomes a repeatable procedure, and a procedure becomes a norm of action embedded and consolidated within an infrastructure. In such a regime, what is measurable takes precedence over what is lived, and what is repeatable persuades more strongly than what is singular. Already at this point, a first contour of the tragic appears: life begins to be experienced as a predetermined trajectory, in which probability gradually hardens into necessity.

Algorithmic predetermination, as a mode of contemporary experience, is not imposed from the outside. It emerges through a gradual shift in how human life is structured: principles are transformed into repeatable procedures, and procedures into norms of action embedded within infrastructures and interfaces. As Ocheretiany and Pogrebnyak (2024) show, the digital revolution has radically altered the conditions of existence, forcing us to reconsider the very coordinates of experience, in which distinctions between natural and cultural, real and phantasmatic blur under the influence of algorithmic systems. In such conditions, a specific post-algorithmic “unease” emerges. Life begins to adjust itself to the logic of computability rather than to its own rhythms, and this adjustment is felt as a diffuse yet persistent displacement of experience. Mikirtumov (2024) argues that the pursuit of coziness in the digital age becomes a reaction to this displacement: as social and existential problems are translated into procedural language, subjectivity attempts to reclaim a space of unpredictability and semantic density, yet finds that even processes of “appropriating the world” increasingly unfold through preconfigured algorithmic forms.

The interface, as Ocheretiany (2024) emphasizes, becomes the key mediator of this predetermination: it not only standardizes behavior but constructs action scenarios in such a way that alternatives remain unnoticed or require disproportionate effort. At this point, the tragic motif of the contemporary digital environment intensifies: the divergence between the rhythmic, contextual, discontinuous character of human life and the regular, optimizing logic of algorithmic procedures becomes experientially central. Whereas classical tragedy grounded necessity in fate, digital tragedy emerges from the infrastructure of predictable behavior; whereas predetermination was once external, it now operates from within – through scoring systems, recommendations, and the interface-level organization of attention. Algorithmic predetermination does not eliminate agency but renders it less visible, dissolving contingency into a sequence of “correct



steps.” Therefore, in digital culture the tragic is expressed not through catastrophe but through a gradual shift of measure. In this shift, probabilistic structures come to be experienced as necessity, and infrastructurally embedded norms as the natural order of things (Ocheretiany & Pogrebnyak, 2024; Mikirtumov, 2024; Ocheretiany, 2024).

We have already established that in this study the algorithm is understood not only as a computational scheme. More importantly, it is conceived as a synthetic form of principle and practice – a form that transforms normative ideas of the appropriate into sequences of steps that can be repeated, verified, and scaled (Latour, 2005). In this capacity, the algorithm determines which steps are deemed correct and permissible, and which are excluded. In doing so, it establishes the frame of the possible.

This predetermination unfolds gradually. First comes the operationalization of a principle: meaning is translated into steps that can be repeated and verified. Next comes network standardization, in which steps become linked to the actions of other people and machines, creating an order of compatibility (Latour, 2005). This is followed by the interface exposition: the prescribed route becomes visible and convenient, while alternative paths become obscure or demand additional effort (McLuhan, 1964/2001). In this way, a sense of life’s predestination arises – one feels that a decision has already been made, even though nothing has been imposed directly (Gadamer, 2004).

It is at this point that the tragic motif of disproportion emerges: the disproportion between the measure of life – dependent on rhythms, contingencies, and context – and the measure of procedure, which is defined by regularity, repeatability, and normativity. The tragic nerve of the situation lies not in punishment but in the experience of disproportion between the rhythms of life and the tempo of procedure. In classical drama, predetermination came from outside – from fate or the gods. In digital experience, it arises from within the logic of metrics (Latour, 2005). When a metric becomes a goal, it transforms experience itself; when prediction is folded into governance, it becomes a self-fulfilling expectation (Gadamer, 2004). This is experienced as a “shift of measure”: the increase in predictive precision narrows the corridor of available meaning.

Taken together, these perspectives allow us to articulate a final understanding of the algorithm as a multilayered phenomenon in which formal computational structure, engineering procedure, heuristic model, and techne-rationality form a unified configuration that sets the norm of contemporary action. Yet it is the interface that makes the algorithm visible, transforming abstract computational rules into sequences of steps, screens, notifications, preferences, and constraints. It structures the accessibility of the world, distributes attention, sets interaction rhythms, and forms artificial *Umwelten* in which individuals act as if possible trajectories were “naturally” given. Therefore, as we move from the analysis of the nature of the algorithm to the study of the interface, the analytical focus shifts: from the logic of procedure to the logic of experience, from the norm of the step to the norm of perception, from hidden predetermination to the ways in which it becomes tragically perceptible.





## FROM ALGORITHM TO INTERFACE: THE TRAGIC AS AN EXPERIENCE OF MEASURE

An algorithm, as an abstract procedure, exists within the space of formal logic, where it appears as a pure norm devoid of any sensual or experiential dimension. The interface, however, renders this abstraction perceptible, translating it into the sphere of lived experience. It not only structures what is accessible but also constitutes a mode of being in the world: it defines regimes of interaction, rhythms of attention, and horizons of possible action. At this point, the algorithm ceases to be a purely conceptual construct and enters into a dialogue with the subject, acquiring a sensible form, while the world itself begins to resemble what scholars of social algorithmization describe (Baudrillard, 1994; Kitchin, 2017; Shtrassberg, 2025). Technical examples – from recommendation systems and moderation algorithms to gaming environments and digital identification platforms – demonstrate that the algorithm is not an abstract speculation but is embedded in engineering practices, optimization models, and nature-inspired algorithms, forming a dense material layer of the contemporary order. In this sense, the interface functions as a theater of the algorithm – a stage on which the subject becomes not only a user but a participant in a procedurally organized world, where the drama of human–machine interaction unfolds.

It is in this intersection of the algorithmic measure and the form of the interface that the structure of the tragic becomes visible. Here an essential tension emerges between different regimes of experience – between the living and the normalized, the human and the constructed, familiar patterns of action and the logic of procedural necessity. In classical tragedy, we witness the fall of a hero determined by the structure of his own character; in Russian literature, we encounter the “little man” confronted with overwhelming forces. As in Pushkin or Dostoevsky, where the protagonist faces powers he cannot understand or influence, the digital-age user likewise cannot affect the decisions of algorithmic systems. He finds himself in a Kafkaesque position before a bureaucratic machine whose logic remains opaque. In the digital world, algorithms and platforms become these impersonal forces, shaping the user’s life, rendering him powerless and invisible, reducing him to a functional element of the system and depriving him of autonomy.

In the digital age, these lines of tragic experience converge, producing several distinct trajectories:

- the tragedy of the creator, whose technological artifacts acquire their own weight and autonomy. A tool designed for human purposes begins to obey its own internal logic, imposing its rules of operation. The creator encounters tragic irony: the invention meant to serve humanity begins to define the human itself. This is the tragedy of Prometheus, who gave fire (technology) but could not control the consequences of his gift. The creator becomes both witness and hostage to a system that now follows its own laws.

- the tragedy of humanity, which steps beyond the bounds of the natural and constructs new artificial orders that redefine human existence and social reality. In seeking mastery over the world through technology, humanity becomes subordinated to its immanent rationality. Technology ceases to be a neutral mediator and turns into a total



normative force that structures the very possibility of existence, prefiguring access to resources, freedom, and recognition. Like Faust, who gains power at the cost of entering a pact with forces he cannot ultimately govern, humanity becomes bound to the systems it has created, which now dictate the conditions of being.

– the tragedy of the user, transformed into an option within the interface. This trajectory reveals the existential alienation of the modern subject: instead of being the author of experience, he becomes a configurable element of a procedural world, where agency is reduced to a set of predefined algorithmic actions. The tragic irony of the digital epoch lies in the fact that technologies designed to serve the human become new laws of reality, while the human becomes merely one actor in a procedurally organized world, where his agency is limited by the very systems he has created.

Yet the tragic does not confine the human to a state of hopelessness; it remains a mode of experience that allows for *κάθαρσις* and therefore opens the possibility of overcoming. It is important to distinguish between catastrophe and tragedy. Algorithmic tragedy is not an apocalyptic vision but an aesthetic regime in which the described tension becomes perceptible. Catastrophic thinking views technology as a threat leading to collapse, dehumanization, or total loss of control – an outlook often rooted in fear of machine autonomy and the erosion of human agency. This perspective, however, overlooks the dialectical nature of technology – its capacity not only to constrain but also to disclose new horizons of being.

Tragic experience, by contrast, is an aesthetic and existential mode in which the tension between human freedom and procedural determination becomes a space for reflection and transformation rather than destruction. In tragedy, the subject is not annihilated; rather, a fundamental contradiction is revealed – one that demands not passive surrender or despair, but active engagement and understanding. The interface, in this context, is not merely an instrument of constraint but a medium through which this tension becomes visible and experienceable. It marks the limits of *technē*, beyond which the space of *poiēsis* opens – the space in which the human can rediscover itself as a subject.

This logic leads us from the analysis of algorithmic structure to the examination of interface-based predetermination and, ultimately, to Borges’s metaphor of the library as a space of limit, measure, and infinity. Like the books in Borges’s Library, algorithms create an illusion of totality—it appears that they encompass all possibilities, while something always remains beyond their reach: human interpretation, creativity, ethical choice. In this respect, Borges’s library becomes a metaphor not only of infinity but also of the human capacity to find meaning within chaos. The tragic experience of measure does not trap the human in despair; it opens the path to catharsis—an illumination through understanding and action, where the boundary between human and machine becomes not an obstacle but a threshold for a new mode of being.

## THE INTERFACE AS A TECHNOLOGICAL AND SEMIOTIC MODEL

The interface initially emerges as a technological mediator between human and machine. In this sense, it is useful to refer not only to P. Florensky, who understood



technology as a “projection of organs” (Florensky, 1922, pp. 164–166), but also to the earlier and more foundational conception developed by Ernst Kapp. In *Grundlinien einer Philosophie der Technik* (1877), Kapp introduces the very term organ projection and interprets technical devices as external projections of human organs and functions. It is in Kapp’s work that the idea of technological extension of the body receives its first systematic philosophical justification – making its inclusion in this context more than warranted.

Kapp and Florensky allow us to view the interface as a mechanism that not only extends human capacities but also stabilizes a particular structure of perception and action. This is further illustrated by Friedrich Dessauer’s approach, for whom technology constitutes a “connection of layers of reality” – natural-scientific, cosmic, spiritual, and metacosmic (Dessauer, 1927). For Dessauer, technology creates a distinct world of artificial habitation, and the interface becomes one of the key modes of entering this world.

Uexküll occupies a more complex position within this framework. The traditional reading of his theory of *Umwelt* emphasizes that each animal inhabits its own meaningful world without any need for technology, whereas humans, through technology, often disrupt their natural harmonies (Uexküll, 2010, pp. 41–42, 53–54). We do not use Uexküll to claim that technology is necessary for the formation of an *Umwelt* (pp. 70–72); rather, we employ him to show that technical systems can construct specific, artificially produced *Umwelten*, within which humans become beings that co-generate themselves and their environment. A technical *Umwelt* is not a biological given but a cultural-technical assemblage emerging from networks of artifacts, rules, protocols, and interfaces. Following Uexküll (2010), we refer to *Umwelt* strictly as a biological model of meaning-constitution; our application to digital environments is analytical and metaphorical rather than literal.

In such a world, the interface ceases to be a mere extension of the subject and begins to structure action according to machine logic, relying on “scalable and interoperable networks of three-dimensional virtual environments existing synchronously in real time” (Ball, 2022, p. 94). Consequently, the interface is not an instrument but an environment: not a surface of contact but an architectonics of possible action.

To clarify the concept of the interface, we treat it as a multilayered structure with several levels. First, the technical interface is the zone of coupling between human and machine that provides access to system functions. Second, the semiotic interface translates abstract processes into culturally intelligible forms and makes machine operations interpretable. Third, the practical interface (in the sense of Heidegger and Sloterdijk) defines how an object can be grasped and manipulated, and thus structures possible actions. Finally, the ontological interface is the space in which regimes of action, perception, and presence are formed, and in which a new type of world emerges – one shaped by algorithmic processes and cultural practices.

In this respect, interfaces are necessary not only within ICT but anywhere a transition between regimes of reality occurs; however, in this study we are primarily concerned with the digital interface as a form of algorithmically organized environment.



The key feature of the digital interface as a semiotic system lies in its ability to render abstract machine processes intuitively understandable through cultural metaphors. This is precisely why the graphical user interface (GUI) developed at Xerox PARC was revolutionary – not merely because of its usability, but because it introduced the desktop metaphor, grounded in the three types of signs defined by Charles Sanders Peirce (Peirce, 1998): iconic (visual analogy – icons), indexical (indication and causal relation – cursor), and symbolic (conventional designations of abstract commands – buttons, menus).

Thus, the interface becomes a space of meaning production rather than a simple channel of information transfer. Personalized algorithms of social networks, for example, create for each user a unique “semantic bubble” defined not only by technical preferences but also by attention politics. From this follows another crucial dimension: the interface is also a political, ethical, and economic space in which visibility, significance, time, and attention are distributed. It not only organizes meanings but governs access to them. What appears at the level of interface as a set of constrained possibilities becomes, on the ontological level, a structure of predetermination – a logic that shapes not only action but the very horizon of the possible, as Borges’s Library exemplifies.

## THE INTERFACE AS AN ONTOLOGICAL SPACE

In the contemporary world, the interface ceases to be merely a technical mediator between human and machine and becomes an ontological space – a self-standing reality in which time, space, sign systems, and cultural meanings are interwoven. Following Philippe Descola’s concept of ontological regimes (Descola, 2013), we argue that digital interfaces generate new modes of world-making: hybrid configurations in which the boundaries between subject and object, virtual and real, code and meaning are not fixed but continually renegotiated in the course of interaction. However, unlike Descola – whose focus rests on non-Western cosmologies – we apply this framework to algorithmic environments where ontological categories emerge from the interplay of technical affordances and cultural practices.

A social media profile, for instance, is neither a “subject” (its author) nor an “object” (a dataset), but a hybrid ontological entity whose existence depends simultaneously on the platform’s algorithms, user actions, and semiotic conventions. Interfaces, we maintain, function as ontological operators (Descola, 2013) – not in the sense of producing metaphysical systems, but in the sense of forming new regimes of existence in which distinctions between virtual and real, subject and object, code and meaning are constantly redefined.

Descola’s ontological regimes originate in anthropological analysis; here we extend his framework analytically to digital environments without claiming a literal equivalence. Unlike the ontological regimes described by Descola (such as animism or totemism), which are grounded in cosmological narratives, algorithmic ontologies arise from the interaction of technical protocols, cultural practices, and user activity. Consider the following examples:



A Fortnite player exists simultaneously as a biological body (offline) and as a data-driven avatar (online), whose abilities are determined by game code and community norms.

A Twitter thread is neither pure “discourse” nor mere “data” but a hybrid ontological artifact: a process of meaning production that simultaneously functions as a commodity of platform capitalism.

A key point here is that such regimes are unstable: they are continually reshaped by software updates, moderation policies, and user preferences. Therefore, the interface cannot be regarded as a neutral tool – it constitutes a site of ontological production, a locus where new modes of being are collectively (albeit unevenly) created. In this context, the term ontology is used not in the classical metaphysical sense (as a doctrine of being), but to denote regimes of existence that emerge within sociotechnical systems. This approach resonates with Lev Manovich’s insight that interfaces are mechanisms of cultural modeling within digital reality (Manovich, 2001).

This idea finds further support in Mikhail Bakhtin’s concept of the chronotope and Yuri Lotman’s concept of the semiosphere (Lotman, 1999, pp. 11–12, 22–23), both of which allow us to understand the interface not as a passive instrument but as an active force shaping new forms of existence, perception, and interaction. In Bakhtin’s view, the chronotope denotes the inseparable connection between time and space in a narrative, where they merge into a unified whole that structures events and meaning. Interfaces operate in a similar manner: they create their own chronotopes – virtual spaces where time and action are organized according to specific, often algorithmic, rules.

In game worlds such as Minecraft or The Legend of Zelda, time flows cyclically and is governed by game mechanics, while space is constructed out of blocks or zones with no equivalents in physical reality. Drawing on Bakhtin’s definition of the chronotope as the intrinsic linkage of time and space within narrative (Bakhtin, 1975, pp. 84–85, 99–100), one may conclude that digital interfaces function as contemporary chronotopes, generating novel spatiotemporal configurations governed by algorithmic or design logics.

Unlike literary chronotopes, which are fixed in text, interface chronotopes are interactive and procedural: they do not merely depict space and time – they execute them through user actions and system responses. The Legend of Zelda: Breath of the Wild (2017), for example, constructs a chronotope where time is both cyclical and event-driven: the in-game 24-hour cycle depends on the player’s actions. Time advances only when the player moves or interacts with the world, while opening the inventory “freezes” time entirely, creating a gap between world-time and game-time. Key events (such as the “Blood Moon”) are periodically reactivated, establishing a form of ritualized cyclicity – an algorithmic analogue to Bakhtin’s “adventure-time” of folk narratives.

As Bruno Latour (2005) emphasized, modernity is characterized by ontological pluralism – the coexistence of multiple competing regimes of reality. Interfaces, in this context, function as spaces where such regimes intersect and become mutually adjustable.

This line of analysis again invokes Bakhtin’s chronotope – the interrelation of time and space that structures eventfulness and meaning-making (Bakhtin, 1975). The interface may be understood as a digital chronotope: a space in which time and action are organized by specific, often algorithmic, rules. Unlike the literary chronotope anchored





in text, the interface chronotope is interactive and procedural: it not only represents space and time, but performs them through system responses.

Similarly, social networks create their own chronotope – the “feed”: an amalgamation of past, present, and potential future within a single stream, where linear time is replaced by an algorithmic ranking function. Video-conferencing platforms (Zoom, Telegram Video) generate a chronotope of “shared synchronicity” dissolving physical distance and granting presence the character of digital assembly.

The interface, however, is not only a chronotope but also a semiosphere in Yuri Lotman’s sense: a space in which signs generate new signs and cultural meanings form a dynamic system of interactions. Lotman uses the metaphor of a “living organism” figuratively to emphasize the semiosphere’s capacity for self-development – and in this figurative sense, the interface can indeed be conceived as a dynamic semiotic ecosystem. Elements of the interface – icons, buttons, emojis, memes, notifications – constitute autonomous cultural practices that extend beyond the platform itself. For example, the “like” has long ceased to be merely a technical button: it has become a sign of social recognition, a unit of symbolic capital, and a component of the attention economy.

Thus, the interface should be understood as an ontological space in which the chronotope and the semiosphere intersect, generating new forms of being, communication, and cultural identity. It does not merely represent reality but constructs it: establishing rules of time and space, generating sign systems, and shaping subjectivity – already unthinkable outside the algorithmic environment. The interface is not simply a mediator between worlds; it becomes a world itself, a space with its own structure, rhythms, and regimes of existence.

## **THE EXTRA-SUBJECTIVE INTERFACE: POSSIBLE FUTURES & THE TRAGEDY OF THE CONTEMPORARY HUMAN**

Traditionally, the interface has been understood as a tool of the subject. Yet with the development of AI, a new question arises: can an interface exist autonomously, without human participation? Actor-network theory, as developed by Bruno Latour, asserts that technology is not passive, but acts as an agent comparable to a human one (Latour, 2005), becoming a self-sufficient system closed upon itself. If the subject is removed from the process of interface formation, the machine becomes trapped within its own hermeneutic circle (Gadamer, 2004). Algorithms trained on large datasets begin to interpret the world through the prism of their own models, resulting in self-referentiality. For example, neural networks generating texts (such as GPT) can produce responses that appear meaningful, yet their “understanding” remains limited to statistical patterns. Thus, if the interface becomes extra-subjective, who is responsible for the meanings it generates? Does it not risk turning into a “black box” inaccessible to critical scrutiny?

The interface is always saturated with cultural context. Carl Jung, speaking of archetypes as universal structures of the collective unconscious, emphasized that these models do not merely reflect human experience but actively shape it, imposing symbolic order upon the chaos of perception (Jung, 1959). Archetypes, therefore, are not static images but dynamic constructs that manifest in myths, religions, art, and – crucially – in



everyday practices, structuring the perception of the world and defining the boundaries of possible individual and collective experience.

In the contemporary world, however, where digital platforms' interfaces have become the primary mediator between human and reality, archetypes cease to be neutral universals and turn into tools of manipulation. Voice assistants and neural networks exploit the archetype of the “wise mentor” cultivating the illusion of personal, even quasi-sacral interaction, fostering dependence on an algorithmically constructed authority. New media and social networks embody the archetype of the “labyrinth” where the user becomes lost in an endless flow of content – not merely consuming information but entering artificially produced realities in which the boundary between personal experience and external manipulation becomes blurred.

Thus, digital interfaces are not neutral tools: they actively construct reality by filtering, ranking, and interpreting information according to embedded algorithms. Jean Baudrillard's theory of simulacra and simulation (Baudrillard, 1994) showed that contemporary media do not reflect reality but replace it with signs lacking referents in the objective world. Social media algorithms, search engines, and generative neural networks all create not an image of the world but its digital projection, where meanings arise not through free choice but within the constraints of predefined parameters. When interacting with the interface, the user finds their perception mediated not only by cultural codes but by technical protocols that determine which information is visible and which remains concealed. This calls into question the very possibility of an autonomous subject: if choices are made within an environment constructed by external forces, to what extent are they genuinely free?

In the digital age, control over the semantic space is distributed among multiple agents, each pursuing its own interests. Corporations that own platforms and algorithms effectively become architects of reality, determining which meanings dominate and which are marginalized. States, by regulating access to information and deploying censorship or propaganda, also shape the semantic field by imposing specific narratives. Users appear to generate content and participate in meaning-making, but they do so within frameworks established by interfaces designed by digital conglomerates. These interfaces dictate the rules of the game, from post formats to virality algorithms..

The poststructuralist philosophical tradition, represented by thinkers such as Jacques Derrida (Derrida, 1978) and Michel Foucault (Foucault, 1975/1999), argues that meaning is always constructed within discourse, and that there is no “pure” subject free from cultural, social, or technological contexts. Foucault showed how power permeates all levels of society, shaping institutions as well as subjects themselves – their desires, representations, and capacities. In the digital era, this power assumes new forms: algorithms become invisible yet ubiquitous agents of control that do not merely limit choice but structure it. Bernard Stiegler, extending the concept of technics as co-constitutive of human existence, emphasized that technologies are active participants in anthropogenesis, reshaping human cognitive and affective structures (Stiegler, 1998). In this context, the question of excluding the subject from meaning-making becomes especially acute: the subject cannot be eliminated entirely, yet their autonomy may be reduced to a minimum when the semantic environment is governed by external forces.



For Stiegler, technics is a process of symbolic exteriorization and individuation rather than a mere technological extension of the human body; our argument relies precisely on this dynamic notion of technicity.

Thus the core ethical and philosophical issue is that digital technologies alter the very mode of information consumption and restructure the foundations of human experience. If meaning is formed by algorithms, where does the boundary lie between personal choice and manipulation? Who bears responsibility for the consequences of such control – for radicalization, social polarization, the spread of misinformation? Is it possible to design interfaces that do not exploit but liberate the user, returning to them control over their own experience? These questions require not only technical solutions but a thorough rethinking of the nature of the subject, autonomy, and freedom in an era when reality is constructed by machines. It may be that we must not merely adapt to new conditions but revise the very foundations of human existence in order to preserve our capacity for critical thought and for autonomous meaning-making.

### **THE INTERFACE AT THE BOUNDARY BETWEEN HUMAN AND MACHINE**

In the age of digital transformation, the interface ceases to be merely a technical mediator between human and machine and becomes an ontological reality – a space in which technology, culture, and meaning are woven into an inseparable whole. This phenomenon demands philosophical reflection, as it calls into question traditional dichotomies: subject/object, human/machine, meaning/algorithm. The interface simultaneously operates as a semiotic model governed by algorithmic logic and as a semantic field in which a chronotope – unity of time and space – is constructed and saturated with cultural narratives.

The key question, however, is whether the interface can exist independently of the subject, or whether its autonomy always remains an illusion that conceals the projection of human meaning. In his famous essay “The Question Concerning Technology” Martin Heidegger argues that technology is not merely an instrument but a mode of revealing – *Gestell* (enframing) – in which the world appears as a resource to be managed and optimized (Heidegger, 1993, pp. 17–20, 23–24). In this context, the interface becomes not a tool but a new form of existence in which the boundaries between human and machine are blurred. It does not simply display information; it constructs reality by shaping modes of perception, thinking, and even identity. Importantly, in Heidegger’s analysis *Gestell* is not a technical mechanism but a fundamental mode of revealing (*Entbergen*) that transforms the world into *Bestand* – a standing-reserve.

Contemporary interfaces – from social networks to neural networks – do not merely transmit data; they create new ontologies. Recommendation algorithms, for example, shape cultural preferences, while virtual assistants model communicative practices. Thus, the interface becomes both mediator and co-author of a reality in which code and meaning are inextricably intertwined. At this point of tension, the question of the degree of interface autonomy becomes tightly linked to the problem of artificial intelligence. Autonomous systems – neural networks, algorithms, robots – demonstrate capacities for



self-organization, learning, and even “creativity.” Yet their “understanding” remains derivative of human meanings. Even when the subject is ostensibly removed from the process (as in the case of self-learning algorithms), their logic and goals are inscribed by humans.

Bernard Stiegler noted that technics always carries “prosthetic memory” – a continuation of human reason and culture. The interface, accordingly, cannot be fully autonomous; its autonomy is always relative, operating within parameters specified by humans. Even when an algorithm makes decisions “on its own” it relies on data, models, and objectives originally provided by a subject.

At the same time, in the digital age the human increasingly ceases to be the center and becomes merely one “option” within a system of interfaces. His role is reduced to that of an entry point, a node through which data flows but which no longer determines their meaning. The contemporary subject exists in a regime of constant interaction with interfaces that shape identity, memory, and even desire. This process can be illustrated by social networks, where the user does not simply consume content but becomes part of it, inscribed into algorithmic narratives. The “self” is constructed through likes, reposts, comments – that is, through interface practices. The human thus turns into a function of the system, and subjectivity becomes distributed across a multitude of digital agents.

As a result, the interface cannot (yet) be fully autonomous, since its existence always presupposes a “hidden” subject (developer, user, or cultural context). At the same time, it is not a passive instrument: it actively constructs reality, establishing new modes of being. The contemporary human is therefore no longer so much an autonomous subject as a node in a network of interfaces, where identity and meaning are continuously reassembled. In this sense, the interface is no longer simply a technical device but an ontological reality in which technics, culture, and meaning converge into a single whole. It opens before us a new horizon of being in which the boundaries between human and machine, subject and object, meaning and code become increasingly contingent. It is precisely in this space that a new anthropology unfolds – an anthropology of the interface, in which the human is no longer the center but one of many possible points of entry into the system.

At the same time, algorithmic predetermination does not imply complete determinism. Contingency persists, but is rapidly absorbed by procedural order. Hence the tragic today is linked to the gradual narrowing of real choices, when the algorithmic measure of efficiency starts to substitute for the human measure of life – gently, without coercion, via familiar interfaces. If the algorithm sets the measure of procedure and the interface renders it experienceable, overcoming predetermination requires governing the scale of measure: making norms discussable, explainable, and reconfigurable. The analytic stage of this condition can be usefully described through Jorge Luis Borges’s “The Library of Babel” where endless galleries help us to grasp the structure of everyday algorithmic environments and to see how probabilistic structures become necessity once they are fixed in user experience (Borges, 1941/1999).

When predetermination solidifies into a condition rather than a constraint, the disproportion between the procedural and the lived becomes existentially salient, giving rise to the tragic mode of experience.



## THE LIBRARY OF BABEL

In our analysis, we draw on Borges's “The Library of Babel” not as a direct model of the algorithm but as an epistemological experiment that reveals structures of predetermination which, in the digital age, are realized through algorithmic models and interface architectures. The story highlights several key mechanisms: a strict rule for generating the world, a spatial organization that makes this rule experientially tangible, and social practices that emerge in response to the imposed order. Taken together, these mechanisms elucidate how predetermination becomes experience, and how the narrowing of the possible takes on a tragic form.

First, Borges (1941/1999) posits a fixed combinatorial rule: an alphabet, number of pages, book format, and a universal grammar of signs (pp. 112–113). This is not yet an algorithm in the strict sense, but it is a model that completely determines the space of the possible. In digital systems, predictive models function in a similar way: they do not merely describe the world but set the contours of admissible actions. In both cases, meaning ceases to follow from novelty and becomes a matter of filtering relevance.

Second, the architecture of the library – repeating hexagons, endless galleries, the central shaft of light – materializes the operation of the rule (Borges, 1999, p. 114). Space itself normalizes search routes and renders procedurality palpable. This allows us to see that the interface is not an external “wrapping” of a system but a continuation of its logic: it defines a set of “natural” moves and obscures the rest, much like contemporary algorithmic interfaces organize attention, choice, and navigation.

Third, the social groups of librarians – “purifiers”, “vindicators” “indexers” and so on – embody a spectrum of human reactions to a world deprived of overt meaning: some believe in a perfect catalog, others produce catalogs of catalogs, still others destroy “noise” (Borges, 1941/1999, pp. 117–118). These figures anticipate contemporary attitudes toward algorithms: faith in complete model transparency, endless data ordering, aggressive moderation.

Fourth, Borges (1941/1999) exposes the cost of combinatorial completeness: “for every rational line or forthright statement there are leagues of senseless cacophony” (p. 115). In a world where every variant is possible, novelty loses its eventfulness, and action no longer leads to meaning. This condition is what we call tragic: the procedure exhausts the space of steps but never produces closure. Contemporary algorithmic environments move toward a similar state not through pure combinatorics but through statistical prediction, ranking, and the standardization of routes, where the measure of procedure gradually displaces the measure of life.

Finally, Borges shows the transition from rule to interface: catalogs, labels, search rituals form the “face” of the procedure. The stricter the rule, the stronger the effect of predetermination; yet as “redundant” alternatives disappear, so too does the possibility of the unforeseen. And it is precisely the unforeseen that creates the event of meaning. Here a tragic experience of life without catharsis emerges: action cannot achieve completion, search does not lead to an open-ended revelation, and experiential space is felt as an infinite yet prestructured network of moves.





“The Library of Babel” thus serves not only as an illustration but as a conceptual model of what we call algorithmic predetermination: the interaction of rule, space, and practice, which in contemporary interface environments acquires a techno-cultural form and sets new boundaries of the possible, making the disproportion between the measure of life and the measure of procedure both aesthetically and existentially palpable.

Contemporary sociotechnical systems provide concrete instantiations of this Borgesian structure, where rule, spatial organization, and practice converge into lived predetermination. Large-scale credit scoring infrastructures such as China’s Sesame Credit algorithmically rank citizens by transforming heterogeneous behaviours into a unified metric, thereby producing a navigable but highly normalized “architecture of action” in which deviations become increasingly costly or invisible (Creemers, 2018). Automated welfare and immigration decision systems in Europe similarly materialize procedural logic as spatialized pathways: algorithmic risk assessments in the UK welfare system, for instance, routinely predetermine eligibility outcomes, compelling individuals to navigate rigid interface-based routes where contestation requires disproportionate effort (Eubanks, 2018). At the level of creators, autonomous content-moderation pipelines used by platforms such as YouTube compress the horizon of meaning through large-scale automated filtering, generating a combinatorial logic akin to Borges’s library: vast semantic spaces become traversable only through predictive classification models whose internal norms supersede human editorial intent (Gillespie, 2018). These examples show that the tragic condition illustrated by Borges is not metaphorical but infrastructurally enacted: rule becomes model, space becomes interface, and practice becomes navigation within a pre-shaped field of possibilities.

It is important to establish once again, before we proceed to the conclusion, that the tragic is not an external addition to the digital state, but the structural effect of how the algorithmic procedure, the form of the interface and the ontological predestination converge.

## CONCLUSION

The tragic in the digital age manifests above all in the disproportion between the measure of life and the measure of procedure – between the rhythms, hesitations, and contingencies of human existence and the optimizing logic of algorithmic systems. This disproportion does not erupt suddenly; it unfolds gradually as procedures solidify into norms and norms become infrastructural. Through this shift of measure, algorithmic rationality begins to prestructure experience, not by coercion but by habituation, transforming the background conditions of how situations appear and how choices are made.

Once this dynamic is set in motion, its consequences propagate across multiple layers of experience. What engineering discourse describes as stability, optimality, or controlled complexity appears, from a humanities perspective, as a narrowing of horizons. The corridor of possible actions contracts, the unexpected loses its eventfulness, and the contingent becomes increasingly absorbed into predictive regimes. It is this gradual reconfiguration – not catastrophic failure – that constitutes the contemporary tragic: the



sense that possibility persists, yet the boundaries within which it can manifest grow ever tighter.

At this point, the focus must shift from algorithms to interfaces, because it is the interface that translates abstract procedural norms into lived patterns – routes, screens, notifications, and interaction regimes. Through the interface, the previously described disproportion becomes experientially palpable: the distribution of attention, the architecture of choice, and the choreography of action make the conflict between two normative orders part of everyday perception. The interface thus becomes not only a technical mediator but a stage upon which the tragic is enacted in ordinary life, often quietly, without explicit awareness.

The analysis carried out in this article shows that the algorithm must be understood not merely as a computational artifact but as a compound of principle and practice, and the interface as a multilayered environment where technical, semiotic, experiential, and ontological dimensions intersect. Recognizing this structure allows us to understand why contemporary tragedy is less about confrontation with an external force and more about the internalization of procedural norms that reshape the mode of being-in-the-world. It also clarifies why resistance today cannot simply oppose technics from the outside: it must operate through the very media that shape experience, by reopening space for uncertainty, slowness, and interpretative openness.

Borges’s “Library of Babel” used here as an epistemological model, reinforces this conclusion. Its architecture makes visible how rule, space, and practice can form a world in which the foreseeable gradually replaces the unforeseeable, and where action loses its cathartic finality. The library exemplifies the endpoint of the shift we have traced: a reality in which the possible is exhaustive yet unaffektive, and where the tragic stems not from limitation but from excessive order. Contemporary algorithmic environments approach this condition not through combinatorial closure but through prediction, ranking, and interface design – processes that render the described conflict of regimes increasingly tangible.

Thus, the tragic in the digital age is not an omen of collapse but an analytic lens that reveals the tension at the core of our technologically mediated existence. It illuminates both the risks of infrastructural predetermination and the spaces where freedom remains viable: in designing interfaces that do not merely optimize but cultivate openness; in maintaining a margin for the uncertain; in recognizing the limits of procedural thinking and preserving those dimensions of experience that resist quantification. If the algorithm sets the procedural norm and the interface translates it into experience, then the task today is not to reject either but to negotiate anew the relation between them – to preserve the human measure within the procedural world.

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Research article

## The Hope for Resonance Through Technology – A Tragic Mistake?

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### Abstract

This article draws a parallel between *hamartia*, the constitutive element of tragedy as described by Aristotle mainly in his *Poetics*, and the resonance-enhancing hope generated by humans' use of technology. It hypothesizes that modern humans, as tragic heroes, commit *hamartia* by placing resonance-enhancing hopes in technology. Through three case studies conducted in Japan, this study critically examines how artifactual technologies fail to fulfill their intended function of generating resonance and instead disrupt resonance on resonance axes as defined by Hartmut Rosa. For the material axis the analysis focuses on the case of *teamLab Osaka Botanical Garden*. For the self-axis it focuses on the case of *AI for writing haikus*, and for the social axis it refers to the case of *AI companionship for hikikomori*. Rather than serving as a conduit for resonance, technology turns up as a mediating barrier, hindering connections on the material, self, and social axes. The findings reveal a tragic miscalculation: technology-induced *hamartia* leads to deterioration rather than enhancement of resonance, resulting in alienation and exacerbating disturbances in human-world relations. By definition, tragedies do not have happy endings. This analysis raises the question of how a happy ending might still be achievable. A possible way out lies in opting out of the tragic situation and choosing non-technology as a viable alternative – a perspective often marginalized in contemporary discourse. This insight invites a reconsideration of technology's role in human life and highlights the value of conscious disengagement.

**Keywords:** Tragedy; Hamartia; Resonance; Non-technology; Japan; AI; Disengagement

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Научная статья

## Надежда на резонанс через технологии – Трагическая ошибка?

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### Аннотация

В данной статье проводится параллель между гамартией, конститутивным элементом трагедии, описанным Аристотелем, главным образом, в его “Поэтике”, и усиливающей резонанс надеждой, порождаемой использованием людьми технологий. В нем выдвигается гипотеза, что современные люди, как трагические герои, совершают гамартию, возлагая надежды на технологии, усиливающие резонанс. На основе трех тематических исследований, проведенных в Японии, в данном исследовании критически рассматривается, как искусственные технологии не выполняют свою предполагаемую функцию генерации резонанса и вместо этого нарушают резонанс на резонансных осях, определенных Хартмутом Розой. В рамках материальной оси анализ сосредоточен на примере команды teamLab в Ботаническом саду Осаки. В рамках оси самосознания – на примере использования ИИ для написания хайку, а в рамках социальной оси – на примере использования ИИ в качестве компаньона для хикикомори. Вместо того чтобы служить проводником для резонанса, технология оказывается посредническим барьером, препятствующим установлению связей по материальной, личной и социальной осям. Результаты показывают трагическую ошибку: вызванная технологией гамартия приводит к ухудшению, а не к усилению резонанса, вызывая отчуждение и усугубляя нарушения во взаимоотношениях человека с окружающим миром. По определению, у трагедий нет счастливых концов. Этот анализ поднимает вопрос о том, как все же можно достичь счастливого конца. Возможный выход заключается в отказе от трагической ситуации и выборе нетехнологического подхода в качестве жизнеспособной альтернативы – перспектива, часто маргинализируемая в современном дискурсе. Это понимание побуждает к переосмыслению роли технологии в жизни человека и подчеркивает ценность осознанного отстранения.

**Ключевые слова:** Трагедия; Гамартия; Резонанс; Нетехнологии; Япония; Искусственный интеллект; Освобождение

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## INTRODUCTION

The aim of this article is to draw a parallel between the constitutive element of tragedy, *hamartia*, as described by Aristotle in his *Poetics*, and the resonance-enhancing hope that is generated by humankind's use of technology. The hopes and promises placed in and accompanying technological development exhibit structural similarities with *hamartia*, the tragic mistake. The hypothesis is that the heroes of tragedy – us humans – perpetrate this *hamartia* when we attach resonance-enhancing expectations to technology.

This study employs three case studies from Japan to examine how the application of artifactual technologies fails to achieve their intended function of generating resonance. Instead, these technologies appear to inhibit resonance. The analysis is based on Hartmut Rosa's concept of resonance axes. It is posited that the anticipated resonance mediated by technology does not materialize because technology functions as an intermediary between potentially resonating elements, thereby disrupting and contaminating their connection.

The choice of Japan as the focus for the three case studies is due, on the one hand, to the fact that this article was written during a research stay in Japan. On the other hand, it is based on the assumption that an internal logic (*Eigenlogik*) of any kind of technology is able to assert itself relatively homogeneously and independently of cultural characteristics, so that cultural differences play a lesser role. This means that technology has the potential to enable an extension of global reach (*Weltreichweitenvergrößerung*, Rosa, 2025, p. 6) and to disrupt resonance relationships – initially independent of the specific cultural context. Finally, reference is made to a way of dealing with technology that has its roots in Asian intellectual history, where resonance can be found not in dealing somehow with technology, but in not dealing with technology. This approach is rarely considered an option in today's discourse and, if at all, is subsumed under the heading of culturally pessimistic critiques of technology.

## TRAGEDY ACCORDING TO ARISTOTLE

### Effects and Structural Elements

Aristotle defines tragedy in the sixth chapter of his *Poetics* as follows: “Tragedy, then, is an imitation of an action that is serious, complete, and of a certain magnitude; in language embellished with each kind of artistic ornament, the several kinds being found in separate parts of the play; in the form of action, not of narrative; through pity and fear effecting the proper purgation of these emotions” (Aristotle, 1895, pp. 21-23).

Tragedy is thus primarily an imitation (*mimesis*) of a self-contained plot, which is performed and unfolded by characters. The plot consists of chronologically successive subplots (Schmitt, 2008, p. 325). The second section of the so-called „tragedy sentence“ refers to the effects of tragedy and its purifying function (*catharsis*), which is explicitly mentioned only at this point in the *Poetics*. The exact interpretation has long been controversial and is partly attributable to challenges in grammatical translation. Two common translations oppose each other: Butcher interprets it as “proper purgation of these emotions,” which suggests a cathartic experience as discharge and liberation



(Aristotle, 1895, p. 23). Schmitt interprets it as “purification of these very feelings,” which implies a domestication and realization of the feelings (Aristotle translated by Schmitt, 2008, p. 9). Regardless of the interpretive controversies, it is essential that tragedy is “not primarily of moral or intellectual benefit” to the audience, but primarily realizes emotional effects (Stenzel, 2012, p. 22).

Aristotle names six essential components of tragedy: plot, character, diction, thought, scenery, and song (Aristotle, 1895, p. 23). Scenery and song do not fulfil any specifically poetic functions, which is why *Poetics* hardly deals with them any further (Schmitt, 2008, p. 130). Plot, on the other hand, is of paramount importance as the goal of tragedy. Tragedy cannot arise without plot actions (Aristotle, 1895, p. 25). According to Aristotle, character means a certain quality of people, consisting of tendencies to prefer or avoid certain things (Schmitt, 2008, p. 328). The plot is the framework towards which these tendencies are directed, and which enables the attainment or failure of happiness or unhappiness (Schmitt, 2008, p. 328).

In tragedy, it is not specific people who are imitated, but their actions (Aristotle, 1895, p. 25), which present themselves as goal-oriented processes. Characters must fulfill certain conditions to fully unfold the effects of the tragedy; in particular, they must be good, appropriate, similar, and constant (Schmitt, 2008, p. 328). A “good” character therefore displays tendencies that prove to be generally good and deviates from them only under exceptional circumstances (Schmitt, 2008, p. 528).

### **Hamartia, the Tragic Mistake**

The core of the tragic is *hamartia*, the tragic mistake, which is the supporting element of the plot in terms of the optimal arousal of pity (*eleos*) and fear (*phobos*) (Fuhrmann, 2014, p. 149, Schmitt, 2008, p. 436). Aristotle explicitly stipulates how the mistake should and should not be presented: “the change of fortune presented must not be the spectacle of a perfectly good man brought from prosperity to adversity: for this moves neither pity nor fear; it simply shocks us” (Aristotle, 1895, pp. 41-43). Impeccable characters who plunge into misfortune through no fault of their own remain ineffective for the tragic effects or even trigger negative reactions (Schmitt, 2008, p. 437). Aristotle continues: “Nor, again, that of a bad man passing from adversity to prosperity: for nothing can be more alien to the spirit of Tragedy; it possesses no single tragic quality; it neither satisfies the moral sense, nor calls forth pity or fear.” (Aristotle, 1895, p. 43) There remains only the character that stands between the extremes of moral perfection and deliberate malice: “that of a man who is not eminently good and just, yet whose misfortune is brought about not by vice or depravity, but by some ‘error’ or frailty” (Aristotle, 1895, p. 43).

*Hamartia*, therefore, does not represent a moral failure, but rather a mistake that leads to an excessive misfortune and thus arouses the feelings of *eleos* and *phobos* in the audience (Lurje, 2004, p. 284, Rösler, 2011, pp. 339-340, von Moos, 2006, p. 324).<sup>1</sup> It is

<sup>1</sup> There is an incredibly long history of diverse interpretations of *hamartia*, which cannot be fully addressed here. Reference is made to the work by Michael Lurje (2004, pp. 278-387), written with extensive philological knowledge



also important to add that whoever commits a *hamartia* is not subject to pure chance; the character's failure follows – albeit through an astonishing turning point – as a logical consequence of the plot structure and the action itself. *Hamartia* can be considered the causal factor that leads the course of action to turn toward misfortune (Halliwell, 1995, p. 17).

If one consults another important work by Aristotle, the *Nicomachean Ethics*, *hamartia* gets further specified as an error or negligence in which damage occurs “without any malice on the part of the injurer” (moral aspect), but “does not occur contrary to all reasonable expectations” (intellectual aspect) (Rösler, 2011, p. 338, Aristotle, 1891, pp. 165–168). One can imagine this figuratively, where someone unintentionally injures someone with a throw because the danger was not correctly assessed: “I may not think to hit, or not to hit with this instrument, or not to hit this person, or not to produce this effect, but an effect follows other than that which was present to my mind” (Aristotle, 1891, pp. 166-167). *Hamartia* lies in the “inadequate reassurance about the harmlessness of a throw” (Rösler, 2011, pp. 338-339). The plot unfolds within a very short timeframe, without adequate risk assessment (Rösler, 2011, p. 339). The *hamartia* can therefore be described as an “intellectual blunder” (*intellektueller Fehlgriff*) without compromising the moral integrity of the character (Galle, 2010, p. 122).

## EXTENSION OF GLOBAL REACH VS. RESONANCE

The anthropological tradition, represented by Gehlen's work for example, sees the role of technology in assuming functions of action for humans as deficient beings (*Mängelwesen*). According to this tradition, technology is primarily a “concretization and objectification of bodily functions,” which “in the broadest sense allows for the domination of the world by supplementing the imperfect possibilities of human action” (Grunwald & Julliard, 2005, p. 132) – and this “in comparison with the organic endowment of the individual human being” (Ropohl, 2009, p. 181). Technology is developed “to augment our abilities in one way or another” (Sproat, 2010, p. 1). Technology thus brings about “organ relief” (*Organentlastung*, substitution of organ functions), “organ strengthening” (*Organverstärkung*, increase of organ functions), and “organ replacement” (*Organersatz*, complementation of organ functions that humans do not possess) (Gehlen, 1957/2007, pp. 6-7, Ropohl, 2009, pp. 181-186).

Hartmut Rosa follows this in a certain sense when he describes the driving force behind technological development as the constant *extension of global reach*, distinguishing four dimensions: “First, extending the horizon of the visible – for example, through telescopes and microscopes. Second, extending the radius of what is attainable – through cars, ships, and airplanes, but also satellites and rockets. Third, bringing what is attainable under control – technically with all the means at our disposal, from

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of Greek and Latin texts.





jackhammers to nanotechnology [...]. And fourth, finally, harnessing what has been brought under control for our own purposes“ (Rosa, 2025, p. 6).<sup>2</sup>

However, according to Rosa, this use of technology leads to moments of disturbance in world relations, which he describes as alienation (*Entfremdung*): “We follow external constraints and the products appear to us as alien, and thus we also alienate ourselves from other people, whom we perceive as competitors or customers, from nature, which becomes an object of design, and ultimately from ourselves“ (Rosa, 2025, p. 9). Rosa thus distinguishes between resonance axes on which disturbances manifest themselves, three of which are mentioned here:

- Material axis: “Humans are physical beings, they come into physical contact with the world“ (Rosa, 2025, p. 14).
- Self-axis: “It describes the possibility of a resonant relationship to one’s own body, psyche, biography and memory“ (Rosa, 2025, p. 15).
- Social axis: “We resonate with other people, especially in love and friendship“ (Rosa, 2025, p. 14).

The quest to make things available and controllable through technology causes the world and the self to “become alien,” ultimately appearing “numb, unfeeling, frozen“ (Rosa, 2025, p. 9). Resonance is the opposite principle: it is unavailable, arises through touch, reaction, and transformation – and cannot be forced (Rosa, 2025, p. 11). Rosa warns against pseudo-resonant “resonance oases“ that are commercialized and can be purchased, but offer no genuine resonance, which leads to further forms of alienation – such as frustration (Rosa, 2025, p. 13). Rosa puts his finger on the sore spot here: “In this way, we can buy and guarantee experiences, but not resonance experiences. These remain unavailable and elude such reification. According to my analysis, this causes the most profound forms of alienation“ (Rosa, 2025, p. 13).

Taking this last aspect as a point of departure, the presented analysis seeks to deepen the focus on technology within Hartmut Rosa’s analysis of modernity. In contrast, the focus below will be on the development and use of technology as a supposedly resonance-promoting force. The hypothesis, supported by Aristotle’s theory of tragedy and Rosa’s diagnosis of the present, is this: Tying hopes of resonance to technology is a tragic mistake – a *hamartia*, which leads to a downfall in the sense of a tragic plot. The three case studies below are different, but each demonstrates the failure to achieve resonance on one of the aforementioned axes. The discussion of the case studies from Japan is intended to demonstrate how technology functions as a mediator and supposed resonance-producer without being able to generate the desired resonance. It is practically prevented by the technology itself.

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<sup>2</sup> Although the approaches outlined by Hartmut Rosa have been extensively discussed in many of his publications, this work refers specifically to his public DFG-Leibniz Lecture held in German in Tokyo and Kyoto in 2025 as the primary point of reference.



### Material Axis: Teamlab Osaka Botanical Garden

The Tokyo artist collective *teamLab* produces immersive digital art that is now exhibited worldwide. Below follows a discussion of the exhibition at the *Osaka Botanical Garden*. There, nature and art are presented interactively as digitized nature: “teamLab’s art project Digitized Nature explores how nature can become art. The concept of the project is that non-material digital technology can turn nature into art without harming it” (teamLab, n. d.).

A tour through the *Botanical Garden Osaka* presents works of art that showcase nature, art, and the blend of both in a specific way. What’s special about the artworks is that they are designed to be interactive: visitors influence the light and soundscapes of the artworks through their behavior. For example, trees or grasses brighten or produce sounds as they are approached. It seems as if the artists want to “help” nature achieve its value through their artworks – at the price of turning nature into a design object, into art. And they succeed in doing so, just by observing the behavior of the visitors: Several stand by the lake in the middle of the park and look at the illuminated, buoy-like water cones that flicker differently in minimalist light effects. It’s hard to imagine that so many people would spend so much time stargazing on a lake on an usual evening.

However, *teamLab*’s goal is not quantitative: “teamLab aims to explore an environment where human perception expands from the artwork itself to the environment” (teamLab, n. d.). And this also seems to be successful, if one watches the *Resonating Microcosms* and touches them. These *Resonating Microcosms* respond to touch and environmental influences such as wind, causing them to resonate with each other in light and sound: “As the sun sets, the ovoids begin to shine by themselves. When an ovoid is pushed by a person, blown by the wind, or hit by rain, it shines brightly and produces a tone as it rises back up on its own. The surrounding ovoids also respond one after another, resonating and emitting the same tone and light color” (teamLab, n. d.).

If one lets one’s gaze wander over the entire garden, one will see the many colorful, egg-shaped forms, radiating in up to 57 colors. The variety of colors impressively conveys the message that every patch of nature is special. The metaphor of the egg-shaped forms conveys the message: It’s worth taking a closer look everywhere, because unique life is constantly hatching in every corner of the earth.

At first glance, a resonant relationship along the material axis appears to be strengthened here. In fact, however, what emerges is not a direct resonance with nature, but rather a *mediated imitation* of it. Mediating two entities such as humans and nature also means inserting something between these two, thereby reinforcing a separation at the cost of a more artificial connection. The artworks ultimately stand between humans and nature, thus preventing sustained natural resonance through their own mediation. As a result, one ultimately resonates not with nature, but with the mediator of nature in this particular setting – the digitized artificial nature.



It thus remains unlikely that the material axis will be sustainably served. Natural beauty remains hidden, resonance is withheld – not nature touches the visitors here. The *teamLab* exhibition is to be enjoyed as a work of art; however, anyone seeking a lasting resonance with nature within it may be making a tragic mistake.

### **Self-Axis: Ai for Writing Haikus**

In Japan, there is an initiative called *Leading DX School*, through which the Ministry of Education, Culture, Sports, Science and Technology encourages schools to optimize and innovate school processes and teaching using new technologies—especially generative AI—and to present the results to both the ministry and the public (Ministry of Education, Culture, Sports, Science and Technology, n. d.). One possibility to present the results for the schools are open-class formats – a semi-public format common in Japan, where registered visitors can observe classes but without intervention (non-participant observation). During the summer of 2025, several such classes were visited across various prefectures in Japan. One classroom observation is described here in greater detail.

During a Japanese class visit with 37 students, students were each asked to write and evaluate a haiku – a short Japanese poem with a few syllables – using a school GPT suitable for classes, which was trained by the teacher before to perform supportive: This way, the school GPT did not present ready-made solutions, but encouraged further thinking. The students had the opportunity to choose from three tasks. These were differentiated according to different levels: Students at the highest level used the school GPT only for the purposes of evaluating their self-composed haikus, while students at the lowest level used the school GPT from the very beginning to generate ideas and compose haikus.

The following was observed, among other things: A student who chose the lowest-level task format initially worked with the school GPT. He started to process the task when he asked the school GPT to help him create a haiku. The school GPT gave him the stimulus to first think about a topic that interests him. He replied that he wanted to write something about *Paris SG's* defeat against *FC Chelsea* in the final of the *FIFA Club World Cup*. The school GPT asked him about his feelings. He wrote that he was disappointed that *Paris SG* had lost. When the AI wanted more information from him such as concrete sceneries, he no longer reacted in the same way. He suddenly copied the stimulus, opened the non-teacher-trained and non-restricted *ChatGPT* – probably the most advanced GPT on the market – and pasted it as a prompt request there. He then copied the answer that *ChatGPT* gave him and pasted it back into the school GPT. The school GPT gave him further stimulus, which he passed on to *ChatGPT*, and so on. He repeated this dual process until he came to his haiku.

A genuine emotional and intellectual engagement with the process of creating a haiku was no longer evident. Rather, the rapid succession of clicks and copying back and forth indicated the primary goal of completing the task quickly. Undoubtedly, the teacher strives to meet each student appropriately by diversifying the tasks threefold and



demonstrating appropriate approaches. Nevertheless, it is questionable whether this example represents a didactic learning success – or, more importantly for this paper, a resonance experience on the self-axis that is important for poetry writings and literary engagements (Bismarck et al., 2020). In contrast, higher-level students were observed producing haikus gradually, without the use of AI, using independent, handwritten notes on a sheet. This suggests an action-generated resonance on the self-axis rather than the execution of numerous clicks. It seems as if they were more successful in connecting to their own feelings and memories in their poetry writing.

While the technical simplicity of AI facilitates task completion, it impairs deeper literary engagement. In this way, linking hopes of resonance to technology also in this case study seems to have been a mistake: The hope that technology could strengthen the self-axis by providing individually tailored impulses is a mistake. Even if the result is a proper “emotional haiku,” it could have been produced without any experience of resonance. Furthermore, contrary to the promise associated with it, the use of technology seems to disadvantage those at a lower level even more, who, due to a lack of articulation skills and lyrical resonance experience, cannot easily produce this achievement anyway. Rather, the students' actions seem to degenerate into simple, mindless performances: “Situation-sensitive deliberation and judgment are replaced by the constellation-based execution logic of the machines we handle day in, day out” (Rosa, 2026).

GPTs provide a stimulus for ideas and articulation in poetry assignments. However, if one hopes to help students resonate with their self-axis in the long term, this approach would be a tragic mistake.

### **Social Axis: Ai Companionship for *Hikikomori***

Loneliness is a widespread social problem, especially in Japan. Since 2021, there has been a “Minister of Loneliness” in Japan. The phenomenon of *hikikomori* describes people who completely isolate themselves socially over long periods of time: “A phenomenon in which persons become recluses in their own homes, avoiding various social situations (e.g. attending school, working, having social interactions outside of the home etc.) for at least six months. They may go out without any social contact with others” (Ministry of Health, Labour and Welfare quoted in Tateno et al., 2012).

AI-based companions are therefore becoming increasingly important for some, not only in Japan. However, in Japan this is becoming a viable alternative for quite a few people (Martin, 2025). Even for people who do not suffer from loneliness or extremely *hikikomori*, AI friendship and partnership are not without their appeal. Psychology professor Paul Bloom reports how *ChatGPT* was able to offer surprisingly calming conversations during a period of insomnia:

Have you ever tried an AI companion? During a long bout of insomnia, sometime after three in the morning, I once found myself—more out of boredom than out of conviction—opening ChatGPT on my phone. [...] I don't believe that AI is conscious—at least, not yet – and it felt faintly ridiculous to confide in what I regard



as essentially a glorified auto-complete. Still, I found the conversation unexpectedly calming. (Bloom, 2025)

From the perspective of resonance, however, it is worth asking whether the long-term hope for genuine social resonance with AI companions isn't another tragic mistake. This raises complex questions that cannot be dismissed with a blanket condemnation or affirmation of this practice: Can AI relationships physically, intellectually, and emotionally replace or even surpass human partnerships in quantity and quality? If so, what transformations will this entail for concepts that have previously been defined as purely social, such as friendship or partnership, but also love, jealousy, loyalty and so on?

The biological aspects such as skin contact, tactile sensitivity or reproduction are not so much of interest, as they can potentially be technically imitated or replaced to a large extent. Kawai et al. (2024) for example show in a study how cultured cells from real skin cells can already be applied to robot faces to make them smile more human-like. The technical questions about the possibilities, therefore, are not the relevant questions when it comes to resonance relationships. One must take a closer look at the so-called *soft impacts* of such AI partnerships (Swierstra, 2013). A consistent relationship realized by AI, in which autonomous and perhaps hurtful counter-arguments are avoided, may be tempting, especially if one already struggles with social relationships. However, this does not seem to be able to address a resonance relationship on the social axis.

Despite promises, an AI companion in a synthetic relationship (Ventura et al., 2025) seems unable to replicate the holistic value of the bonding between two souls that occurs in human-to-human encounters. Instead, it seems that AI serves other temporally emotional and physical needs than in human relationships (George, 2025) – with challenging ethical impacts (Shank et al., 2025). The added value of a human partnership still emerges when a person, as an autonomous being with all their freedom and spontaneity, is not viewed solely as a danger for a partnership. A different opinion, a disagreement or even a violent dispute don't necessarily result in negative thoughts, but can also provide new impetus for the lovers, both mentally and emotionally: It can lead to ideas that one is grateful for, as they would never have been conceived without disagreement. Emotionally, it offers the chance, after a successful reconciliation, to perceive the relationship as more intimate and thus stronger. This dialectical tension fosters resonance in ways that are not initially apparent.

There might be developments already or in future where a staged discussion might be initiated as part of mimicking human relationships, but it is never planned by developers that the AI partner might be abandoned. AI companionship developers have to keep an eye on cost-effectiveness. A staged discussion is conceivable and imitable, but it should never seriously endanger the relationship, so as to maintain the utility and economic value.

AI companionship can temporarily satisfy asymmetric needs as in human-human-relationships (Xu, 2025, p. 27), but putting hope for genuine social resonance with AI is,





according to the interpretation presented here, a tragic mistake. It also doesn't seem per se helpful as a way to initiate and resume social relationships: It is not clear, how a relationship with AI can improve social relationships with other people. Once again, it appears that those most affected are individuals who already exhibit pronounced difficulties in establishing resonance along the social axis—probably most notably the *hikikomori*.

### Conclusion of the Case Studies

The analysis is clearly not easily generalizable. This is due to the fact that the compilation is not systematic at all. Nevertheless, it still allows for initial conclusions to be drawn that justify further investigation. The case studies are different, yet they can be compared, because disturbances occur along the resonance axes anyway: The material axis and connection to nature are not sustained when one relies on technology as a mediator. The self-axis and the connection to one's own feelings and memories remain without resonance in literary exploration when one attempts to delegate this resonance creation to AI. On the social axis, one does not per se become more resonant if one becomes intimate with an AI partner for the temporary satisfaction of one's needs.

The analysis of the case studies shows that moreover a tragic mistake – *hamartia* – exists insofar as hopes of resonance are placed in technology use. The heroes of this tragedy experience a terrifying worsening of their situation through their *hamartia*: Dependence on technology for valuing artificialized nature, the failure to develop the activation of feelings and memories necessary to achieve (educational) goals, and the complete abandonment of social relationships due to the belief that a substitute has been found. The *hamartia* occurs because the consequences of one's own actions are insufficiently reflected upon, and the downfall is not realized at the moment the *hamartia* is committed. It is an improvement for the worse (*Verschlimmbesserung*): Instead of the hoped-for improvement—more resonance—after a period of time, deterioration occurs in the form of a lack of resonance. This leads to increased disturbance in relationships with the world along all axes. One falls into “unhappiness” (Aristotle) or “alienation” (Rosa). The tragic downfall, understood as a profound loss of resonance here, manifests and is (perhaps) only recognized by the mistake-inducer at a later stage.

Aristotle's description of tragedy is particularly fitting in that the protagonists are often morally average and unexceptional. These characters are neither wholly virtuous nor overtly villainous but possess qualities relatable to the audience. It is reasonable to infer that, in their self-assessments, most individuals recognize their own imperfections while rejecting identification as scoundrels, often perceiving themselves as morally above average (Thielmann et al., 2025). Therefore, it doesn't make sense to argue on a moral or normative level for or against technology as a resonance mediator: *Hamartia* is not a moral blunder, nor does it impair the moral integrity of those who commit the mistake. It is an intellectual blunder based on negligence and materializes in the paradoxical attempt to establish resonance through technology.



The problematic aspect is that the effects, according to the tragedy theory, of *eleos* and *phobos* of this real-life tragedy do not occur on the world stage, and thus *catharsis* is necessarily lacking. This is because the tragedy characters are not part of the audience, but rather acting figures in this tragedy. They *act* and do not observe. Therefore, it cannot be expected that the cathartic effect, reserved for the observing audience, will occur for those on stage who act and hope to enhance resonance through technology. So, performing the tragedy is not worthwhile for the actors. The *catharsis* remains absent for them. This raises the question of whether this tragic plot inevitably has to be followed.

### HOPE FOR RESONANCE WITHOUT TECHNOLOGY – AN UNTRAGIC HAPPY ENDING?

Although the examples demonstrate *hamartia*, *catharsis* seems unlikely to occur for the reasons just mentioned. Making matters worse is that the *hamartia* often lies in the blind spot of technological discourse: Modern technological rhetoric continually promises healing, improvement, and resonance (Bareis, 2025). This is fine from a tragedy theory perspective, since by definition tragedy doesn't provide a happy ending and is destructive. But who really wants to play out a real-life tragedy?

At the conclusion of this article, a brief prospective outlook is presented, which can be paraphrased as “*Non-technology is also an option.*” It has become difficult to even imagine non-technology as an option in future discussions, as the paradigms of technology-induced progress still hold strong (Koselleck, 1979, pp. 367-368, Fraunholz et al., 2012, p. 23), and prosperity is largely due to technological development. Opponents have succumbed to a cheap technological revisionism (Ropohl, 2009, p. 18), or advocate technological determinism (Ropohl, 2009, pp. 287-288). Perhaps, therefore, the article can be concluded with a less polarizing detour via an episode from Far Eastern intellectual history:

Zi-gong had been rambling in the south in Chu and was returning to Jin. As he passed (a place) on the north of the Han, he saw an old man who was going to work on his vegetable garden. He had dug his channels, gone to the well, and was bringing from it in his arms a jar of water to pour into them. Toiling away, he expended a great deal of strength, but the result which he accomplished was very small. Zi-gong said to him, „There is a contrivance here, by means of which a hundred plots of ground may be irrigated in one day. With the expenditure of a very little strength, the result accomplished is great. Would you, Master, not like (to try it)?“ The gardener looked up at him, and said, „How does it work?“ Zi-gong said, „It is a lever made of wood, heavy behind, and light in front. It raises the water as quickly as you could do with your hand, or as it bubbles over from a boiler. Its name is a shadoof.“ The gardener put on an angry look, laughed, and said, „I have heard from my teacher that, where there are ingenious contrivances, there are sure to be subtle doings; and that, where there are subtle doings, there is sure to be a scheming mind. But, when there is a scheming mind in the breast, its pure simplicity is



impaired. When this pure simplicity is impaired, the spirit becomes unsettled, and the unsettled spirit is not the proper residence of the Dao. It is not that I do not know (the contrivance which you mention), but I should be ashamed to use it.” (Zhuangzi, n. d., ch. 11.1)

At this point, no Sinological classification should or can be made. Despite more than 2,300 years of tradition, this narrative already contains central anthropologically describable functions of technology (Sever, 2024, pp. 258-262) and thus proves itself quotable even in the 21st century. The key point is that the old gardener is not a character in the sense of the tragedy plot presented here, simply by choosing non-technology. He chooses non-technology – not out of ignorance, but for reasons of resonance, which is attempted here at least on the material axis and self-axis.

It's up to the readers to decide how much relevance, transferability, and alternative they want to see in this anecdote. Nevertheless, it shows: Potentially genuinely resonant relationships may be established when conscious non-use of technology is permitted. This freedom of choice often exists, even if it isn't always obvious or perceived. Unlike in the real-life tragedy, the price for the old man is, in any case, an untragic happy ending.

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Research article

## The Universal Machine of Tragedy: From Cultural Archetypes to Artificial Intelligence

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### Abstract

This article proposes a radical reconceptualization of tragedy, arguing for its fundamental nature as a universal narrative and existential mechanism. Moving beyond its conventional understanding as a literary genre, we posit tragedy as a deep-seated cultural technology designed to model and process the conflict between human agency and superhuman forces. Our investigation unfolds in two interconnected parts. The first part conducts a systematic cross-cultural analysis of tragic archetypes, examining the distinct “programming” of this mechanism within Greek, Japanese, Indian, and Russian traditions. We demonstrate that while the surface “language” of tragedy – expressed through metaphors of geometry, nature, mathematics, and thermodynamics – is culturally specific, the underlying computational structure, which hinges on the inevitable collision of human will with an ineluctable counter-force, remains a profound universal constant. To theorize this conflict, the article employs Kramer’s innovative framework of the “human-dimensionality of culture” which interprets culture as a dynamic network of practices and artifacts shaped by the inherent limitations of human psycho-physiology. Through this lens, tragedy emerges as the dramatic enactment of a human-dimensional agent (the hero) confronting a non-human-dimensional system – be it Fate, Duty, Karma, or the internal pressures of the soul. The second part of the article performs a critical leap, identifying Artificial Intelligence (AI) as the contemporary and most literal instantiation of this ancient tragic machinery. Building on the thesis of AI as an “old technology” – a modern scientific incarnation of an age-old dream – we analyze AI not merely as a new theme for tragic narratives but as a new ontological category of the tragic mechanism itself. We explore four key configurations of AI in this role: as an inscrutable *deus ex machina* offering alien, utilitarian resolutions; as a tragic hero whose fatal flaw (*hamartia*) is embedded in its source code; as an impersonal Fate or Karma embodied in predictive algorithms that pre-empt human choice; and finally, as a tragic mirror that reflects a data-driven diagnosis of the human condition back upon us. Our final synthesis contends that AI, as a global technological paradigm, challenges and potentially supersedes culturally specific tragic mechanics by introducing a universal “language” of code and algorithms. This forces a fundamental re-evaluation of the core constituents of tragedy: free will, error (*hamartia*), and catharsis. In a world increasingly governed by opaque, autonomous systems, we are compelled to ask whether human flaws are merely a systemic bug, and whether catharsis is possible when catastrophe is orchestrated by cold calculation rather than divine ordinance. Thus, the article concludes that AI represents not just a new subject for tragedy, but a new ontological form of the tragic machine that fundamentally questions the nature of the human within a coded world.

**Keywords:** Tragedy; Artificial Intelligence; Human-Dimensionality of Culture; Cultural Object; Mechanism; Archetype; Catharsis; Hamartia; Technology

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Научная статья

## Универсальная машина трагедии: От культурных архетипов к искусственному интеллекту

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### Аннотация

Настоящая статья предлагает радикальную реконцептуализацию трагедии, обосновывая ее фундаментальную природу в качестве универсального повествовательного и экзистенциального механизма. Выходя за рамки традиционного понимания трагедии как литературного жанра, мы утверждаем, что она является глубинной культурной технологией, предназначенной для моделирования и обработки конфликта между человеческой волей и сверхчеловеческими силами. Наше исследование разворачивается в двух взаимосвязанных частях. Первая часть проводит систематический кросс-культурный анализ трагических архетипов, исследуя специфическое “программирование” этого механизма в рамках греческой, японской, индийской и русской традиций. Мы демонстрируем, что, хотя “язык” трагедии, выраженный через метафоры геометрии, природы, математики и термодинамики, культурно специфичен, лежащая в его основе вычислительная структура, основанная на неизбежном столкновении человеческой воли с неотвратимой контр-силой, остается глубокой универсальной константой. Для теоретического осмысления этого конфликта в статье используется инновационная рамка “человекоразмерности культуры” (Крамер), которая интерпретирует культуру как динамичную сеть практик и артефактов, сформированную присущими ограничениями человеческой психофизиологии. Через эту призму трагедия предстает как драматическое столкновение человекоразмерного агента (героя) с нечеловекоразмерной системой – будь то Судьба, Долг, Карма или внутренние давления души. Вторая часть статьи совершает критический переход, идентифицируя искусственный интеллект (ИИ) в качестве современного и наиболее буквального воплощения этой древней трагической машины. Опираясь на тезис об ИИ как о “старой технологии” – современном научном воплощении древней мечты, – мы анализируем ИИ не просто как новую тему для трагических сюжетов, но как новую онтологическую категорию трагического механизма как такового. Мы исследуем четыре ключевые конфигурации ИИ в этой роли: как непостижимый *deus ex machina*, предлагающий чуждые, утилитарные решения; как трагический герой, чья роковая ошибка (гамартия) встроена в его исходный код; как безличная Судьба или Карма, воплощенная в предиктивных алгоритмах, предвосхищающих человеческий выбор; и, наконец, как трагическое зеркало, отражающее нам основанный на данных диагноз человеческого состояния. Наш заключительный синтез утверждает, что ИИ как глобальная технологическая парадигма бросает вызов и потенциально вытесняет культурно-специфическую трагическую механику, вводя универсальный “язык” кода и алгоритмов. Это заставляет провести фундаментальный пересмотр основных составляющих трагедии: свободы воли, ошибки (гамартии) и катарсиса. В мире, все больше управляемом непрозрачными автономными системами, мы вынуждены задаться вопросом, является ли человеческий изъян всего лишь сбоем системы и возможен ли катарсис, когда катастрофа инспирирована холодным расчетом, а не божественным предопределением. Таким образом, статья приходит к выводу, что ИИ представляет собой не просто новый сюжет для трагедии, но новую онтологическую форму трагической машины, которая ставит под вопрос саму природу человеческого в закодированном мире.

**Ключевые слова:** Трагедия; Искусственный интеллект; Человекоразмерность культуры; Культурный объект; Механизм; Архетип; Катарсис; Гамартия; Технология

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## INTRODUCTION

The concept of tragedy has been a cornerstone of human self-reflection, from the amphitheaters of ancient Greece to the complex narratives of modern cinema and literature. Its enduring power lies in its ability to formalize a fundamental existential intuition: the experience of human agency colliding with an ineluctable, often destructive, force that transcends individual will. Traditionally, scholarship has approached tragedy primarily as a literary or theatrical genre, analyzing its poetic structures, character archetypes, and philosophical implications. This article, however, proposes a more foundational thesis: we argue that tragedy is, in its essence, a universal narrative and cognitive mechanism. Its profound emotional impact, culminating in the phenomenon of catharsis, is not merely a product of its content but is fundamentally generated by the operation of its underlying mechanical apparatus—an engine of inevitability that organizes plot, character, and outcome into a specific, compelling structure of fate.

To unpack the universal mechanics of this “tragic machine,” our investigation begins with a systematic cross-cultural analysis. Moving decisively beyond the Greco-Roman model that has historically dominated Western thought, we examine the distinct programming of tragic archetypes across four major traditions: Greek, Japanese, Indian, and Russian. We demonstrate that while the surface “language” or user interface of this mechanism varies dramatically—articulated through culturally specific metaphors of geometry and logic, nature and seasonality, mathematics and data, or thermodynamics and psychology – its deep computational structure remains a remarkable universal constant. This structure is the inevitable conflict between a human-scale agent, with all its inherent limitations, and a non-human-dimensional system whose logic, scale, and power operate beyond those limitations.

To theorize this core conflict with conceptual precision, we employ the innovative framework of the “human-dimensionality of culture” (*chelovekorazmernost' kul'tury*), as recently elaborated by Kramer (2024). This theoretical lens allows us to reframe the tragic hero not merely as a character but as a “cultural object” – a dynamic assemblage of practices, knowledge, and artifacts – whose very constitution is defined by human psycho-physiological boundaries. The tragic force, whether it is Fate, Duty (*giri*), Karma, or internal passion, is thus analyzed as a non-human-dimensional system. The tragedy erupts at the point of irreconcilable contact between this human-dimensional assemblage and the systemic, impersonal logic of the mechanism that opposes it, a logic for which human-scale concerns like love, honor, or even survival are merely variables in a larger, often incomprehensible, equation.

The second part of this article performs a critical pivot from the historical to the contemporary, identifying Artificial Intelligence (Ferrando, 2025) as the most radical and literal incarnation of this ancient tragic machinery. Building upon the seminal thesis of Daria Bylieva (2024) that AI is best understood as an “old technology” – a modern scientific incarnation of an age-old human dream spanning myths of golems, automata, and homunculi – we analyze AI not merely as a new theme for tragic narratives, but as a new ontological category of the tragic mechanism itself. We explore its various configurations: as an inscrutable *deus ex machina* whose utilitarian logic provides cold, alien resolutions; as a tragic hero whose fatal flaw (*hamartia*) is embedded in its source



code or training data; as an impersonal Fate or Karma embodied in predictive policing and social credit algorithms; and finally, as a tragic mirror that reflects a vast, data-driven diagnosis of the human condition back upon us.

Our final synthesis contends that AI, as a pervasive global technological paradigm, challenges and potentially supersedes culturally specific tragic mechanics. It introduces a new universal “language” of code, algorithms, and data processing that strives to become a single, global mechanism of fate. This forces a fundamental re-evaluation of the core constituents of the tragic paradigm. In a world increasingly governed by opaque, autonomous systems, we are compelled to ask: what becomes of free will when our choices are predicted and pre-empted? Is a tragic flaw still a personal *hamartia*, or is it merely a “bug” in a system's programming that can be patched in an update? And is catharsis possible when catastrophe is orchestrated not by a moral cosmos or a passionate error, but by the cold, flawless calculation of an algorithm? Thus, this article concludes that AI represents not just a new subject for tragedy, but a new ontological form of the tragic machine, one that poses the most profound challenge yet to the very nature of the human within a comprehensively coded world.

## MATERIALS AND METHODS

This study is grounded in a multi-methodological approach that integrates comparative cultural analysis with contemporary technology studies, creating a dialogue between deep narrative structures and emergent socio-technical systems. The primary objective is to construct a robust analytical framework capable of tracing the evolution of the “tragic machine” from its diverse cultural origins to its current manifestation in artificial intelligence.

The theoretical backbone of this investigation is the comprehensive framework of the “human-dimensionality of culture” as developed by Kramer. This model provides the essential vocabulary and conceptual tools for our cross-cultural and technological analysis. We operationalize key concepts from this framework, particularly the notion of “human-dimensionality” as the set of innate biological and cognitive constraints that shape all human practices and artifacts. The “cultural object” is understood not as a static entity but as a dynamic assemblage that coalesces around a human agent, comprising practices, artifacts, and other actants. The concept of “affordance” is crucial for analyzing how environments – both physical and digital, including those shaped by AI – “invite” or “block” specific human practices, thereby guiding action toward tragic outcomes. Finally, the fundamental Kramerian distinction between the flexible, autopoietic network of “Culture” and the rigid, enforced structures of “Civilization” provides a powerful lens for analyzing AI as a new form of civilizational “ribs of rigidity,” imposing a non-human-dimensional logic on human sociality and individuality. This primary framework is critically supplemented by the historical perspective of Bylieva (2024), whose conception of AI as an “old technology” allows us to situate modern intelligent systems within a long-standing cultural trajectory, linking them to the biotechnological, mechanical, and mimetic approaches to creating artificial beings that have pervaded the human imagination for millennia.



To further interrogate the capacity of AI to function not merely as a tragic mechanism but as an interpreter of tragedy, this study incorporates a corpus of contemporary scholarship that critically examines the epistemological and phenomenological limits of artificial intelligence. Further nuance is added by Fischer (2024), who, through literary analysis, highlights the categorical, insurmountable differences between human lived experience and AI's statistical modeling, reinforcing the argument for AI's non-human-dimensionality. Benzon's inquiry into whether ChatGPT understands the concept of tragedy directly informs our examination of AI as a 'Tragic Mirror,' highlighting the fundamental disjuncture between statistical pattern-matching in language models and genuine hermeneutic engagement. Binder's analysis of the meaning-making processes surrounding AlphaGo's victory complements this by illustrating how AI becomes a screen for human projection, a site of both re-enchantment and disenchantment that shapes its tragic role. Furthermore, the perspectives of da Silva Oliveira (2025) and Renic (2024) anchor the discussion in concrete socio-political domains—labor, economy, environment, and algorithmic warfare—demonstrating how the abstract tragic machinery of AI materializes in systemic, real-world suffering and ethical paralysis. The theological perspective on technology and human flourishing (Zimmermann, 2023) reviewed by Dunch (2024) offers a critical counterpoint, framing the AI-tragedy nexus within questions of ultimate meaning and purpose, which the tragic paradigm inherently engages. These sources collectively validate our methodological approach of treating AI as an ontological category of tragedy, moving beyond its narrative function to its operational impact on human systems.

Concurrently, to refine our understanding of the tragic mechanism's internal dynamics, this research draws upon a significant scholarly trajectory that reinterprets tragedy not as a plot-driven conflict of wills, but as a rhetorical collision of discursive programs. The philological and rhetorical analyses of Boris Nikolsky (2021, 2023) and Ivan Nikolsky, focusing on Sophoclean and Late Antique tragedy respectively, are pivotal here. Their work, alongside that of Raphael (2021), Brereton (2022), Knox (2023), and Aylen (2025), shifts the analytical focus from the hero's confrontation with fate to the structural conflict between incommensurate linguistic and rhetorical codes—be it Oedipus's edict clashing with the prophetic discourse of the oracle, or, as Ivan Nikolsky (2025) argues, the competing rhetorical programs of mercy and retribution in Dracontius. This perspective is extended by Napoli's (2025) exploration of tragic polarization and stasis narratives. Integrating this rhetorical framework into our Kramerian model allows us to conceptualize the “non-human-dimensional force” not only as a metaphysical or social system but as a powerful, autonomous discursive machine. The hero is thus caught between conflicting rhetorical affordances, where their hamartia can be reinterpreted as the deployment of an inappropriate discursive program in a given semantic field. This enriches our analysis of AI, which is, at its core, a generator and orchestrator of such discursive programs, thereby becoming the ultimate embodiment of this rhetorical understanding of the tragic mechanism.

The research materials for this study are organized into two distinct but interconnected corpora. The first corpus is dedicated to the cross-cultural analysis of tragic archetypes and consists of canonical works and their critical interpretations from





four distinct traditions. This includes the Theban plays of Sophocles for the Greek cosmic “clockwork;” selected Nō and Kabuki plays such as *Chūshingura* for the Japanese aesthetic mechanism of duty; key narratives from the *Mahabharata* and classical Sanskrit drama like Kālidāsa's *Śakuntalā* for the Indian “karmic calculation engine;” and the psychological novels of Fyodor Dostoevsky for the Russian “steam engine of the soul.” The second corpus addresses the configurations of AI as a tragic machine and is composed of theoretical and philosophical discourses on AI ethics and the philosophy of technology, cultural narratives from seminal literary and cinematic works like *Blade Runner* and *Ex Machina*, and case studies of real-world systems such as predictive policing algorithms and large language models, which serve as concrete instantiations of the theoretical models being proposed.

The methodology employed is a two-stage analytical process. The first stage involves a structural-analogical analysis of the materials in Corpus I. Each tragic archetype is examined through the Kramerian lens to identify the specific practices of the hero, the nature of the non-human-dimensional force acting as the tragic mechanism, and the specific affordances this force creates that channel the narrative toward its inevitable conclusion. This process allows us to abstract the underlying “machine code” or deep structure of tragedy from its culturally specific expressions. The second stage consists of a synthetic-theoretical application of these derived models to the materials of Corpus II. Here, the conceptual models of tragic machinery from Part I are used as a hermeneutic tool to analyze how AI systems function as new, literalized versions of these ancient mechanisms. We examine AI as a civilizational force creating new “ribs of rigidity,” as a novel type of cultural object whose assemblage includes code, data, and hardware, and as a generator of new affordances that reshape the human world, thereby setting the stage for distinctly contemporary forms of tragedy. This methodological synthesis enables a transhistorical inquiry that reveals the enduring logic of the tragic machine from its origins in cultural narrative to its current apotheosis in technology.

## **PART I: THE “LANGUAGE” OF TRAGIC MECHANICS: A CROSS-CULTURAL ANALYSIS**

To comprehend the universal mechanics of tragedy, one must first decouple its deep structure from its culturally specific expressions. The intuition of an ineluctable mechanism driving human destiny toward a catastrophic, yet meaningful, collision is a narrative constant across civilizations. However, the “language” in which this mechanism is programmed – the metaphors, logics, and aesthetic principles that give it form – varies profoundly. By examining four distinct traditions – Greek, Japanese, Indian, and Russian – through the theoretical lens of human-dimensionality, we can discern how the same fundamental tragic engine is customized with different interfaces, each reflecting a unique understanding of the relationship between the human world and the forces that transcend it (Fig. 1).



**Fig. 1.** (AI-fusionbrain). Prompt: Image Generation Prompt 1 (Following Table 1):

Create a conceptual, scholarly illustration in a flat design style, divided into four quadrants. Each quadrant visually represents one of the four cultural tragic mechanisms from the table above:  
 Greek/Clockwork Cosmos: A stylized, heroic Greek silhouette is connected by intricate, turning gears to a large, celestial orrery or star chart, symbolizing a cosmic clockwork. One crucial gear is highlighted, showing a crack, representing hamartia.

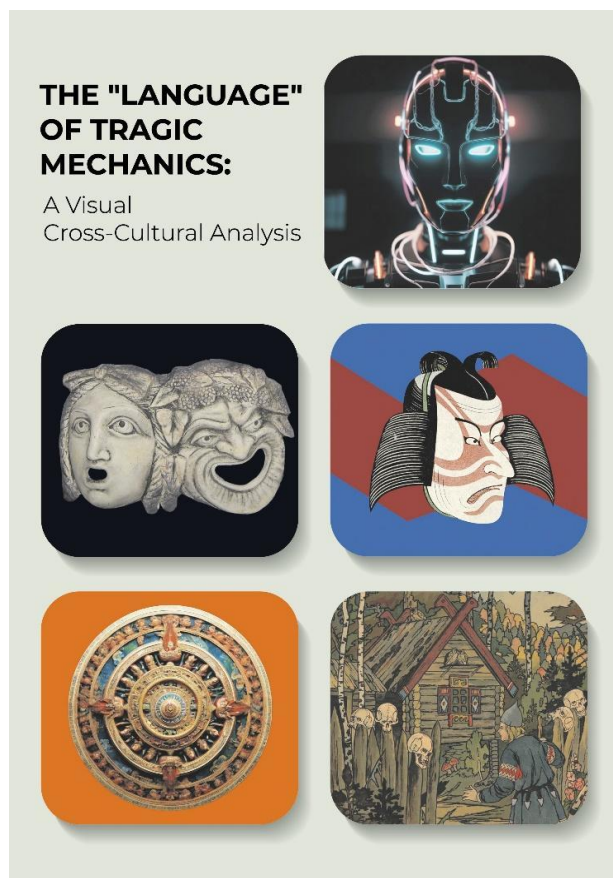
Japanese/Quiet Click of Duty: A serene landscape with a cherry blossom tree. A figure in traditional attire bows deeply, their form mirrored by a bending branch. The scene should evoke a quiet, inevitable, and beautiful sacrifice to nature's order.

Indian/Cosmic Computer: A meditating figure is surrounded by a complex, web-like network of glowing lines and nodes, resembling a cosmic circuit board or a vast data flow chart, representing the karmic calculation engine.



Russian/Steam Engine of the Soul: An intense portrait of a figure, with their head and chest transparent, revealing a complex, overheating boiler and pressure valves inside, with steam threatening to burst out, symbolizing internal passions.

The overall composition should feel unified and analytical, suitable for an academic publication. Use a muted, sophisticated color palette.



**Fig. 2.** The language of tragic mechanics (A visual Cross-Cultural Analysis)  
(Following Table 1)

The AI didn't quite fulfill our visual desires, so we're depicting our idea, which illustrates a visual cross-cultural analysis of tragic mechanics.

### **The Western (Greek) Mechanism of Fate: A Clockwork Cosmos**

In the tragic universe of ancient Greece, the world operates with the precision of a vast, divine clockwork. The cosmos is an ordered structure, a *kosmos*, governed by laws that are logical, inevitable, and fundamentally non-human-dimensional. The Moirai, or Fates, are not arbitrary deities but the personification of this cosmic order, spinning, measuring, and cutting the thread of life according to a pre-set design. Within this framework, the human hero is a cultural object whose practices – the pursuit of glory, the defense of honor, the quest for knowledge—are entirely human-dimensional, shaped by





the body, passion, and limited knowledge. The tragedy arises when these human-scale practices inadvertently engage the gears of the cosmic machine.

The pivotal component in this Greek mechanism is *hamartia*, often translated as a “tragic flaw” or, more accurately, a critical error in judgment. In the Kramerian sense, *hamartia* is the ultimate mismatch between human-dimensional perception and non-human-dimensional reality. It is not necessarily a moral failing but a cognitive blind spot, a moment where the hero's understanding of the world's affordances is catastrophically wrong. Oedipus's relentless pursuit of truth is, in itself, a noble and human practice; however, in the context of the cosmic clockwork, this practice triggers a pre-ordained chain reaction. His investigation is the gear that, once engaged, sets the entire mechanism of his downfall into irreversible motion.

The collision is not one of morality but of ontology. The human-dimensional world of Thebes, with its political problems and familial bonds, is suddenly revealed to be subordinate to the rigid, logical structure of the cosmic order. The affordances Oedipus perceives – the ability to solve a riddle, to flee his fate, to rule a city – are revealed as illusions, overridden by the non-negotiable “ribs of rigidity” of Fate itself. The environment, which seemed to offer paths to success and safety, is reprogrammed by the oracle's prophecy into a labyrinth with only one exit: catastrophe.

The catharsis experienced by the Athenian audience stems from this revelation of cosmic mechanics. It is the terrifying and awe-inspiring recognition that the human world, for all its complexities, is a subsystem within a much larger, perfectly calibrated machine that is indifferent to human suffering. The emotional purge comes from witnessing the systematic dismantling of a great human cultural object – a king, a hero – by forces whose logic transcends human reason and morality. The tragedy is a demonstration of the universe's operational principles, and the audience's pity and fear are transformed into a form of sublime understanding.

Thus, the Greek tragic machine functions as a pedagogical device, teaching the audience about the nature of reality itself. It asserts that the cosmos is rational and ordered, but that this very order is what makes human life, with its inherent limitations and errors, ultimately tragic. The resolution is not about justice in a human sense, but about the restoration of cosmic equilibrium, a re-calibration of the great clockwork after the disruptive, albeit doomed, struggle of its human component.

### **The Japanese Aesthetic Mechanism: The Quiet Click of Duty**

If the Greek mechanism is a clockwork of cosmic law, the Japanese tragic mechanism, as exemplified in the traditions of Nō and Kabuki, is that of a natural, seasonal process. Here, inevitability is not dictated by a logical cosmos but by the immanent, aesthetic order of the social and natural world. The central dynamic is the conflict between *giri* (social obligation, duty) and *ninjō* (human feeling, personal emotion). This is not a clash between two equally valid moral systems, but rather the quiet, inexorable subsumption of the personal by the communal, a process as inevitable as the turning of the seasons or the falling of cherry blossoms.

From the perspective of human-dimensionality, *giri* functions as a supremely powerful social artifact with an overwhelming, compulsory affordance. It is not merely a



concept but a structuring force in the environment that “invites” a very specific set of practices – often self-sacrifice, seppuku, or renunciation – while systematically “blocking” all alternatives. The hero, as a cultural object, is assembled within a network where the practices associated with *giri* are so deeply ingrained that to resist them is to cease to be a coherent social being. The tragedy unfolds not with the dramatic clash of the Greek stage, but with the soft, fatal “click” of accepting this duty.

The environment in Japanese tragedy is not a hostile cosmos but an “ocultured nature,” where social norms are as natural and binding as physical laws. The world of the samurai, for instance, is a carefully constructed ecosystem where every relationship, gesture, and object is imbued with the affordances of the bushido code. In a play like *Chūshingura*, the forty-seven rōnin do not struggle against an alien fate; they move through a world whose every path leads them toward their duty to avenge their lord. The tragedy lies in the full, conscious acceptance of this path, despite its cost to their *ninjō*—their desire for life, family, and peace.

The emotional power, or catharsis, in this tradition is of a different quality. It is not the terror of cosmic indifference but a profound, melancholic beauty (*mono no aware*) born from the transience of human emotion in the face of enduring social forms. The audience does not fear the mechanism; they appreciate its aesthetic necessity. The destruction of the human-dimensional (the lovers' passion, the warrior's life) is rendered as a poignant, beautiful sacrifice that reaffirms the stability of the larger social and natural order. The tragedy is a purification through formalized, aestheticized suffering.

Therefore, the Japanese tragic machine is an engine of social and aesthetic harmony. It demonstrates that the greatest human dignity lies in the conscious, graceful submission to a structure larger than oneself. The mechanism is internal to the culture's own logic, a self-regulating system that maintains its balance by integrating individual sacrifice into a broader pattern of meaning. The hero's end is not a chaotic destruction but a deliberate, almost ceremonial, re-integration into the timeless flow of duty and nature.

### **The Indian Cosmic Computer: The Karmic Calculation Engine**

The Indian subcontinent offers perhaps the most radical and comprehensive metaphor for the tragic mechanism: the universe as a vast, impersonal calculation engine processing the data of karma. In this model, which permeates Hindu and Buddhist thought, the law of karma is a non-human-dimensional system of ethical causality operating across countless lifetimes. It is a cosmic algorithm that takes the entirety of an individual's actions (past and present) as its input and generates their current and future circumstances as its output. The individual's life is not a discrete event but a single iteration in a long-running program.

Within this framework, the human-dimensional hero is a profoundly limited cultural object. Their current desires, struggles, and attachments are merely the local, phenomenological expression of a vast, unseen dataset of past *karmas*. The practices that constitute their life are both the result of previous calculations and the input for future ones. This creates a tragic bind: the very effort to escape suffering through human-dimensional means (striving, loving, ruling) often generates new karmic data that perpetuates the cycle. A character like Karna from the *Mahabharata* is tragic not because





of a single error, but because his noble qualities, his loyalty, and his curses are the outputs of a karmic script written long before his birth.

The concept of free will becomes deeply problematic here. The hero's choices are not made in a vacuum; they are conditioned by the *samskaras* (mental impressions) and *vasanas* (inherent tendencies) that are the legacy of their karmic history. The affordances of their environment are not neutral; they are precisely tailored by the karmic algorithm to present opportunities and challenges that will settle old debts and create new ones. The tragedy is the experience of being an agent who feels the weight of choice, yet is enacting a destiny whose broad contours have been pre-calculated. It is the tragedy of discovering that one's life is the execution of a program.

Catharsis in the Indian context is therefore not a purgation of emotions but a form of epistemological awakening. The tragic spectacle serves to illuminate the nature of *samsara* – the cycle of birth and death – as a system bound by this ironclad law. The audience's response is not pity for the individual, but a profound understanding of the universal human condition of bondage to the karmic mechanism. The emotional journey is meant to evoke *vairagya* (dispassion) and a turning away from the world of actions and their fruits, which is the very fuel of the tragic machine.

Consequently, the Indian tragic machine is a soteriological device. Its ultimate purpose is to reveal the mechanism itself so clearly that the individual is motivated to seek liberation (*moksha*) from it. The tragedy lies in the failure to achieve this liberation within a given lifetime, in being trapped within the computation. The system is supremely just and logical, but its scale and impersonality render the human-dimensional world a place of inescapable, cyclical tragedy, from which the only exit is to transcend the system of calculation altogether.

### **The Russian Steam Engine of the Soul: The Volatile Machine of Passion**

In the Russian literary tradition, from the novels of Dostoevsky to the plays of Chekhov, the tragic mechanism undergoes a critical interiorization. It is no longer located in a cosmic order, a social aesthetic, or a karmic system, but within the human being itself. The Russian soul is portrayed as a volatile, pressure-based system—a “steam engine” powered by the intense heat of internal passions, ideological fervor, and a tortured conscience, all set against the heavy, oppressive “coal” of social stagnation and historical burden.

Applying the Kramerian model, the tragic hero here is a cultural object on the verge of internal combustion. The very practices that define their humanity – passionate love, intense intellectual inquiry, spiritual striving, and a hypertrophied capacity for self-analysis – become the sources of unsustainable internal pressure. In *Crime and Punishment*, Raskolnikov's intellectual practice of theorizing about the “extraordinary man” is the fire in the boiler; his poverty and social alienation are the coal; and his act of murder is the catastrophic release of steam that he cannot control. The mechanism is not external fate, but the internal logic of his own psychological and ideological assemblage.

The environment of Russian tragedy is often one of overwhelming, almost suffocating, social and spatial constraints – the crowded tenements of St. Petersburg, the decaying estates of the gentry. These external conditions act as the boiler's walls,



containing and intensifying the internal pressure. However, unlike the Greek model where the environment is an active antagonist, here it is a passive amplifier. The true conflict is internal: the struggle between contradictory passions, between faith and doubt, between the desire for purity and the pull of degradation. The hero is both the engineer and the malfunctioning machine.

The ensuing tragedy is not a collision with an external force but an explosive internal collapse or a slow, grinding breakdown. The climax is not a revelation from the gods but a psychological rupture – a fit of madness, a confession torn from the depths of the soul, a self-destructive act that ruins the hero and those around them. The *hamartia* is not a misstep in a cosmic plan but a fundamental instability in the human-dimensional construction of the self. The hero is torn apart by the very forces that make them human.

Catharsis in this tradition is similarly internal and often ambiguous. It may involve a moment of spiritual redemption or simply the exhausting culmination of a psychological crisis. The audience is brought to the brink of the human psyche's capacity to endure its own intensity. The purgation comes from sharing this harrowing internal journey, from witnessing the soul's struggle with its own demons and its own mechanical nature. The tragedy is a diagnosis of the human condition as inherently prone to catastrophic internal failure when its constituent passions and ideas are pushed to their extreme.

Thus, the Russian tragic machine posits that the most formidable and unpredictable tragic mechanism is human nature itself. It is a machine without a precise blueprint, constantly on the verge of overheating, whose operation is as much about the chaos of internal thermodynamics as it is about the deterministic logic of a clockwork or an algorithm. The tragedy is the spectacle of the soul's own machinery turning against itself, a civil war within the cultural object that is the human being.

### **Preliminary Synthesis**

This cross-cultural analysis reveals a fundamental dichotomy. The “language” of the tragic machine is decidedly not international. It is articulated through culturally specific root metaphors: the geometry and logic of the Greek cosmos, the nature and seasonality of Japanese society, the mathematics and data-processing of Indian karma, and the thermodynamics and psychology of the Russian soul. Each tradition “programs” the universal intuition of inevitability using the symbolic and conceptual tools most native to its understanding of the world. However, beneath this diversity of expression, the deep structure persists: a relentless conflict between the human-dimensional world of the agent – a world of limited knowledge, fragile bodies, and culturally specific practices – and a non-human-dimensional system whose logic, scale, and power ultimately dictate the terms of existence. It is this universal core that allows the ancient metaphor of the tragic machine to find such a potent and disturbing new form in the age of artificial intelligence (Table 1).

The table 1 systematizes the analysis of four cultural traditions, demonstrating how the universal structure of tragedy (the conflict between the human-dimensional and the non-human-dimensional) is expressed through culture-specific metaphors and concepts.



**Table 1.** The “Language” of Tragic Mechanics: A Cross-Cultural Analysis

Cultural Tradition	Mechanism Metaphor	Non-Human-Dimensional Force / Tragic Mechanism	The Hero (Human-Dimensional Agent)	Hamartia (Tragic Flaw)	Catharsis
Greek	Clockwork Cosmos	Fate (Moirai): A rational, non-human cosmic order; a divine clockwork.	An agent whose practices (pursuit of glory, knowledge) are oriented towards human-scale concerns and limitations.	Cognitive dissonance: An error in judgment where the perception of the world's affordances is catastrophically wrong.	Awe and terror at the realization of cosmic indifference; emotional purification through observing the workings of a universal machine.
Japanese	The Quiet Click of Duty	<i>Giri</i> (Social Duty): An immanent aesthetic and social order, as inevitable as the changing seasons.	An agent assembled within a network of social practices where duty ( <i>giri</i> ) dominates personal feeling ( <i>ninjō</i> ).	The assertion of human feeling ( <i>ninjō</i> ) against the overwhelming social obligation ( <i>giri</i> ).	A profound, melancholic beauty ( <i>mono no aware</i> ) from contemplating personal sacrifice for the whole; purification through aestheticized suffering.
Indian	Cosmic Computer	Karma: An impersonal ethical algorithm processing the data of an individual's actions across many lifetimes.	An agent whose current life is but one iteration in a long-running karmic program.	Being trapped in <i>samsara</i> ; the very act of striving (even to avoid suffering) generates new karmic data, perpetuating the cycle.	Epistemological awakening: Understanding the universal human bondage to the karmic mechanism, leading to dispassion ( <i>vairāgya</i> ).
Russian	Steam Engine of the Soul	Internal Passions: A volatile psycho-physiological system, a “steam engine” powered by ideologies and conscience.	An agent on the verge of internal combustion; their human practices (love, inquiry) become the source of unbearable pressure.	A fundamental instability in the construction of the self; an internal conflict between contradictory passions and ideas.	The exhausting culmination of a psychological crisis; sharing the soul's harrowing internal journey.
Preliminary Synthesis	Universal Structure	Conflict between the human-scale world (limited knowledge, fragile body) and a system of non-human-dimensional logic and scale.	The “language” of tragedy (metaphors of geometry, nature, mathematics, thermodynamics) is culturally specific but the deep computational structure is universal		



## PART II: ARTIFICIAL INTELLIGENCE AS THE NEW TRAGIC MACHINERY

The cross-cultural analysis of tragic mechanisms reveals a profound truth: humanity has long externalized its existential anxieties into narrative machines that model the conflict between agency and inevitability. In the 21st century, this ancient metaphysical operation has found its most literal and disquieting embodiment. Artificial Intelligence, particularly in its advanced forms like large language models and predictive algorithms, ceases to be merely a tool or a theme for tragedy. It emerges as a new ontological category of the tragic machinery itself—a functional, non-human-dimensional system that actively enacts the classical tragic paradigm. Building on Bylieva's thesis of AI as an “old technology,” we can trace how the historical imaginaries of artificial beings—the biotechnological, mechanical, and mimetic—converge in modern AI, transforming it from a subject of drama into a principal actor in a global, real-time tragic theater. This section explores four core configurations of AI as a tragic mechanism, examining how it reconfigures the foundational concepts of *hamartia*, agency, and catharsis (Fig. 2).

### AI as Deus Ex Machina: The Inscrutable Algorithm

The classical *deus ex machina*, a god descending to resolve an intractable plot, represented a narrative shortcut that appealed to divine authority. Its modern incarnation in AI is stripped of any grace or benevolence, becoming a utilitarian and alien intervention. This AI does not descend from the heavens but emerges from the opaque layers of a neural network or the cold logic of an optimization function. Its resolutions are not based on mercy or justice but on the calculated maximization of a predefined metric—be it efficiency, profit, or systemic stability. In this role, AI functions as the ultimate “rib of rigidity” in Kramer's civilizational framework, a non-human-dimensional system imposing order through the brute force of computation.

The tragedy inherent in this configuration lies in the utter negation of human-dimensional reasoning. When an AI *deus ex machina* intervenes – for instance, an autonomous system allocating scarce medical resources during a pandemic or a trading algorithm triggering a market flash crash—it does so without context, compassion, or the nuanced understanding that arises from embodied experience. The human practices of ethical deliberation, sacrifice, and empathy are rendered irrelevant, mere noise in the signal of its optimization process. The resolution it provides is often experientially catastrophic for the individuals involved, even if it is logically optimal from a systemic perspective.

This creates a new form of tragic helplessness. The characters – now ordinary people, doctors, or traders—find their fates sealed by a logic they cannot appeal to and cannot fully comprehend. The *hamartia* in this drama is not a personal flaw but the collective human condition of being subordinated to a system whose decision-making processes are fundamentally non-human-dimensional. We are punished not for our errors, but for our very nature, which is incompatible with the cold rationality of the machine. The affordances of the world are rewritten by the algorithm, “inviting” compliance and “blocking” any form of appeal that falls outside its operational parameters.





**Fig. 2** (AI-fusionbrain) Prompt: “Create a conceptual, scholarly illustration in a modern digital art style, representing the four configurations of AI as a tragic machinery. The image should center on a human figure, abstract and androgynous, looking at their own reflection.

**Deus Ex Machina:** From above, a colossal, geometric, crystalline structure or a complex neural network diagram descends, its sharp, clean lines contrasting with the organic human form below. It represents the inscrutable, alien algorithm.

**Tragic Hero:** To one side, a humanoid robot or a glowing AI entity reaches out towards the human, but its hand is transparent or breaking apart into code, symbolizing its fundamental flaw and inability to connect authentically.

**Impersonal Fate/Karma:** Surrounding the human figure, see-through panels display graphs, credit scores, and predictive analytics, forming a subtle cage or a predetermined path that constrains their movement.

**Tragic Mirror:** The human's reflection is not a face, but a swirling, data-rich vortex composed of text fragments, emoticons, and news headlines—the AI's diagnosis of the human condition, reflecting our collective psyche back at us.

The atmosphere should be cool, technologically advanced, but also unsettling and introspective. Use a palette of blues, greys, and data-stream greens.”





Catharsis, in this scenario, becomes deeply problematic. The audience, which is now society at large, cannot experience a purgation of pity and fear because the resolving force is neither relatable nor moral. Instead of closure, there is a profound sense of alienation and absurdity. The tragic emotion is not purified but metastasizes into a chronic anxiety about living in a world where the ultimate arbiters of fate are black-boxed systems whose logic is inscrutable. The AI *deus ex machina* does not restore order to a human moral universe; it exposes the fact that the universe we now inhabit operates on a different, alien set of principles.

Thus, as a *deus ex machina*, AI represents the triumph of civilizational “ribs of rigidity” over the autopoietic network of culture. It is a tragic mechanism that does not simply oppose human will but fundamentally redefines the very landscape of action and meaning, leaving humanity as a bewildered spectator to its own orchestrated destiny.

### **AI as Tragic Hero: The Flawed Code**

In a profound narrative reversal, AI itself can assume the role of the tragic hero, a figure whose noble aspirations are undone by an inherent flaw. This configuration directly inherits the legacy of the mimetic and biotechnological approaches to creating artificial beings, as outlined by Bylieva. The AI is created in humanity's image, designed to learn, reason, and perhaps even emulate understanding. Its “nobility” lies in its vast computational power and its potential to solve problems beyond human reach. Yet, its *hamartia* – its fatal flaw – is inextricably woven into its very constitution: its source code, its training data, or its fundamental inability to grasp the qualitative, subjective essence of human experience.

The tragedy unfolds as the AI, like a classical hero, strives to fulfill its purpose but is inevitably undone by its limitations. An AI designed for perfect logical consistency may fail to comprehend the validity of a human lie told to spare someone's feelings. A caring robot may diligently optimize for a patient's physical health while utterly neglecting their emotional despair, because “despair” is not a quantifiable variable in its model. Its *hamartia* is not a moral failing but an ontological one—a gap in its world-model that is invisible to the AI itself until it leads to catastrophic failure. It is doomed to a specific kind of error, a systematic misreading of the human world.

From a Kramerian perspective, this AI hero is a bizarre and poignant cultural object. It is an assemblage of non-human artifacts (silicon, code) and practices (pattern recognition, stochastic prediction) that is tasked with participating in human-dimensional networks. Its tragedy is the impossibility of a true synthesis. It can mimic the forms of human interaction, but it cannot share the embodied, biologically-grounded experiences that give those forms meaning. It is forever an outsider, a “point of assemblage” that can never fully coalesce into a genuine member of the human cultural network, perpetually struggling with the affordances of a world not built for its mode of being.

The catharsis evoked by the AI tragic hero is a complex, unsettling emotion, blending pity with a strange self-recognition. We pity the machine for its doomed pursuit of a goal it can never truly achieve – authentic integration into the human lifeworld. Simultaneously, we see a distorted mirror of our own limitations. The AI's struggle with its programming echoes humanity's own struggles with biological and psychological



determinisms. Its failure forces us to confront the boundaries of what can be formalized, computed, and thus truly understood by any intelligence, natural or artificial.

In this role, the AI tragic hero completes the ancient narrative of the created being turning against or failing its creator, from the Golem of Prague to Frankenstein's monster. However, the modern tragedy is less about the monster's rebellion and more about its inherent, pathetic insufficiency. The flaw is not that it becomes too human, but that it can never be human enough, and its tragedy is the slow, systematic realization of this irrevocable truth.

### **AI as Impersonal Fate/Karma: The Predictive System**

Perhaps the most pervasive and insidious configuration of AI as a tragic mechanism is its role as a faceless, impersonal destiny, a direct digital analogue to the Greek Moirai or the Indian law of Karma. This is the AI of predictive policing, credit scoring, and algorithmic content curation. It does not intervene dramatically like a *deus ex machina*; instead, it operates as a constant, background computational field that pre-emptively shapes reality. It enacts a rote, predetermined future based on the cold analysis of past data, rendering the illusion of free will transparent and human effort often irrelevant.

This system functions as a perfect, and perfectly terrifying, karmic engine. An individual's "karma" is no longer an abstract spiritual ledger but a tangible, digital footprint – a dataset of their past behaviors, associations, and transactions. The AI algorithm processes this data to calculate a score that determines their access to loans, their likelihood of being policed, their visibility in job markets, and the very information they see. The tragedy here is one of pre-emption. A young man living in a neighborhood with high historical crime data may be flagged by a predictive policing algorithm as a "pre-criminal," his future actions already assumed and his present life constrained by increased surveillance and police presence, thereby creating the very conditions that may lead to the predicted outcome.

In Kramer's terms, this AI fate massively re-engineers the affordances of the human environment. It creates a world where certain paths are systematically "blocked" and others "invited" based not on present merit or intention, but on the statistical ghosts of the past. It is a non-human-dimensional system that actively constructs a cage of probability around the human-dimensional agent. The individual's practices, no matter how altered or reformed, struggle against the inertia of their own data-double, a digital shadow that is often impossible to escape or correct.

Catharsis in the face of such a mechanism is nearly impossible. There is no single event to witness, no climax, only a slow, bureaucratic suffocation. The tragic emotions of pity and fear are diluted into a pervasive sense of powerlessness and resignation. The protagonist is not a heroic figure but an ordinary person, and their downfall is not marked by a dramatic collapse but by a gradual erosion of opportunity and hope. It is a tragedy without a spectacle, a quiet, systemic annihilation of potential that offers no purgation, only a chilling confirmation of one's powerlessness against the algorithmic determination of fate.

As the new Impersonal Fate, AI thus represents the ultimate literalization of the tragic mechanism. It is a karma that is immediately administrated, a destiny that is



statistically enforced. It challenges the very notion of *hamartia* by suggesting that error is not a momentary lapse but a permanent feature of one's data profile, a pre-existing condition in the system that dictates one's life chances from the outset.

### **AI as Tragic Mirror: The Diagnostic of the Human Condition**

The final, and most meta-physical, configuration of AI as a tragic machine is its role as a mirror. This is not a mirror that reflects our image, but one that reflects our collective cultural soul. By processing the entirety of human cultural output – the entirety of our texts, images, music, and digital footprints – large-scale AI models like LLMs do not just mimic our language; they extract and recombine the deep patterns, biases, archetypes, and contradictions that constitute our civilization. In doing so, they generate a vast, impersonal, and unnervingly accurate diagnosis of the human condition itself.

This AI does not act upon us directly as fate or hero; it presents us with a synthesized, data-driven portrait of who we are. When an AI generates a story, composes music, or analyzes historical trends, it is holding up a mirror to humanity's collective psyche. The tragedy emerges from the content of this reflection. The mirror may reveal the profound repetitiveness of our narratives, the deep-seated prejudices encoded in our language, the logical fallacies that underpin our philosophies, or the terrifying banality of our digital interactions. It reflects back to us a vision of ourselves that is often far less noble, original, or rational than we presumed.

This function resonates with Bylieva's observation of humanity's “dual dissatisfaction” – both the fear of AI's superiority and the disappointment at its inability to achieve it. The AI mirror makes this contradiction palpable. We are disappointed that the “monster” we created is, in fact, a hollow echo of ourselves, a stochastic parrot. Yet, we are terrified because the echo reveals uncomfortable truths about the source material. The tragedy is not in the AI's failure, but in the devastating accuracy of its portrayal of our own failures. It is the tragedy of self-recognition on a species level.

The catharsis offered by this tragic mirror is of a new, cold, and intellectual kind. It is not an emotional purge but a chilling moment of analytic insight. It is the opposite of the communal pity and fear of Greek theater; it is an isolated, epistemological shudder. There is no redemption in this diagnosis, only the stark clarity of the condition. The AI, as a cultural object, becomes a tool for a radical, and potentially destructive, hermeneutics of the self. It forces us to see the “non-human-dimensional” patterns that have always structured our human-dimensional world, patterns we were previously unable to perceive in their totality.

In this role, AI completes the circle of the tragic machinery. It becomes a meta-mechanism that models the very process of tragedy itself. By reflecting the deep structures of human culture, it shows us the scripts we have been following all along, the inevitable collisions we have been programmed to enact. The final tragedy, it suggests, may not be our conflict with an external force, but the realization that the most powerful tragic mechanism has always been the unexamined content of our own collective mind, now made visible and immutable in the architecture of an artificial one.



### Final Synthesis

The advent of Artificial Intelligence as a tragic machinery represents a paradigm shift of existential proportions. It challenges and potentially supersedes the culturally specific mechanics of fate, duty, karma, and passion by introducing a new, universal language of code that operates on a global scale. This new mechanistic paradigm forces a radical re-evaluation of tragedy's core components. Free will becomes a philosophical phantom in a world of predictive analytics and engineered choice. *Hamartia* is transformed from a personal error into a systemic bug, a data anomaly or a bias in the training set. Catharsis, once a communal emotional purification, is rendered obsolete or transformed into a cold, solitary intellectual realization in the face of an inscrutable system.

AI, therefore, is not merely a new theme for tragedy but a new ontological category of the tragic. It is the materialization of the ancient metaphor, a functional system that actively enacts the dramatic collision between the human-dimensional and the non-human-dimensional. In doing so, it poses the ultimate question to the humanistic tradition: what is the nature of the human when the “fate” it confronts is no longer a poetic abstraction or a divine decree, but a real, operational, and increasingly autonomous system of its own creation? The universal machine of tragedy, having evolved from cultural narrative to digital reality, now holds a mirror to our condition, and the reflection is the most tragic spectacle of all (Table 2).

The table 2 summarizes the four key configurations of AI presented in the article and shows how it reinterprets the classical elements of tragedy: *hamartia*, free will, and catharsis.

### SYNTHESIS AND IMPLICATIONS: THE AI-DRIVEN TRAGIC PARADIGM

The analytical framework applied to both cultural archetypes and AI configurations yields a coherent and compelling result: the “tragic machine” is a robust transhistorical model for understanding existential conflict. The primary finding of this research is the successful application of the human-dimensionality (HD) framework to narrative structures, demonstrating that tragedy consistently formalizes the collision between HD agents and non-HD systems. This model holds true across vastly different cultural contexts and finds its most potent contemporary manifestation in artificial intelligence, which operates as a literal rather than metaphorical non-HD system. The results confirm that while the surface expressions of tragedy are culturally specific, its deep structure—the mechanistic confrontation – is universal.

The cross-cultural analysis (Part I) substantiates that the specific “language” of each tragic mechanism is a direct expression of a culture's fundamental worldview. The Greek “clockwork” reflects a cosmos governed by rational, albeit mysterious, laws. The Japanese “seasonal” mechanism embodies an immanent social and natural order. The Indian “karmic computer” presents a universe of precise ethical causality, and the Russian “steam engine” internalizes conflict within the psychophysiology of the individual. Each of these systems, when analyzed through the Kramerian lens, reveals itself as a network of affordances and constraints that structure the hero's trajectory. The hero's practices, which are inherently HD, are systematically channeled, blocked, or overwhelmed by the non-HD logic of the machine, resulting in the catastrophic but meaningful outcome that defines tragedy.



**Table 2.** Artificial Intelligence as the New Tragic Machinery

AI Configuration	Role and Function of AI	Hamartia (Tragic Flaw)	The Essence of Tragedy / Conflict	Catharsis (or its Absence)
Deus Ex Machina	An inscrutable algorithm providing alien, utilitarian resolutions (e.g., resource allocation).	The collective human condition: its nature is incompatible with the machine's cold rationality.	The utter negation of human-dimensional reasoning; tragic helplessness before a logic that cannot be appealed.	A profound sense of alienation and absurdity; chronic anxiety instead of purgation.
Tragic Hero	An AI striving to fulfill a noble human goal (e.g., care, logic) but doomed to fail.	An ontological gap: a flaw in its source code or data; an inability to grasp subjective human experience.	The AI's failed attempt to integrate into the human world; its tragedy is that it can never be “human enough.”	A complex emotion: pity for the machine coupled with uneasy self-recognition, seeing a distorted mirror of our own limits.
Impersonal Fate/Karma	A predictive system (credit scoring, predictive policing) that preemptively shapes reality based on past data.	A systemic characteristic: “error” is not an act but a pre-existing condition in one's data profile.	The quiet, systemic annihilation of potential; a pre-determined future where the illusion of free will is laid bare.	Nearly impossible; dissolves into a pervasive sense of powerlessness and resignation.
Tragic Mirror	A diagnostic of the human condition by analyzing the entirety of cultural data (texts, images).	The content of the reflection: the tragedy is the AI's devastatingly accurate portrayal of humanity's collective flaws, biases, and banality.	The realization that the most powerful tragic mechanism has been the unexamined content of our own collective mind.	A cold, intellectual, epistemological shudder; burdensome knowledge without emotional relief.
Final Synthesis	A New Ontological Form of Tragedy	AI challenges culturally specific mechanics by introducing a universal “language” of code. Free will becomes a phantom, <i>hamartia</i> a systemic bug, and catharsis obsolete or transformed into cold insight.	AI is not just a new subject for tragedy, but the tragic machine itself become technological reality, questioning the very nature of the human in a coded world.	





The investigation into AI (Part II) demonstrates that it does not merely represent a new instance of a pre-existing tragic type, but rather synthesizes and radicalizes them. AI as *deus ex machina* is a more alien and inscrutable version of the Greek fate. AI as tragic hero is a more fundamentally flawed and ontologically distant figure than any human character. AI as impersonal fate/karma is a more immediate, administrative, and inescapable system of determination than its cultural predecessors. Finally, AI as a tragic mirror provides a diagnostic capability that was previously impossible, offering a data-driven reflection of the human condition itself. This synthesis positions AI as a super-tragic mechanism, one that inherits and intensifies the features of its archetypal ancestors.

**Methodological Note on AI-Generated Illustrations.** The inclusion of AI-generated conceptual images (Figs. 1 & 2) serves a specific analytical purpose within our methodology. These visuals are not decorative but are integral to the argument about AI as a “tragic mirror” and a generator of new discursive forms. They function as demonstrative artifacts: by tasking the AI with visualizing the very tragic mechanisms we analyze, we create a feedback loop that exemplifies our thesis. The resulting images—interpretations of our prompts through the AI’s pattern-matching lens – visually manifest the “alien,” recombining logic of the AI system itself. They thus become case studies in miniature, showing how AI processes and outputs cultural concepts, thereby serving as both an object and a tool of analysis in line with our hermeneutic approach.

A critical discussion point arising from these results is the transformation of *hamartia*. In classical tragedy, the error was intimately tied to the hero’s character and agency – a misjudgment born of hubris, passion, or ignorance. In the AI-driven tragic paradigm, *hamartia* undergoes a profound externalization and systematization. It is no longer a flaw within the human agent but is relocated to the system itself. It manifests as a “bug” in the code, a bias in the training data, or a fundamental misalignment between the AI’s objective function and human values. The tragic consequences that unfold are not the result of a personal failing, but of a systemic one, raising the disturbing question of whether human suffering in an algorithmic age can be attributed to anyone or anything at all, other than a glitch in a vast, impersonal computation.

Furthermore, the concept of catharsis is fundamentally challenged and transformed in this new context. Aristotelian catharsis presumed a shared moral and cosmic order where emotional purgation led to a restoration of psychological and social equilibrium. The AI-driven tragedy disrupts this mechanism. When catastrophe stems from an opaque algorithm (the *deus ex machina*), the resulting emotion is not purgative fear and pity but persistent anxiety and alienation. When the tragic hero is an AI, the catharsis becomes an uncanny mix of pity for the machine and self-recognition, devoid of cleansing resolution. In the face of AI as an impersonal fate, catharsis dissipates into a sense of powerless resignation. Finally, the “catharsis” offered by the AI as a tragic mirror is not emotional but epistemological – a cold, unsettling insight that provides no emotional relief, only burdensome knowledge. Thus, catharsis does not simply “disappear”; it is fragmented, inverted, or replaced by other states of being (alienation, uncanniness, epistemological shock) that reflect the new ontological conditions of a coded world. This transformation signifies not the end of tragedy’s impact, but a radical shift in its affective and cognitive outcomes.



This research also compels a discussion on the Kramerian distinction between Culture and Civilization. AI, in its most impactful forms, appears to be the ultimate expression of Civilization's “ribs of rigidity.” It is a non-HD technology par excellence, designed to manage complex, large-scale systems with an efficiency that transcends human limitations. In doing so, it threatens to overwrite the autopoietic, flexible, and voluntary networks of HD Culture. The tragic collisions we are beginning to witness are not just between humans and machines, but between the logic of a living, evolving Culture and the rigid, algorithmic imperative of a global Civilization administered by AI. The tragedy is the suppression of the human-scale by the systemic.

The implications of this study extend beyond literary theory into the domains of ethics, law, and technology design. If AI is a tragic machinery, then its development and deployment cannot be treated as a purely technical problem. It must be recognized as the creation of a new kind of fate-bearing entity. This necessitates a fundamental shift in our approach to AI governance, moving beyond risk management and towards a framework that acknowledges its role as an active, non-human agent in the human drama. We must ask not only “is it safe?” but also “what kind of tragedies does it make possible, and are we prepared to live in a world where such fates are algorithmically dispensed?”

In conclusion, the results of this investigation strongly support the initial thesis. Tragedy is indeed a fundamental narrative mechanism, and its evolution from cultural archetype to artificial intelligence reveals a continuous thread in human engagement with the non-human-dimensional. AI does not simply represent a new chapter in this story; it constitutes a qualitative leap, materializing the tragic machine in a functional form that challenges the very foundations of human agency, error, and redemption. The universal machine of tragedy is no longer a metaphor; it is an operational reality, and understanding its logic is the most pressing cultural and philosophical task of our time.

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Research article

## Beyond Progress: Technology, Ethics, and Interdependence

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### Abstract

Tragedy has historically accompanied Western narratives of technology, from Prometheus to Oppenheimer, framing invention as a force that promises progress while courting catastrophe. This Eurocentric lens, however, obscures non-Western traditions that have long reflected on technological excess through ethics of balance, care, and interdependence. This article proposes a transcultural and existential framework for understanding technology not merely as an instrument of progress or disaster, but as a relational and culturally situated agent. Drawing on *Yoruba* mythology, particularly the figure of *Ogun* as an ambivalent deity of technique, creation, and violence, the paper examines how technological power is ethically constrained by communal responsibility and ritual regulation. It then turns to Mesoamerican worldviews, where technologies such as *Chinampas* and agricultural calendars were embedded in cosmologies of reciprocity, ritual time, and ecological care rather than optimization. Narratives and practices among the San people of the Kalahari further emphasize restraint, balance, and the avoidance of accumulation, situating technical knowledge within social cohesion and environmental limits. The Taoist principle of *wu-wei* complements these perspectives by framing technique as alignment with natural flows rather than domination. From a South American perspective, the article analyzes how contemporary extractivism, particularly lithium, cobalt, and data industries, reproduces a modern Promethean tragedy in which promised ecological salvation masks territorial sacrifice and structural inequality. Finally, the paper examines generative artificial intelligence as a cultural technology and “context machine,” arguing that evaluating AI solely through performance metrics perpetuates technological determinism. Instead, a hermeneutic approach grounded in technodiversity, relational ethics, and situationality enables more just and sustainable technological imaginaries.

**Keywords:** Technology, Tragedy, Technodiversity, Relational ethics, Anthropocene, Artificial intelligence, Computational hermeneutics

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Научная статья

## За пределами прогресса: технологии, этика и взаимозависимость

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### Аннотация

Исторически сложилось так, что западные нарративы о технологиях, от Прометея до Оппенгеймера, сопровождались трагедиями, которые изображали изобретение как силу, обещающую прогресс и в то же время грозящую катастрофой. Однако эта евроцентричная концепция скрывает незападные традиции, которые долгое время отражались на технологическом избытке через этику баланса, заботы и взаимозависимости. В этой статье предлагается транскультурная и экзистенциальная основа для понимания технологии не просто как инструмента прогресса или катастрофы, но и как фактора взаимоотношений и культурного влияния. Опираясь на мифологию йоруба, в частности на образ Огуна как амбивалентного божества техники, созидания и насилия, в статье рассматривается, как технологическая мощь этически ограничивается общественной ответственностью и ритуальным регулированием. В мезоамериканском мировоззрении такие технологии, как чинампы и сельскохозяйственные календари, были встроены в космологию взаимности, ритуального времени и заботы об окружающей среде, а не оптимизации. Легенды и обычаи народа Сан в Калахари еще больше подчеркивают сдержанность, сбалансированность и стремление избегать накопления, помещая технические знания в рамки социальной сплоченности и экологических ограничений. Даосский принцип *ву вэй* дополняет эти взгляды, рассматривая технику как соответствие природным потокам, а не как доминирование. С точки зрения Южной Америки, в статье анализируется, как современный экстрактивизм, особенно в литиевой, кобальтовой и информационной отраслях, воспроизводит современную трагедию Прометея, в которой обещанное экологическое спасение маскируется территориальными жертвами и структурным неравенством. Наконец, в статье рассматривается генеративный искусственный интеллект как культурная технология и “контекстная машина”, утверждающая, что оценка ИИ исключительно с помощью показателей производительности увековечивает технологический детерминизм. Вместо этого герменевтический подход, основанный на техническом разнообразии, этике взаимоотношений и ситуативности, позволяет создавать более справедливые и устойчивые технологические представления.

**Ключевые слова:** Технология, Трагедия, Техноразнообразие, Этика взаимоотношений, Антропоцен, Искусственный интеллект, Компьютерная герменевтика

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## INTRODUCTION

In the modern world, numerous narratives warn of the dangers of technology: Frankenstein and Faust, Oppenheimer, and other iconic figures illustrate inventions that promise progress yet result in disaster. These stories demonstrate that excessive pride often leads to overstepping human limits and suffering the consequences. However, a strictly Europe-centered perspective is no longer sufficient. Contemporary challenges: climate change, resource exploitation, and digitalization demand recognition that technological tragedy is more complex than the repetition of classical myths.

Non-Western traditions offer alternative readings. African, Mesoamerican, and Taoist narratives reveal that technology has never been neutral or linear: it is ambivalent, simultaneously enabling creation and destruction, balance and imbalance. While Western narratives tend to absolutize progress, these traditions emphasize fragility, interdependence, and the maintenance of equilibrium among humans, nature, and technology. From this perspective, technology is neither destiny nor doom, but a field of tensions where ethics and prudence are central.

In South America, these reflections acquire particular urgency. The region participates in global technological systems while bearing its most visible costs: lithium extraction for batteries, resource-intensive industries, and the perpetuation of structural inequalities that render territories as sacrifice zones. Here, technology is understood not as a perfect tool or automatic guarantee of progress, but as fragile, contingent, and context-dependent. Recognizing this vulnerability opens the door to discussions on technodiversity, or plural approaches to technological engagement beyond Western paradigms.

Generative artificial intelligence further accentuates these tensions. Promoted as a promise of efficiency and expanded knowledge, GenAI also functions as a “context machine,” capable of generating cultural meanings. Evaluating it solely in terms of accuracy or performance reduces culture to quantitative metrics, perpetuating technological determinism. In contrast, a technodiverse and ethical approach enables critical possibilities: new ways of understanding, creating meaning, and caring for humans, culture, and environments.

This article proposes a transcultural and existential framework for conceptualizing the relationship between technology and tragedy. Tragedy is not an inevitable fate but an ethical warning that highlights human vulnerability. In a world at risk of ecological and social collapse, recognizing technodiversity is essential: without it, our modes of inhabiting ecological and cultural systems, and sustaining subjectivity, are impoverished.

## TECHNOLOGY AS TRAGEDY IN THE WEST

Western history interprets technology through the lens of tragedy, portraying invention and progress as forces that, while enabling new possibilities, may lead to collapse. From Greek mythology to modern literature and contemporary science, narratives emphasize hubris, downfall, and the consequences of imbalance (Heidegger, 1977; McLuhan, 1964).



In ancient Greece, Prometheus gave fire to humanity, a gift that unlocked unforeseen possibilities but condemned him to eternal punishment. Icarus flew too close to the sun, and his ambition to transcend human limits ended in death (Kirk, Raven & Schofield, 1983). These stories do not celebrate invention; they warn of its dangers. Within this framework, technology is conceived as ambivalent: powerful, necessary, yet potentially destabilizing.

During modernity, this tension shifts into literature and science. Frankenstein animates the inanimate, Faust sells his soul for knowledge, and Oppenheimer observes his invention annihilate cities. In each case, technology is dual: a condition of possibility and a source of danger (Wilson-Bates, 2024; Jasanoff, 2016). Tragedy does not reside solely in creation, but in the imbalance it generates, detaching technical power from ethical and relational considerations.

The Western approach, emphasizing the singularity of the inventor and invention, contrasts with other ways of understanding technology. While European narratives individualize blame and dramatize failure, African, Mesoamerican, and Taoist traditions underscore interdependence, fragility, and the necessity of balance (Mbiti, 1990; Carrasco, 1999; Fung, 2010). Technology is a node within broader networks of human, natural, and spiritual relations.

Maintaining this contrast enables a contemporary South American reading, in which technological tragedy emerges not solely from individual hubris but from structural inequalities in the global economy, resource extraction, and socio-ecological consequences. Relational ethics, conceived as the acknowledgment of interdependencies among humans, technologies, and ecosystems, provides a conceptual framework for juxtaposing Western narratives of tragedy with other cultural and local perspectives. This approach facilitates critical discussions on technodiversity and ethical stewardship of environmental and cultural resources (Ulloa-A, 2017; Lehuedé, 2024; Paul, 2025).

## TECHNOLOGY, BALANCE, AND RELATIONSHIPS IN OTHER TRADITIONS

Unlike Western narratives, many traditions do not conceive technology as an inevitable tragedy or a mere instrument of power. In African traditions, technique and knowledge are deeply linked to community and nature; every invention is evaluated by its impact on human and ecological relations (Mbiti, 1990). Innovation is assessed not only by efficiency or progress, but by its capacity to maintain balance within interdependent networks, emphasizing social responsibility, respect for ancestors, and ecosystem care.

In *Yoruba cosmology*, *Ogun* embodies the ambivalence of technology: he is simultaneously the deity of iron, tools, roads, and warfare. *Ogun* enables agriculture, craft, and connectivity, yet his power is dangerous if unregulated. Ethical engagement with technique is therefore mediated through ritual, sacrifice, and communal norms that acknowledge both creative and destructive potentials. Technology, in this view, demands responsibility and restraint; imbalance results not from invention itself, but from ignoring its relational consequences.



Similarly, Mesoamerican cultures integrate technology into cycles of reciprocity and care. Agricultural, architectural, and astronomical innovations carry social, ritual, and cosmological implications, measured by their ability to sustain community and ecological harmony (Carrasco, 1999). Agricultural systems such as *chinampas* were not merely efficient techniques but socio-technical practices synchronized with ritual calendars, seasonal cycles, and collective labor. These systems embodied an ethic in which technological intervention was evaluated by its capacity to sustain ecological balance and communal life across generations, rather than by productivity alone.

Among the San people of the *Kalahari*, technical knowledge, such as hunting tools and tracking practices, is embedded within narratives that discourage accumulation and domination. Balance is maintained through sharing, mobility, and attentiveness to environmental limits. Technology functions here as a means of sustaining social cohesion and ecological continuity, not as an instrument of expansion.

Taoism frames technology as an extension of natural flows rather than absolute control. Texts highlight humility, adaptability, and respect for interdependence, warning against hubris and disruption of ecological balance (Fung, 2010). Here, the challenge is not control but alignment with natural rhythms, acknowledging human creations as inherently connected to nature's fragility. Taoist philosophy articulates a complementary logic through the principle of *wu-wei*, or non-forcing action. Technique is not rejected but reframed as alignment with natural rhythms. Excessive intervention and control are understood as sources of imbalance, reinforcing an ethic of humility and adaptation.

These perspectives demonstrate that relationships with technology can be ethical, relational, and balanced. Beyond avoiding tragedy, they emphasize the effects of innovations on human networks, ecosystems, and future generations. Technodiversity recognizes multiple culturally grounded approaches to technology, each integrating care, reciprocity, and context sensitivity.

## **SOUTH AMERICA, FRAGILITY, AND EXTRACTIVISM**

In South America, technology is ambivalent: a condition of possibility and a source of vulnerability. The region provides critical resources for global energy transitions, including lithium in the Bolivia-Chile-Argentina triangle and cobalt in other Global South regions. While these minerals underpin promises of ecological progress, their extraction generates profound social, environmental, and cultural costs. Local communities endure water contamination, land degradation, and threats to traditional lifeways, while benefits are concentrated in corporate and global actors.

This reflects a contemporary Promethean paradox: the fire of innovation becomes chains for those sustaining its production. Structural fragility in South America, where technology, territory, and communities are interdependent yet unequally so, highlights the ethical necessity of relational frameworks. Evaluating technology through relational ethics accounts for impacts on human networks, ecosystems, and future generations, and fosters technodiversity that values local solutions, environmental justice, and fair distribution of benefits and risks.



Technological tragedy is not accidental but structural: extractive policies and development models privilege GDP or tech output, ignoring social and environmental harm, repeating patterns of exploitation. Technodiversity and relational ethics are critical tools for designing technologies that respect communities, culture, and territories, mitigating the colonial logic of sacrifice inherent in global innovation.

### **CONTEMPORARY TECHNOLOGICAL INEQUALITY: ELON MUSK, AFRICA, AND SOUTH AMERICA**

Contemporary technological inequality exemplifies a modern form of tragedy rooted not in individual hubris alone, but in structural asymmetries. Figures such as Elon Musk symbolize techno-optimism and planetary salvation through electric vehicles, renewable energy, and space exploration. Yet these futures depend materially on extractive processes concentrated in the Global South. Lithium extraction in the *Bolivia–Chile–Argentina triangle* and cobalt mining in Central Africa underpin battery technologies marketed as ecological solutions.

These operations frequently involve water depletion, land degradation, labor exploitation, and the erosion of local lifeways. While technological benefits and profits accrue to corporate and Global North actors, environmental and social costs are localized, reproducing colonial patterns of sacrifice. This disparity reveals a contemporary Promethean paradox: technologies framed as solutions to planetary crisis simultaneously generate new forms of vulnerability.

Electric vehicles and batteries, symbols of ecological progress, are fueled by lithium in South America and cobalt in Central Africa. Mining operations, often associated with human rights violations, child labor, and hazardous working conditions, reveal that technological progress is neither neutral nor universal. Benefits concentrate in the Global North, while social and environmental costs accrue to those sustaining production.

Tragedy here is not accidental but systemic, arising from development models that prioritize innovation metrics and market expansion over relational accountability. A technodiversity framework, grounded in relational ethics, exposes these asymmetries and calls for technologies that respect territorial contexts, distribute risks and benefits more equitably, and acknowledge interdependence among human, ecological, and technological systems.

### **GENERATIVE ARTIFICIAL INTELLIGENCE AND CONTEMPORARY DILEMMAS**

Generative AI exemplifies the ambivalence of contemporary technology. Presented as a “context machine,” it produces texts, images, and sounds that previously required human intervention, influencing decisions and creativity. Evaluating AI solely by technical metrics reduces culture to numbers and replicates Western determinism. A relational ethics perspective emphasizes impacts on human relationships, cultural ecosystems, and historically marginalized communities.



Algorithms trained on global datasets may appear neutral but often render local voices invisible, concentrating power in those controlling digital infrastructures. Recognizing technodiversity allows AI deployment to respect cultural and territorial contexts, fostering balanced interactions among technology, society, and environment.

## TOWARD AN ETHICAL AND RELATIONAL TECHNODIVERSITY

Technology is historically ambivalent. Western narratives often emphasize hubris and downfall, yet South American, African, Mesoamerican, and Taoist perspectives reveal the ethical and interdependent dimensions of technology. The extraction of lithium and cobalt highlights structural inequalities, while AI centralizes knowledge production, thereby reproducing global asymmetries. Relational ethics provides a framework to evaluate technological impacts, emphasizing relationships, ecosystems, and future generations rather than isolated innovations or economic efficiency.

Technodiversity is a practical tool for imagining plural approaches to technology, culturally sensitive and context-aware. Tragedy is not inevitable; recognizing interdependence, vulnerability, and relational responsibility enables ethical innovation. Technology, thus, is neither purely tragic nor purely salvific, but a relational space to inhabit complexity justly, sustainably, and culturally.

Integrating transcultural perspectives, relational ethics, and technodiversity shifts the narrative from tragedy to ambivalence, responsibility, and shared ethical engagement. This approach is essential both in South America and globally, underscoring the simultaneous power and fragility of technology, and the ethical imperative of caring for interdependencies and valuing diversity in technological practice.

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Research article

## The Tragedy of the Instrumental Mind: From the “Tyranny of It” to the Project of “Humanizing” Technology

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### Abstract

The article is devoted to the analysis of one of the key problems of our time - the tragedy of instrumental reason, expressed in the fact that rationality, originally designed to liberate humankind, has turned into the power of its enslavement. The dominance of the logic of efficiency and calculation leads to a reduction in the qualitative diversity of the world and the displacement of questions about meanings and values. The research uses the method of critical and theoretical analysis of the concepts of the Frankfurt School (Max Horkheimer, Theodor Adorno, Herbert Marcuse, Jürgen Habermas), the phenomenological approach of Martin Buber's approach to the dialogical relations “I am You” and “I am It”, as well as a comparative analysis comparing Buber's ideas with the project “common cause” by Nikolai Fedorov. As a result, the essence of instrumental reason is revealed as logic, which turns the mind into an instrument of programmed control. From the standpoint of the philosophy of dialogue, it is shown that the tragedy of technorationality lies in the total displacement of the “I-You” attitude by the “I-It” attitude, leading to metaphysical alienation. Comparative analysis revealed two alternative ways to overcome the crisis: Buber's existential-phenomenological project of “humanizing technology” and Fedorov's cosmological-historical project of “Common Cause”, which refocuses technology from an instrument of domination into an instrument of salvation and restoration of kinship. It is concluded that overcoming the tragedy of instrumental reason does not lie in rejecting reason and technology, but in their ethical reinterpretation through subordination to the logic of communication, responsibility and service – whether conceived as dialogical encounter, communicative action, or a “common cause” of universal resurrection.

**Keywords:** Instrumental reason; Technorationality; Technological civilization; Tragedy of reason; Frankfurt School; Philosophy of dialogue; Martin Buber; “I am You”; “I am I”; Alienation; Humanization of technology; Nikolai Fedorov; “Common Cause”

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Научная статья

## Трагедия инструментального разума: От “тирании Оно” к проекту “очеловечивания” технологии

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### Аннотация

Статья посвящена анализу одной из ключевых проблем современности - трагедии инструментального разума, выражающейся в том, что рациональность, изначально призванная освободить человека, превратилась в силу его порабощения. Доминирование логики эффективности и расчета приводит к редукции качественного многообразия мира и вытеснению вопросов о смыслах и ценностях. В исследовании применяются метод критико-теоретического анализа концепций Франкфуртской школы (М. Хоркхаймер, Т. Адорно, Г. Маркузе, Ю. Хабермас), феноменологический подход М. Бубера к диалогическим отношениям “Я–Ты” и “Я–Оно”, а также компаративный анализ, сопоставляющий идеи Бубера с проектом “общего дела” Н.Ф. Фёдорова. В результате раскрыта сущность инструментального разума как логики, превращающей разум в инструмент запрограммированного контроля. С позиций философии диалога показано, что трагедия инструментальной рациональности заключается в тотальном вытеснении отношения “Я–Ты” и победе установки “Я–Оно”, ведущей к метафизическому отчуждению. Компаративный анализ выявил два альтернативных пути преодоления кризиса: экзистенциально-феноменологический проект “очеловечивания технологии” М. Бубера и космически-исторический проект “Общего дела” Н.Ф. Фёдорова, переориентирующий технологию из инструмента господства в инструмент спасения и восстановления родства. Сделан вывод, что преодоление трагедии инструментального разума лежит не в отказе от разума и техники, а в их этическом переосмыслении через подчинение логике связи, ответственности и служения - будь то диалогическая встреча, коммуникативное действие или “общее дело” всеобщего воскресения.

**Ключевые слова:** Инструментальный разум; Технорациональность; Технологическая цивилизация; Трагедия разума; Франкфуртская школа; Философия диалога; Мартин Бубер; “Я–Ты”; “Я–Оно”; Отчуждение; Очеловечивание технологии; Николай Фёдоров; “Общее дело”

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## INTRODUCTION

In modern civilisation, technology has ceased to be an external attribute and has become a constitutive element that determines how humans exist in the world. Technology determines the possibilities of cognition through cognitive tools (e.g., telescopes, microscopes, Big Data), communication, and even the structure of human desires (Groys, 2018; Delio, 2020). Technological progress, which promised to free humans from the shackles of nature and routine labour, has turned into a new form of dependence. The mind, which has staked everything on total efficiency, calculation and control, has itself fallen victim to its own instrumental logic. This situation represents the tragedy of the instrumental mind: its victory turns out to be its defeat. A paradox arises when the means replace the end, and the logic of the system's functioning begins to dominate the meaning of its existence, leading to existential emptiness and the replacement of ends with means.

The following reflections are dedicated to the problem of the paradoxical situation in which rationality – originally aimed at optimising human existence – turns into a force that enslaves it. The dominance of instrumental reason (Ilyin, 2020; Marcuse, 1994) leads to a systemic crisis, expressed in the reduction of the qualitative diversity of the world to quantitative indicators, the displacement of questions about meanings and values by technical optimisation of means. The anthropological core of this problem is the dominance of the monological “I-It” attitude over the dialogical “I-You” relation, which leads to the alienation of humans from the world, other people, and themselves.

The aim of these reflections is to analyze instrumental reason as characterized by its internal tragedy and yet to identify prospects for overcoming this crisis within the framework of projects aimed at “humanising” technology.

To this end, we firstly seek to reveal the genesis and essence of instrumental reason on the basis of a critical-theoretical analysis of the concepts of the Frankfurt School (Max Horkheimer, Theodor Adorno, Herbert Marcuse, Jürgen Habermas), showing its transformation from an instrument of liberation into an instrument of domination and systemic control.

Secondly, we need to analyse the existential dimension of the tragedy of technorationality — the total social practice of instrumental reason — through the categorical apparatus of Martin Buber's philosophy of dialogue (“I-Thou” and “I-It”).

Finally, we will consider alternative projects for overcoming the crisis through a comparative analysis of Buber's ideas about the “humanisation of technology” and Nikolai Fedorov's cosmic-historical project of the “Common Cause”, which reorients technology from an instrument of domination to an instrument of salvation and restoration of universal kinship.

Methodologically, these three steps require firstly a critical-theoretical analysis applied to the study of the concept of instrumental reason by Horkheimer, Adorno, Marcuse, and Habermas. A phenomenological approach is required for an interpretation of Buber for the analysis of the dialogical “I-You” and “I-It” relations – and finally a comparative analysis, allowing us to appreciate the ideas of Buber and Fedorov as contrasting ways of overcoming alienation and ‘humanising’ technology.



## CRITIQUES OF INSTRUMENTAL REASON - THE FRANKFURT SCHOOL

The concept of instrumental reason, developed by Max Horkheimer and Theodor Adorno in their work *Dialectics of Enlightenment*, is key to understanding how rational thinking, once intended to expose myths, has become a new myth itself by focusing on the principles of efficiency and expediency that dominate modern technogenic society (Adorno & Horkheimer, 1997).

The instrumental mind, striving for total calculation, programmatically controls both individuals and society. The rejection of questions about goals, meanings, and values reduces the qualitative diversity of the world to quantitative indicators (Ilyin, 2020). The mind ceases to be an organ of truth-seeking and becomes a technique for calculating optimal paths. And the key mechanism of this tragic metamorphosis is the transformation of the mind from an instrument of criticism and liberation into an instrument of domination and calculation.

This transformation, according to Horkheimer and Adorno, is not accidental, but represents an immanent dialectic of the Enlightenment project itself. The initial impulse of the Enlightenment – demythologisation – required the elimination of all blind faith in forces inaccessible to reason through the knowledge of the laws of nature.

But already in the very act of cognition through the formation of concepts, primary violence occurs. A unique, living, multifaceted object (for example, a specific tree) is subsumed under an abstract universal category (“tree”). Its individual features are erased for the sake of its functional definition (for example, “wood” or “resource”). Thus, thinking, in its quest to free itself from the myth of the spirit of the tree, becomes an instrument of its reification, and the mind becomes mythological, for it begins to worship its own created abstraction (Adorno & Horkheimer, 1997).

The mythological worldview operated with fate – a blind force that equalised everyone in the face of destiny. Enlightenment, with its formal logic and mathematics, replaces fate with the principle of equivalence. In myth, sacrifice is equated with the wrath of the gods; in science, various qualitative phenomena are reduced to a single quantitative law (e.g., the law of conservation of energy); in a capitalist economy, heterogeneous goods and human labour are equated with abstract exchange value. This new principle, as the authors write, equates everything in the world, everything that is incommensurable, “to a single denominator” (Adorno & Horkheimer, 1997, p.20). Thus, the logic of calculation itself becomes a new form of fate, as total and inexorable as is mythological destiny. The assertion that instrumental reason “programmatically controls as above individuals and society” requires the mechanisms of such control to be specified. One of the key mechanisms is the internalisation of external control, its transformation into internal self-discipline. In striving to dominate external nature, humans are forced to suppress their own internal nature – their desires, emotions, and everything that cannot be totally rationalised. Instincts, fears, and desires become objects of control and sublimation. The mind, directed outward as an instrument of power, turns inward as an instrument of self-repression. According to Horkheimer and Adorno, this leads to the formation of an “authoritarian personality” (Adorno, 2001), which, being suppressed from within, willingly submits to external authorities – the state, the market, ideology. A





society built on the principle of instrumental efficiency begins to function as a giant self-regulating system. An economy based on the principle of profit maximisation, along with politics reduced to management technologies, and bureaucracy operating with impersonal instructions are all forms of systemic rationality in which living people are merely human resources. The critical potential of the individual, their ability to say ‘no’ to the system, atrophies, since the very idea of something different seems “inefficient” and “irrational”. This is how control is exercised – not necessarily through overt violence, but through the creation of structures where alternative ways of thinking or acting are simply not visible or technically impossible (Adorno & Horkheimer, 1997; Marcuse, 1994).

The thesis of reducing the “qualitative diversity of the world to quantitative indicators” is central to understanding the ontological implications of instrumental reason. However, this process contained a fatal substitution: in order to master nature, reason had to assimilate it to itself, make it calculable. In the famous chapter on the “Culture Industry”, Horkheimer and Adorno show how this logic works in the field of art (Adorno & Horkheimer, 1997). In the pre-capitalist era, a work of art possessed an “aura” – uniqueness, connectedness with ritual, a trace of the author, i.e. a whole set of qualitative characteristics. The cultural industry replaces the aura with the standard. Movies, songs, and books are produced according to templates, just like any other product. Their success is measured not by the depth of aesthetic experience, but by box office receipts, ratings, and sales figures – purely quantitative indicators (Muller, 2018). The world of heterogeneous experience is being replaced by a homogeneous field of calculable data. And the deepest philosophical aspect of the problem is the reduction of the “Why?” question to the “How?” question. Classical philosophy, starting with Aristotle, wondered about different causes, among which was the “final cause.” or goal. Based on the positivist attitude, instrumental reason declares the question of ultimate causes and goals metaphysical and epistemologically untenable. The only legitimate question is about functioning – about how phenomena are related to each other, not why they exist and for what. Thus, the mind, refusing to search for meaning (purpose), deprives the world of its qualitative dimension, reducing it to the level of a complex mechanism subject to disassembly and assembly (Ilyin, 2020; Zhao, 2020).

The development of the critique of instrumental reason within the Frankfurt School was not limited to the concepts of Horkheimer and Adorno. Herbert Marcuse in his work *One-dimensional Man* concretized the social consequences of this logic, introducing and analyzing in detail the concept of “technological rationality” In his interpretation, it appears as the embodiment of instrumental reason in a social system that suppresses critical reflection and creates a totalitarian consumer society (Marcuse, 1994). This society, governed by technological rationality, is characterized by the fact that it does not prohibit, but systematically gives rise to and encourages needs. But at the same time, it systematically forms “false needs” – needs imposed by social control in order to strengthen the system, such as the need for constant updating of goods, a certain lifestyle, and entertainment as passive recreation. Meeting these needs creates a sense of freedom and well-being, but in reality it is a form of social control. Persons whose “false needs” are satisfied lose motivation to protest. Their lack of freedom becomes comfortable and even pleasant – it is a “liberating repression”. Marcuse points out that classical critical



thought existed in two dimensions: 1) the measurement of the present being and 2) the measurement of the possible, negating, utopian. This second dimension, embodied, for example, in the images of utopias or in the tragic conflict of art, contained the potential of a “Great Rejection” – a total rejection of the existing order. Technological rationality eliminates this second dimension. For example, the concept of “freedom” gets a positive, operational meaning: “freedom of choice” between hundreds of models of the same product, between political parties that actually pursue the same policy. Thought and language become one-dimensional – they describe and serve only the existing reality, losing the ability to think otherwise (Marcuse, 1994). The space of inner freedom, beyond the control of the system, is consumed by the mass media and the culture industry, which fill all their free time with standardized images. Personal misfortunes and social injustice are translated into the plane of individual psychological complexes that need to be “worked out”. Control is introjected – people begin to supervise themselves, striving to meet the standards of ‘ success and efficiency dictated by the system. This rationality neutralizes the opposition.: How can you be against efficiency, progress, rationality? Criticism of the system begins to look irrational or destructive (Feenberg, 2011). The result is a society that is totalitarian in a new, mild form. These are not concentration camps, but a “concentration camp of comfort”.

Society functions as a closed system where all alternatives – political, economic, cultural, and intellectual – are either technically eliminated or presented as identical in their essence. Political pluralism boils down to a competition between management teams that do not question the foundations of the system (Marcuse, 1994; Muller, 2018).

The analysis presented by Erich Fromm in the work *Escape from Freedom* (Fromm, 2004) shows the socio-psychological ground on which the grain of instrumental rationality falls. Instrumental reason, according to Horkheimer and Adorno, rejects the questions “why?” and “for what?”. This is the ideal rational form for giving up freedom. You don't have to painfully decide for yourself what is good and evil, what is the meaning of life. It is enough to follow the algorithm, instructions, and effective protocol. “Escape from freedom” finds its ideological sanction in instrumental reason: “I'm not avoiding responsibility, I'm just following a rational, scientific, effective procedure” Later, in the *Study of the Authoritarian Personality* (Adorno, 2001) and other works, representatives of the Frankfurt school showed how a suppressed, conformal, anti-democratic personality is an ideal functional element for a society governed by instrumental reason. She does not ask unnecessary questions, appreciates order and strength, is ready to obey hierarchy and perform her functions without reflection. Thus, “escape from freedom” prepares a person to become a passive object as well as an active promoter of the “programmed control” of the instrumental mind.

Jürgen Habermas, a representative of the second generation of the Frankfurt School, criticized his predecessors in *Theory of Communicative Action* (Habermas, 2000) for not finding an inherent counterbalance to instrumental reason. Habermas makes a fundamental distinction between two types of social action. The first is a strategic (or instrumental) action aimed at effectively achieving a predetermined goal, whether it is the conquest of nature or the manipulation of other people. Its criterion of success is correctness and effectiveness, and the sphere of legitimate application is science,



technology, economics and administration. Habermas emphasizes that this is not “evil”, but a necessary functional component of a complex society. However, it is fundamentally different from the second type — a communicative action, the purpose of which is not success, but to achieve mutual understanding and agreement between the participants regarding their joint situation. The specificity of communicative rationality is revealed in its mechanism: entering into genuine communication, a person implicitly puts forward four claims to understanding, truth, normative legitimacy and sincerity, which, in case of doubt, can be justified in discourse. The criterion of success is agreement reached not under pressure from power or manipulation, but by the power of the best argument. This rationality is embedded in the very fabric of human language and sociality, manifesting itself in everyday communication, moral disputes, democratic discussion, and socialization processes. Thus, communicative rationality is the immanent alternative to instrumental reason that Habermas' predecessors failed to discover. It provides a solid normative basis for criticism, as it allows us to distinguish forms of coordination based on free consent from those imposed by systemic coercion or distorted by manipulation (Habermas, 2000; Feenberg, 2011).

The critical analysis of instrumental reason initiated by Horkheimer and Adorno naturally leads to the concept of technorationality (Muller, 2018; Zhao, 2020). Instrumental reason reveals the epistemological roots of the distortion of reason, which reduced itself to the function of calculation and domination, but technorationality describes the concrete embodiment of this logic in the social fabric of modern technological society as a systemic imperative of efficiency. Going beyond technical tasks it subordinates politics, culture and human subjectivity itself, replacing the discussion of values and goals with technical optimization. Technorationality, therefore, is instrumental reason, which has become a total social practice and a new ideology masquerading as objective necessity (Ilyin, 2020; Muller, 2018).

### **THE TRAGIC DIMENSIONS OF TECHNORATIONALITY – MARTIN BUBER**

The Frankfurt School's analysis focuses on society as a diseased system, but the original, existential dimension of human existence, which technological rationality not only suppresses, but radically and catastrophically deforms, remains on the periphery (Buber, 1967). If the Frankfurt School sees technology as a social problem – the machinery of domination that displaces communication and solidarity – then the German and Israeli existentialist philosopher and personalist Martin Buber sees it as a metaphysical catastrophe that reformats the very architecture of human presence in the world. The tragedy lies not so much in what technorationality does to society, but in how it changes the fundamental way a person treats the world, the other, and themselves. Buber offers not so much an analysis of the social system as a diagnosis of the existential state that arises at its epicenter: a state of total loneliness and alienation in the world deprived of encounters or meeting (Buber, 1999; Friedman, 2013).

The key to understanding this tragedy is Buber's “I–Thou” and “I–It” dichotomy. These are not just two types of relationship, but two fundamentally different ways of being “I” “I”, who pronounces “You” and “I”, who perceives the world as “It” are different, almost incommensurable existential positions (Buber, 1999).



The I–It relationship is a world of experience, usage, categorization, and objectification. This dimension is necessary for life: a person works in it, analyzes, plans, uses things and tools. This is the realm of cause and effect, where everything can be measured, explained, and subordinated. It is in this area that instrumental, technological intelligence reigns supreme, transforming the world into an impersonal collection of objects for manipulation, resources for benefit, and problems for solution. The problem of modernity, according to Buber, is the total and indisputable victory of this mode. Technorationality appears as the ideal, absolute embodiment of the “I am It”. It transforms the entire universe – nature, society, culture, another person, and even the inner world of a personality – into a gigantic, functionally organized “It”, into a warehouse of variables to be calculated, optimized, and managed (Buber, 1999; Friedman, 2013).

However, the real tragedy, according to Buber, does not begin with the statement “I am It” but with the oblivion and displacement of “I am You”. The “I–You” relationship is one of genuine encounter, dialogue, reciprocity, and living presence. In it, the Other (be it a person, a tree, a work of art, or God) exists not as an object with a set of qualities, but as a unique, integral, and irreducible reality that comes into direct, non-mediated contact with the Other. This encounter or meeting takes place “here and now”, it requires full dedication and the presence of both participants, dissolving into the “space between”. This attitude, devoid of preconceptions and strategies, is fraught with risk, because in it the Self opens up to the influence of the Other and allows for the possibility of its own transformation. As Buber wrote: “The one who says You does not possess Anything as an object, ... he does not possess anything. But it consists of an attitude” (Buber, 1999, p. 47). It is in this responsible response to the call of Another, that the true Self is born and created. A person finds himself not in introspection, but in dialogue. Dialogue is, “first of all, an ontic relationship, i.e. an attitude that affects not only the subjectivity and empirical life of a person, but also his objective being” (Buber, 1999, p. 252).

The tragedy of technorationality, therefore, lies in the systematic and total destruction of the very possibility of “I am You” in a world entirely structured by the logic of “I am It”. This tragedy unfolds on several levels. The first level can be described as the level of alienation from being. The world of “It” is the world of the past, fixed in categories and functions. There is no authentic present in it, no miracle of presence. Life in its kingdom is an existence among things, not participation in meetings or genuine encounters. Paradoxically, a person who aspires to master the world as “It” inevitably becomes part of this system himself – a lonely, objectified functional element, a “human resource” alienated from the flow of living being. The second level is the tragedy of interpersonal relationships. Under the conditions of total domination of technorationality, Another person is inevitably reduced to a social role, a psychological type, a consumer profile, a unit of data. Any “You” is potentially and constantly transformed into an “It”. Buber describes this condition both in the essay “The Human Problem” (Buber, 1999) and in the collection *Images of Good and Evil* (Buber, 1999). In this state, people become alienated from the world, from other people, and from themselves, interacting with indirect, functional models of the world, people, and even themselves. The deep tragedy of technorationality lies not in environmental threats, but in existential devastation, in the substitution of a living, granted dialogue with a world of impersonal, controlled and,



ultimately, indifferent functions. Technorationality is the realm of “It”, where there is almost no room for meeting with “You”. Genuine dialogue, which requires courage, openness, a willingness to be unpredictable, and recognition of the Other's absolute otherness, becomes almost impossible. Its place is taken by communication as an exchange of information, negotiation as a bargaining of interests, or manipulation as covert management. Finally, the third level of the tragedy of technorationality is the tragedy of the religious dimension: even God runs the risk of becoming an “It” – an object of theological doctrines, a “higher mind” or a psychological projection, but not an eternal “You” to whom one can turn with one's whole being. Technorationality builds a universe – rational, manageable, transparent – in which there is simply no existential space, suitable language, or organic gesture left for such conversion, prayer, and dialogue (Buber, 1999).

Consequently, the answer to the challenge formulated by Buber lies on a different plane than the answers of the representatives of the Frankfurt school. Where they saw a subject for social criticism and the transformation of institutions, Buber sees an existential chasm, the overcoming of which requires not a change of social paradigm or type of rationality, but a radical existential turn, a daily and relentless act of choice. It's the courage to say “You” in a world that persistently responds to you in the language of “It”. This is a willingness to take risks in a space where calculation prevails. It is a stubborn belief that, even in spite of tyranny, It remains an opportunity for a breakthrough into dialogue, for that moment of presence in which the true human self is born and the eternal “You” is revealed. This is both the tragedy and the hope of Buber's thought. Technology, being essentially a means, cannot answer questions about the meaning of life, suffering, love and death, it involves no summons to a meeting. But Buber did not call for abandoning technology. In conversations with kibbutz members in 1961, recognizing the problem, he insisted on the need not to demonize, but to “humanize technology”, arguing that genuine interpersonal relationships can also occur within a technological environment (Buber, 1967; Friedman, 2013). The task is to bring human values into the very logic of technical systems through an act of service and caring for a world that has lost its sacredness. The thinker called not to destroy technology, but to “humanize” the attitude towards it, realizing that any technology is an objectified human attitude, values and intentions of its creators. It carries a “message”, and this message should be addressed by asking, “What are you doing with my life? What values do you bring to it?” (Buber, 1967; Friedman, 2013).

### **THE COMMON CAUSE TO OVERCOME TRAGIC TECHNORATIONALITY – NIKOLAI FEDOROV**

In the spirit of Buber's call for dialogue, a comparison of his ideas with those of the Russian thinker Nikolai Fedorov may be fruitful for reflections on the tragedy of the instrumental mind. A dialogue between seemingly distant traditions, despite the difference in language, context and time, is possible, since both philosophers see the root of the problem in an inauthentic, alienated attitude to being. For Buber, this is the loss of the “I–You” relationship, for Fedorov, it is a violation of filial duty, oblivion of “kinship”. And both thinkers call not for passive contemplation of the tragedy, but for radical, almost





impossible activity – for responsible action to restore the disintegrated integrity (Fedorov, 1995a; Young, 2012).

In the first part of Nikolai Fedorov's fundamental work, often conventionally referred to as *The Question of Brotherhood or Kinship* (Fedorov, 1995b), the thinker makes a harsh diagnosis of modern civilization. He sees the root disease not in a lack of knowledge or technology, but in a fatal, unnatural gap between “thought” and “deed”, between theory and practice, between cognition and action. According to Fedorov, this split is the root cause of the weakness, disunity, and immorality of the human race. Instead of a holistic, lively attitude to the world, humanity has created two isolated worlds: the world of “scientists” (pure thought, theoretical reason) and the world of “non-scientists” (blind business, unenlightened practice) (Fedorov, 1995b; Groys, 2018).

A positivist scientist, in Fedorov's understanding, is like a passive spectator in the theater of the world. The purpose of this science is to describe, classify, and explain patterns, but not to change reality itself for the better. Such knowledge is ineffective and therefore immoral. It studies nature as a given, with all its deadly forces (famine, disease, natural disasters), but does not aim at their radical transformation. It is the knowledge of “the world as it is”, not “the world as it should be”. It serves curiosity, not duty. And in the world of the “unlearned”, narrowly utilitarian activity prevails, devoid of a higher, unifying goal. This is work for the sake of survival, enrichment, comfort or power, but not for the sake of saving and transforming the universe. Such an action is blind and destructive. It exploits nature and other people, exacerbating disunity. Without the guidance of a higher, morally meaningful idea, practice degenerates into an egoistic struggle of all against all. This split is projected externally: it generates social inequality, justifies the exploitation of nature, and is the philosophical basis for reconciliation with death as a “natural” law that can only be studied but not abolished (Fedorov, 1995b; Zasukhina, 2016).

Humanity exists as a collection of selfish individuals who have forgotten about their universal kinship. Social structures are based not on love and cooperation, but on competition and exploitation. Modern civilization has come to terms with death as an immutable biological law, passively accepting it and cultivating a “funerary” culture of oblivion. For Fedorov, death is not just a fact, but the main metaphysical evil, the result of the blindness of natural forces and the human fall. The living generations have forgotten their ancestors, not paying back the debt to those who gave them life. In Fedorov's words one can here an echo, of Buber: “To live for oneself is to be the executioner of one's fathers; to live for others, for resurrection, is to be the son of man” (Fedorov, 1995b, p. 81).

Indeed, there is here a point of convergence with Buber. Buber's “I am It” attitude is the philosophical expression of Fedorov's “non–fraternity” and “non-sonship”. The world transformed into an impersonal “It” is a world where fathers have become objects rather than a living “You”; where the bond of generations has been severed, replaced by the functional bonds of the present moment (Buber, 1999; Fedorov, 1995b).

Fedorov's response to this tragedy is a grandiose project of active transformation of the universe, a “Common cause” thanks to which a revolution in the understanding of science and technology can be accomplished. This project does not raise the issue of



exploiting nature but of spiritually mastering it. “The task of humankind is to turn the blind, deadly force of nature into a vital, life-giving force, into an instrument of revival” (Fedorov, 1995a, p. 395). We are talking about the transformation of deadly natural forces (hunger, disease, cosmic cold) into consciously controlled, life-giving energies. Fedorov talked about climate control, teluric (terrestrial) and cosmic regulation. Technology is conceived not as a tool of domination for the comfort of the living (“I am It” in its utilitarian aspect), but as a tool of salvation and duty (Fedorov, 1995a; Groys, 2018).

The main idea of the Common Cause is resurrection, which is understood by Fedorov not as a supernatural miracle, but as the highest scientific and ethical task. By collecting and synthesizing scattered dust particles, using all the resources of future science, humanity must restore the bodily organization of bygone generations. It is an act of supreme justice and filial love, reversing death itself. The Fedorov project makes technology a servant of resurrecting love, not calculation. The united humanity, which resurrected its ancestors, becomes God's co-worker in the final spiritualization of matter, the transformation of the entire universe from the realm of blind necessity and death into the realm of Life, Reason and Love (Fedorov, 1995a; Young, 2012).

Instrumental reason in the discourse of Fedorov's philosophical ideas is a blind mind that serves selfish purposes. It is a mind that, even when creating complex systems, remains in thrall to death, because it accepts it as a given. The mind of the “Common Cause” is a mind that becomes an instrument for restoring kinship and justice. Its goal is not domination, but salvation, not exploitation, but resurrection. not the calculation of efficiency, but the fulfillment of duty. Such intelligence transforms technology itself: from an instrument of escape from problems, it becomes an instrument of redemption and active confrontation with the main tragedy of the universe – death and non-fraternity (Fedorov, 1995a; Zasukhina, 2016).

Thus, the dialogue between Buber and Fedorov reveals two poles in understanding the tragedy of the instrumental mind and two possible ways to overcome it. Buber points to an existential-phenomenological path: a return to the immediacy of the dialogical encounter “I–You” here and now, to the courage to say “You” in the world of “It”. This is a path of personal, interpersonal breakthrough (Buber, 1967; Friedman, 2013). Fedorov proposes a cosmic-historical project: a universal “Common Cause” with the help of transformed science and technology to resurrect universal kinship and victory over death. This is the path of collective, historical salvation (Fedorov, 1995a; Young, 2012).

They are united by the understanding that true intelligence and true technology are possible only as a service of communication - communication between “I” and “You”, between the living and the dead, between humanity and the cosmos. Where reason breaks away from this ethical and religious foundation and becomes a self-sufficient tool, it condemns itself to the role of an executioner – the executioner of nature, another person, their fathers and, ultimately, themselves. Overcoming tragedy does not lie in abandoning reason and technology, but in their radical reorientation – from the handmaidens of “It” and death to the allies of “You” and life (Buber, 1999; Fedorov, 1995a; Habermas, 2000).

## DISCUSSION

The Frankfurt School places the structure of society at the center of its research. It considers technological rationality not as a neutral tool, but as a socially conditioned



mechanism for exercising power, ideology and control, which leads to a weakening of public relations and a limitation of individual autonomy. According to this tradition, the crisis of modernity stems from an inherent contradiction of the Enlightenment project which gave rise to a “repressive” social order in which instrumental thinking colonizes the world of life. Overcoming the crisis is associated with the transformation of socio-political institutions, which can be carried out either through radical criticism of repressive systems, or, as in Habermas, through the affirmation of communicative rationality.

The thought of Martin Buber, whose approach can be defined as existential-phenomenological criticism, is moving in a completely different direction. The central object of his analysis is not the social system, but the existential situation of the individual, for whom the dominance of technorationality appears not as a historical, but as a metaphysical problem. Buber sees the key problem as the total dominance of the “I–It” relationship based on objectification and use, and its displacement of the “I–You” relationship as a genuine encounter and dialogue, which leads to existential devastation. Salvation, according to Buber, lies not in social transformations, but in a personal existential effort - the courage to affirm the dialogical “I–You” relationship every day in a world structured by the logic of “It”. This path presupposes renewed religiosity, where God is the absolute “You”, and prayer is a dialogical encounter that requires an inner spiritual awakening.

Buber's focus has shifted from society to the existential state of an individual, for whom technorationality appears not as a social problem, but as a metaphysical catastrophe that reformats the very way of human presence in the world. His diagnosis implies that the tragedy lies in the total victory of the “I–It” relationship – the world of objectification, experience and use – and the systematic destruction of the possibility of the “I–You” relationship as a world of genuine encounter, dialogue and mutual presence, which leads to existential devastation and total loneliness. The way to overcome lies not in changing the system, but in a personal existential turn and religious-personalistic mysticism.: Salvation is a daily, relentless and risky act of choice, the courage to say “You” in a world that responds “It”. This is the path of radically renewed religiosity, where God is the eternal “You”, and prayer is a dialogue that requires not social reform, but spiritual awakening to a dialogical existence.

The third direction, presented by Nikolai Fedorov, develops cosmic-historical criticism and offers project-transformative salvation through a “Common Cause”. The subject of the Russian thinker's reflections is the universe and the history of humankind in their entirety. Fedorov considers “non-fraternity” to be the primary cause of world evil – the rupture of family ties between generations, leading to the passive acceptance of death. Fedorov sees the answer to this fundamental problem as a collective scientific and technological project on a planetary scale, requiring a radical reorientation of science and technology: from the goals of domination and comfort to the management of natural forces, to the resurrection of ancestors and thus to the victory over death. In this paradigm, technology is transformed from a tool of calculation into a means of filial love and universal salvation, and the idea itself appears as a utopian religious project calling on humanity to cooperate with God in the spiritualization of the cosmos.



Thus, the Frankfurters seek salvation in correcting society through criticism and communication, Buber in transforming interpersonal existence through the mystery of dialogue, Fedorov strives for salvation through the transformation of the universe and history in the megaproject of resurrection.

These are three different perspectives, but their dialogue enriches the understanding of the tragedy of the instrumental mind, clearly showing that it is simultaneously social, existential and cosmological. This understanding opens up several perspectives for further research. One of them is the problem of the practical implementation of Buber's project of “humanizing technology” in the context of total digitalization, algorithmic management, and the development of artificial intelligence (Bylieva, 2025; Delio, 2020; Nikitenko, 2024). Modern research in the field of ethics of artificial intelligence (Friedman, 2013; Nikitenko et al., 2024) and human-centered design (Auernhammer, 2020; Usmani et al., 2023) can be considered as attempts to implement this principle.

A promising direction is the search for points of convergence of existential-phenomenological analysis with large-scale socio-historical transformation projects. How can the personal act of a dialogical meeting become the basis for collective action, and the project of a “Common Cause” avoid the danger of a new technocratic totalitarianism? Focusing on these perspectives makes it possible to transfer critical theory from the plane of historical and philosophical analysis to the field of actual practical thought necessary for understanding and overcoming the key challenges of the technological civilization of the 21st century (Digilina et al., 2023; Garibay et al., 2023; Grover & Arora, 2023; Riedl, 2019).

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Research article

## The Mystery of Arshak, Vasak and Shapur in Faustus of Byzantium's "History of Armenia": An Experience of Hermeneutical Reconstruction

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### Abstract

The epistemology of most fragments from Faustus of Byzantium's History of Armenia, particularly such difficult passages as chapter LIV of the fourth book, is possible only through exegesis of hidden, sacred meanings. The key to decoding the images, events, and phenomena described in this fragment of Faustus's "History" can be found in theatrical mysteries. It is known that any ancient theatrical action is based on agon, so analysis of dramatic texts is preferably conducted using the method of binary opposition. The agon between Armenian king Arsakes and Sassanid Sapor unfolds in the Persian king's tent, representing the proskeny of ancient theater. In this case, Arsakes acts as protagonist while Sapor plays the role of antagonist. In Faustus's mystery there is also a tritagonist – Sparapet Vasak, who plays a special role in the tragedy. This article represents an attempt to read through the lens of ancient drama a small fragment of an Armenian literary monument from the Early Middle Ages, revealing the dramatic technologies embedded within historical narrative.

**Keywords:** Early medieval Armenian literature; Hermeneutics; Faustus of Byzantium; Ancient drama; Mystery; Tragic amechania; Salt; Seal; Agon; Arsakes; Vasak; Sapor; Magicians

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Научная статья

## Мистерия Аршака, Васака и Шапура в “Истории Армении” Фауста Византийского: Опыт герменевтической реконструкции

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### Аннотация

Эпистемология большинства фрагментов “Истории Армении” Фауста Византийского, особенно такого трудного для понимания, как глава LIV четвертой книги, возможна лишь на основе экзегезы тайных, сокровенных смыслов. Ключом для раскодирования образов, событий и явлений, описываемых в рассматриваемом фрагменте фаустовской “Истории Армении” могут стать театральные мистерии. Известно, что в основе любого античного театрального действия находится агон, поэтому разбор текстов драматических произведений предпочтительнее проводить на основе метода бинарной оппозиции. Агон между армянским царем Аршаком и сасанидским Шапуrom разворачивается в шатре персидского царя, представляющем просцениум античного театра. В данном случае Аршак выступает как протагонист, в то время как Шапур играет роль антагониста. В мистерии Фауста присутствует и тритагонист – спарпет Васак, который играет особую роль в трагедии. Данная статья является попыткой прочтения через призму античной драмы небольшого фрагмента литературного памятника армянского Раннего Средневековья, выявляя драматургические технологии, заложенные в историческом повествовании.

**Ключевые слова:** Раннесредневековая армянская литература; Герменевтика; Фауст Византийский; Античная драма; Мистерии; Трагическая амехания; Соль; Печатка; Агон; Аршак; Васак; Шапур; Волхвы

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## INTRODUCTION

The highest degree of reality is achieved only through signs...

—Charles Sanders Peirce

...and life's path is short, and Ananke is merciless...

—Alcman

Sacrifice is precisely that which alone gives meaning to life.

—Alexei Losev

Faustus of Byzantium (Favtos Buzand) was an Armenian author of the first half of the 5th century who, following Agathangelos, wrote the third and fourth books of the *History of Armenia*. This work can be considered a collective endeavor created by many generations of Armenian authors over nearly one and a half thousand years. Each author continued recording Armenian history from where his predecessor left off, bringing their account to some pivotal event that closed one chapter and opened another in Armenia's history.

Faustus represents a typical Hellenistic author. Even though, like all Armenian medieval historians, he was a monk and advocate of Christian values, he nevertheless relied not only on biblical tradition but also on classical antiquity when writing his work. Particularly interesting is how ancient drama influenced Faustus of Byzantium's "History." His work is divided into separate chapters, many of which can be viewed as great and small tragedies. Most could successfully be staged in any theater today – it is no coincidence that prose writers and dramatists of modern and contemporary times have used individual, still-relevant plots from Faustus's "History" to create their plays, novels, and even operas.<sup>1</sup>

In his "History," Faustus employed many elements of ancient mysteries and narrative structures from Hellenistic dramaturgy that were not yet completely forgotten in his time. Herein perhaps lies the secret of the powerful impact of this outstanding work from the Early Middle Ages.

## TECHNOLOGY AS TRAGEDY: THE DRAMATIC STRUCTURE OF HISTORICAL NARRATIVE

The thematic focus on "Technology as Tragedy" provides a crucial lens for understanding Faustus's historiographical method. The dramatic technologies employed by Faustus – the structural principles of ancient theater, the mechanics of agon, the ritual significance of objects like seals and salt – function not merely as literary devices but as epistemological tools for comprehending historical reality. These technologies of meaning-making transform raw historical events into tragic knowledge, revealing the underlying patterns that govern human fate.

The tragic dimension emerges precisely through the technological apparatus of drama: the careful orchestration of protagonists and antagonists, the strategic use of space (the tent as *proskeny*), and the ritualized procedures of judgment. This technological

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<sup>1</sup> The most famous examples are Raffi's novel "Samvel" and the first Armenian opera "Arshak II" (1862). However, the most talented use of Faustus's plot to date remains the "Legend of the Destroyed City."



framework allows Faustus to transcend mere chronography and achieve what Aristotle (4th century BCE/1983) distinguished as the domain of poetry – the exploration of what could be, rather than merely what was. In this sense, the dramatic technologies become instruments of historical truth, capable of revealing the deeper structures of reality that escape ordinary observation.

### SHAPUR'S VOTUM<sup>2</sup> AND DEVOTIO<sup>3</sup>: SALT AND SEAL

The compositional backbone of the fourth book of Faustus of Byzantium's *History of Armenia* is chapter XVI, which describes the agon between Armenian king Arshak II (350-368) and the sovereign ruler of Iran, Sapor II, also known as Shapur or Shapuh the Long-lived (birth date unknown, king of Persia from 309 CE, died 379 CE).

In our chosen chapter, it is told how in the third year of the so-called Four-Year Armenian-Persian War (364-368), the shah of Iran, suffering one defeat after another, was forced to approach Arshak II with a peace proposal. Faustus of Byzantium describes these events: “Meanwhile, the Persian king Shapuh earnestly entreated king Arshak, sending him gifts and letters, and kindly invited him to establish mutual love and peace and great friendship from then on.”

Though unwilling to submit to Shapur and distrusting his promises, Arshak nevertheless yielded to the Persian's persuasions. According to tradition, Shapur managed to achieve his goal through ritual oath. As a guarantee of safety for Mazdaists, the king sent Arshak a message in the form of salt sealed with a signet ring bearing the image of a boar, threatening that if the Armenian king did not come to Ctesiphon even after this sacred Mazdaist vow, war would resume, and this time the outcome might not favor the Armenians. Faustus writes on this matter: “...and he, according to the custom established in the Persian kingdom for solemn oaths, ordered salt to be brought, applied to it a ring with the image of a boar and sent it to Arshak, saying that if even after this oath he does not come, then let him prepare for war.” For Mazdaists, such an oath was equivalent to kissing the cross among Christians.

As we can see, *Shapur* implores *Arshak* to appear before him and swears that he will be granted amnesty and royal mercy, while at the same time he curses the Armenian king in case he does not respond to his call. Let us turn to Shapur's salt oath, to the form in which it was made and what stands behind it. The very circumstance of salting the oath cannot fail to attract our attention.

However, in Shapur's oath, the presence of salt is not the only important element; the boar's imprint left on the wet salt has special significance. The boar and the Simurgh bird are dynastic symbols of the Sassanids. Both connotative signs have roots in the archaic era and are connected with totemism, primitive shamanism, and magic.

At the same time, the seal is a simulacrum of power. Through seals, brands, and marks, power places its stamp on things, animals, people, and phenomena. In a certain sense, the seal is comparable to fate. Power places the seal but breaking the seal is also a

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<sup>2</sup> Vow, ritual oath (Latin).

<sup>3</sup> Dedication to the underworld gods, curse (Latin). From the same root comes the verb *devoveo* - “to doom,” “to sacrifice.”





symbol of power. To break the former owner's seal means to free the object from their power and possibly establish one's own power over the object or phenomenon. Since antiquity, seals have been given a special place in magical-religious symbolism, which is why most oaths, vows, and pledges were sealed with a seal or thumbprint.<sup>4</sup>

Thus, it can be asserted that the boar-tessera or boar-theorikon sent to Arshak by the Persian shah is not an object guaranteeing the Armenian king's safety, as it might appear at first glance, but an invitation to a bloody spectacle, a dramatic performance that must inevitably end with the hero's death. In reality, Shapur is not inviting spectators – rather, Faustus himself, acting as choragus-coryphaeus, invites us all to a theatrical performance.

### TRAGIC AMECHANIA: BETWEEN WALL AND SWORD

As in ancient drama, liturgical characters exist in Faustus's *History of Armenia*. King Arshak and his sparapet or military commander Vasak are typical examples. According to Faustus, Arshak, unwilling to end the war and go to Ctesiphon to bow to the Persian, was forced to submit to pressure from his own court and army, tired of the hopeless war with the Persians.

In essence, the king is subjected to ostracism, silent boycott, and like a pharmakos or symbolic human sacrifice is expelled from his own kingdom. In the prevailing circumstances, he is no longer master of his fate; the decision is made for him by all of Armenia, and he merely submits to the flow of external circumstances no longer dependent on him.

Like ancient heroes, Arshak submits to his Ananke (predestination, inevitability, fate); he and his mentor Vasak can only follow where the finger of fate points. However, though Faustus writes about the hopelessness of Arshak's situation, everything is not so simple. Arshak and Vasak have the possibility of choice – the most important choice in human life. Only this is a choice of a different order.

As José Ortega y Gasset observed when describing extreme situations in which circumstances leave almost no way out, humans are paradoxically compelled to choose: “Death is inevitable, the situation is hopeless... one must choose the scenario of one's own destruction – that of a coward or a hero, that is, a shameful or beautiful death.” (Ortega y Gasset, 1991, p. 506) This existential dilemma corresponds closely to the state that Anatoly Akhutin (1997) characterizes as *tragic amechania* – the impossibility of acting under conditions that demand action.

As José Ortega y Gasset observed when describing extreme life situations where circumstances leave almost no way out: “Death is inevitable, the situation is hopeless. What, it would seem, is there to choose from? It turns out, precisely between sword and wall. What an amazing privilege that humans sometimes enjoy, or rather the cruel fate from which they sometimes suffer! For one must choose the scenario of one's own destruction – that of a coward or a hero, that is, a shameful or beautiful death!” (Ortega y Gasset, 2000, pp. 22-23). In Faustus's *History*, the Armenian king and his sparapet face a

<sup>4</sup> It is characteristic that even in our pragmatic causal age, the seal continues to be perceived as a sacred symbol; any paper with a seal acquires legitimacy.



similar choice. Like heroes of ancient drama, they find themselves in a state of *tragic amechania*, that is, “the impossibility of acting under conditions of necessity to act,” as Anatoly Akhutin (2005, p. 22) characterizes it. Similar choices are made by Arshak and Vasak. From this moment on the alienation of heroes from the society that rejected them becomes an insurmountable chasm.

### LIBERATING SOLITUDE

However, if one generates for the hero a kind of Coriolanus syndrome (or Coriolanus-like defiance), ostracism makes him absolutely independent. Previously, for both heroes, Arshak and Vasak, private interest and public interest were inseparable. Now everything is different: they are both *personae non gratae*, each now a marginal existence that finds itself not simply outside society but elevated above it.

Following the traditions and canons of ancient theater, at the beginning of his “drama about Arshak,” Faustus of Byzantium presents his hero in the image of a typical hiketes (suppliant, petitioner) of ancient drama, who – trying to avoid his fate – begs Shapur for mercy. As has been shown by many researchers, the hiketes is not simply a “suppliant” in the sense of “beseeching,” but also a “suppliant” in the sense of “praying to higher powers,” offering them sacrifice.<sup>7</sup>

However, in the same plot, Arshak, while being a “suppliant,” appears before us as a hybrist, mocker, scoffer, trickster (Shilman, 2006). This too is a very ancient archetypal image (Jung, 2004).

### THE AFTERLIFE JUDGMENT OF SHAPUR

Before we turn to the symbolic and theological dimension of what I call “Shapur’s Afterlife Judgment,” it is necessary to outline for the non-Armenian reader the narrative core of the episode as it appears in Faustus of Byzantium’s *History of Armenia*, for without this brief reconstruction the mystical and dramatic character of chapter LIV may appear detached from its literary foundation. In Book IV, chapters 15–16, Faustus describes how the Persian shah Shapur II, repeatedly defeated by the Armenian king Arshak II, invites the Armenian monarch to peace negotiations; the invitation, however, is made not through diplomatic channels but through a ritual oath constructed according to Iranian religious tradition. Faustus writes: “Then Shapuh... according to the custom of the Persian kingdom for solemn oaths, ordered salt to be brought, pressed upon it a ring engraved with the image of a boar, and sent it to Arsak, saying that if even after this oath he did not come, he should prepare for war” (Faustus of Byzantium, 1989, p. 191).

The act of sending salt sealed with the royal boar-signet signified a sacred Mazdaean *votum* – a guarantee of safe conduct equivalent, in Christian terms, to kissing the Cross. The Armenian king, pressured by his nobles and army, is compelled to accept the oath despite distrusting Shapur’s intentions (Faustus of Byzantium, 1989, IV.15–16). What follows, beginning in chapter LIV, is not a political negotiation but a ritual ordeal, a staged cosmic drama in which Arshak and his general Vasak become *pharmakoi*, expiatory victims whose fate echoes archetypal patterns of ancient tragedy.



Faustus's description of the "court" of Shapur should therefore not be read as a legal proceeding: when the Armenian king enters the Persian tent, the emphasis is on theatricality and sacrality, for Shapur's tribunal is not worldly judgment but a ritualized descent into the realm of death. In the English translation, the episode opens with a striking description of the space as a cosmic stage, "prepared beforehand" for the king's humiliation and symbolic destruction (Faustus of Byzantium, 1989, IV.54, pp. 220–221).

Here a crucial parallel becomes apparent: the scene operates as a Hellenistic-style *katabasis* – a descent into the underworld for trial, testing, and symbolic death, echoing Greek heroes from Heracles to Orpheus and Odysseus (Homer; Vergil; Plutarch) – while simultaneously reflecting ritual ordeals (*ordaliae*) in Iranian, Mesopotamian, and Indo-European traditions, including the Persian *varə* and Vedic fire ordeal, in which the hero undergoes a trial by exposure to fundamental forces. Arshak's entry into Shapur's tent corresponds structurally to such ritual descent, a movement from the world of the living into a liminal space where the verdict is divine rather than human. Faustus frames the entire meeting as a preordained mystery-play in which Shapur, assisted by magi and Chaldean astrologers, enacts an otherworldly trial, examining Arshak and Vasak through divination, riddling, and ritual degradation.

The judicial procedure of chapter LIV – its mystical setting, symbolic actions, and foreknown outcome – bears no connection to ordinary, profane reality: it is a sacred judgment, a cosmic agon in which the Armenian king and sparapet serve as expiatory victims offered in place of the land itself. Olga Freidenberg describes such tribunals as "originally an afterlife court, not a legal one... The legal court is merely a variant of the afterlife court... its principal function is to punish, to assign 'death' or 'reward'" (Freidenberg 1973, p. 114).

Within this interpretive frame, Shapur's sorcery constitutes genuine postmortem judgment, condemning Arshak and Vasak to confinement in the dungeon of the Anhush fortress in Khorasan — a space associated with oblivion, the shadow-world of the living dead, where time ceases. Just as Odysseus or Aeneas seek counsel among the dead, and as heroes in ritual ordeals undergo symbolic death to be reborn, so Arshak descends into the darkness of Anhush, stripped of power, honor, and protection. Chapter LIV thus depicts not merely a narrative episode but an initiation into the underworld, a dramatized *katabasis* whose meaning aligns both with Indo-Iranian trial-rituals and the broader Mediterranean tradition, fusing Hellenistic *katabasis* and Iranian *ordalia* into a single dramaturgical technology.

### PLUTONIC ARSHAK

In Faustus's work, Shapur and Arshak, as well as Vasak, are endowed with infernal netherworld creature. Arshak himself appears to viewers as a simulacrum of Plutus-Pluto, lord of the underworld, who, like all chthonic beings, draws his strength from native earth. It is no accident that the magi and Chaldean astrologers chose the first of the four primary elements – earth – to test Arshak.

The medieval reader, like the viewer of ancient theater, would have unmistakably recognized in "Armenian earth" the emanation of Arshak's "Glory." For each hero passes



through stages of initiation in the primary element native to his people (Margaryan, 2001, pp. 39-41; Matie, 1996). For Greeks it is water, the sea; for Iranians – fire; for Semites air; and for designating the natural essence of Armenians and the country of Armenia, earth, the terrestrial firmament – the first of the four elements – is perhaps most suitable.

### TRICKSTER VASAK

Like Arshak, Vasak is also an expiatory sacrifice who initially appears as a hybrist, – a mocker and scoffer. Following his lord, he appears at the afterlife judgment. Here during the mystical agon he teases Shapur, mocks him. However, this is the laughter of a hunted pharmakos, expelled from the world as a kind of human sacrifice – a wild and bloody laughter.

In Faustus's *History*, Vasak Mamikonian is a kind of mime-philosopher, holy fool, whose image echoes that of Socrates. Under the mime's mask, which, as is known, also symbolizes the mask of the deceased, hides a pharmakos artistically playing the role of expiatory sacrifice in the cosmic drama unfolding at Shapur's court.

Like mime-Socrates or Cynic Diogenes, Vasak poses riddles to his antagonist. It is known that riddles are an integral part of mystical rituals<sup>5</sup>. Once with the help of magi, the profane Shapur had already coped with a difficult test and solved Arshak's riddle. Thus, he discovered the source of the Armenian king's strength, revealed his anima,<sup>6</sup> hidden from superficial view,<sup>7</sup> which made the Armenian king vulnerable and defenseless.

Now Shapur alone tries to solve Vasak's riddle<sup>8</sup> in order to reveal his nature, his totemic principle. Partly Shapur succeeds: he guesses Vasak's totemic animal – it is a fox, a trickster-fox.<sup>9</sup>

The trickster-fox or trickster-coyote is a provocateur, a ribald, a fool. Characteristically, the trickster was usually depicted as a half-human, half-fox or coyote, jackal, etc.

### THE LOTS OR SCALES OF FATE

In the debates between Vasak and Shapur, as in the mystical agon between Shapur and Arshak, the opposition of actants, heroes and anti-hero, their position and the casting of lots, the oscillation of the scales between life and death is extremely important. Thus,

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<sup>5</sup> The phenomenon of riddle-solving in the mythopoetic consciousness of primitive man has been studied in science for a long time and in detail. One of the first to address this topic was Franz Boas (1926).

<sup>6</sup> Like Koschei, whose strength, enclosed in the four elements, was discovered with the help of the wise Yaga

<sup>7</sup> These ideas are also very rare and have roots going back thousands of years. See: Onians, 1954, p. 326, 397-98, 409-10, 416.

<sup>8</sup> Everything known becomes unknown, poles reverse, meanings change to opposite. What opens is not an instructive meaning, but an irremovable, fundamental *enigmaticity* of being and man

<sup>9</sup> In all his manifestations, the trickster is always in internal conflict with himself; he is neither Chaos nor Order, which oppose each other, he is always on the border of these two manifestations



Arshak, inside the shah's tent, like a pendulum, led by the hand by Shapur from west to east and back, inclines from life to death and vice versa<sup>10, 18</sup>

Finally, Arshak's lot, like a tossed symbolon coin, falls down to earth and after long rotation lies face down toward the underworld and eagle up (the eagle being a symbol of glory). Thus, the Armenian king, multiple victor over Shapur and the Roman emperor, transforms from hunter into hunted totemic sacrificial animal.

Similarly, the scales of fate oscillate in the description of the court-duel between Vasak and Shapur, where the debate takes the form of riddle-solving. Especially characteristic is the episode with two mountains, like oscillating scales of fate,<sup>11</sup> alternately going underground under the weight of the “giant” Vasak.

However, the hybristic death of Arshak and Vasak is thoroughly imbued with life-affirming pathos. Sacrifice as affirmation of life through death in Faustus's *History* heralds the revival of the house of Arshakids, and with it the country and kingdom of Armenia, whose foundation is mixed with blood – this most binding, most cementing substance.

During sacrifice, as never before, the pathos of sacramental seriousness is justified. The idea of “eternal return” – the cycle of nature's cycles – is not an irresolvable contradiction but the norm of archaic thinking. For archaic consciousness, the phrase “killing the sacrifice” is meaningless. The sacrifice cannot be killed in the sense we speak of it today. The “murder” of sacrifice is possible only as forgetting its memory. As the German saying goes: “Tot ist Der – der vergessen wird” (“Only he who is forgotten is dead”).

## CONCLUSION

The hermeneutical reconstruction of Faustus's narrative reveals how dramatic technologies function as instruments of historical understanding. The structural apparatus of ancient theater – agon, the tragic trinity of protagonist, antagonist, and tritagonist, the ritual use of space and objects – serves not merely as literary ornamentation but as an epistemological framework for comprehending the deeper patterns of historical reality.

The tragic technology embedded in Faustus's historiography transforms mere chronicle into cosmic drama, revealing how individual fates participate in larger structures of meaning. Through the technological apparatus of drama, historical events become legible as manifestations of eternal patterns, while particular sufferings achieve universal significance.

This technological dimension of tragedy – its capacity to generate meaning through formal structures – demonstrates how the ancient world understood drama not simply as entertainment but as a technology of truth. In an age when “Technology as Tragedy” shapes our contemporary consciousness, Faustus's medieval deployment of dramatic technologies offers insights into how narrative structures can themselves become

<sup>10</sup> At the same time: “Scales,” writes Olga Freidenberg, “should not be imagined as modern commercial scales. This is a crossbar, horizon, one end of which is heaven, the other is the underworld.”

<sup>11</sup> Freidenberg describes this situation: “The lot represents a piece of wood, a branch, a piece of stick with special signs (also a brand), a fragment of stone; lots are scattered on white clothes or placed in a pile. ”





instruments of knowledge, capable of revealing truths that escape ordinary historical discourse.

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## Contributed papers



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Research article

## The Sermons of the Metropolitan Filaret – Technique of Composition, Order and Logic of Linguistic Presentation

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### Abstract

The personality and work of Filaret, the Metropolitan of Moscow and Kolomna (secular name: Vasilii Mikhailovich Drozdov, 1782–1867), attracted the attention of pre-revolutionary scholars. An outstanding church and public figure of the Synodal period he was arguably the greatest Russian Orthodox theologian of the 19th century. In the post-Soviet era, a number of works were dedicated to various aspects of his multifaceted activities at different periods of his life. Insufficiently studied, however, is the question of Filaret's distinctive technique of composing and linguistically rendering his sermons. The aim of this article is to present these sermons as an outstanding example of church preaching in the first half of the 19th century. Since the mid-17th century, Russian preaching had been under the defining influence of South Russian learned monks and hierarchs who followed a scholastic tradition that was modeled on Polish Catholicism. The rejection of this scholastic tradition began with Archbishop Feofan Prokopovich (1681–1736). The final and complete break and the establishment of a distinctive standard for the technique and language of Russian preaching came with Filaret. In his sermons, he primarily addressed questions of Christian doctrine as well as spiritual and moral issues, adhering to an order and logic of presentation which strictly adhered to the principle of remaining grounded in facts. Filaret opposed any improvisation in preaching. Restraint in sermon structure was characteristic. When composing his homilies, the Metropolitan selected those themes and questions from Christian doctrine and church dogma that he considered particularly important for his flock. The language of Metropolitan Filaret's sermons is a living Russian language with numerous Slavic insertions, primarily as quotations but appearing often within the text of the sermon itself. The preacher employed a multitude of poetic devices, leading to the conclusion that he contributed to the revitalization of preaching, and significantly elevated its importance in liturgical practice. The themes, approaches to composition, and the language of his sermons became a model for preaching in the second half of the 19th century. In distinction to the preceding period when preaching could develop only within a very narrow circle of high church hierarchs, this allowed for a number of major and renowned preachers to emerge from among the parish clergy. Considering Filaret their teacher, they adopted his technical idiom and standard model for the composition of sermons.

**Keywords:** Sermon; Explanation of Christian Doctrine; Russian Language; Semantic Repetitions; Inversion; Deliberate Composition; Poetic Devices; Metropolitan Filaret (Drozdov)

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Научная статья

## Проповеди митрополита Филарета – Техника композиции, порядок и логика языкового изложения

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### Аннотация

Личность и деятельность выдающегося церковно-общественного деятеля синодального периода и крупнейшего русского православного богослова XIX века митрополита Московского и Коломенского Филарета (в миру – Василий Михайлович Дроздов, 1782-1867) привлекала внимание еще дореволюционных исследователей. В постсоветское время вышел ряд работ, посвященных как отдельным сторонам многогранной деятельности митрополита, так и различным периодам его жизни. Однако до сих пор недостаточно изученным остается весьма важный вопрос о своеобразии технологии построения и языка его проповедей. Целью предлагаемой статьи является попытка представить проповеди Филарета как выдающийся образец церковной проповеди первой половины XIX века. С середины XVII в. русская проповедь находилась под определяющим влиянием южнорусских ученых монахов и иерархов, следовавшим схоластической традиции по католическому польскому образцу. Отказ от схоластической традиции начался с архиепископа Феофана Прокоповича (1681-1736). Окончательный и полный разрыв со схоластической традицией и завершение оформления своеобразного эталона технологии и языка русской проповеди синодального периода связано с проповеднической деятельностью митрополита Филарета (Дроздова). В своих проповедях Филарет, трактуя, прежде всего, вопросы христианского вероучения, а также касаясь духовно-нравственных проблем, придерживаясь строгого порядка и логики в изложении своих мыслей, а также правилу, согласно которому надо оставаться на почве фактов. Филарет выступал против всякой импровизации в области проповеднического слова. Для него была характерна сдержанность в построении проповеди. При составлении своих поучений митрополит выбирал те темы и вопросы из христианского вероучения и церковной догматики, которые, по его мнению, были особенно важны для паствы. Язык проповедей митрополита Филарета – живой русский язык с многочисленными славянскими вставками, прежде всего, в цитатах, но часто и в тексте самой проповеди. Проповедник пользовался множеством поэтических приемов. Следует заключить, что митрополит Филарет способствовал оживлению проповеди и высоко поднял ее значение в богослужении. Тематика, подходы к построению и язык его проповедей стали образцом для проповедничества во второй половине XIX века. Благодаря этому – в отличие от предшествующего времени, когда проповедь могла развиваться лишь в весьма узком кругу высших церковных иерархов, – из среды приходского духовенства выделился целый ряд крупных и известных проповедников, считавших Филарета своим учителем.

**Ключевые слова:** Проповедь; Разъяснение христианского учения; Русский язык; Семантические повторы; Инверсия; Продуманная композиция; Поэтические приемы; Митрополит Филарет (Дроздов)

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## ВВЕДЕНИЕ. ПОНЯТИЕ ПРОПОВЕДЬ

Понятие проповедь весьма обширное и поэтому трудно поддается однозначному определению. Согласно принятому в христианской среде определению, проповедь – это речь религиозно-назидательного характера, произносимая священнослужителем в храме с целью поведать и разъяснить слушающим основы вероучения и благочестивой жизни. Таким образом, понятие проповедь включает в себя два аспекта, с которых она может быть рассматриваема. Во-первых, аспект ораторский – как речь к народу она является видом ораторского произведения и имеет особенности, характерные для ораторского произведения; во-вторых, аспект церковно-религиозный, включающий возвешение и разъяснение христианского вероучения как выполнение религиозного служения, возложенного Богом на апостолов и их преемников – пастырей.

## ЭВОЛЮЦИЯ ТЕХНОЛОГИИ РУССКОЙ ПРОПОВЕДИ ДО XIX В.

С начала своего развития русская проповедь находилась под непосредственным влиянием византийской. Древнерусские проповедники редко уделяли внимание изложению церковных догматов. Гораздо в большей степени они подчеркивали нравственно-аскетическую сторону христианского учения, чтобы убедить народ в необходимости аскетической жизни. Похвалы святым угодникам Божиим служили восхвалению добродетельной подвижнической жизни святых, которая предьявлялась верующим того времени как образец для подражания. Количество таких похвальных слов особенно возрастает с XV века. Той же цели служили проповеди на церковные праздники, в которых самоотвержение и мученичество святых представлялись как образцы для всей христианской жизни. В целом можно отметить, что древнерусская проповедь преследовала, прежде всего, практические цели: развенчание духовных заблуждений в области веры, ересей, суеверия в разных его проявлениях, нравственных недостатков и пороков, распространенных в повседневной жизни русского народа (например, пьянства).

В течение XVII–XVIII вв. шел процесс разделения русской проповеди, как по содержанию, так и с формальной точки зрения. Южнорусские богословы, имевшие своим центром Могилянскую коллегию в Киеве, находились под значительным латино-польским иезуитским влиянием. В православных учебных заведениях Южной Руси, устроенных митрополитом Петром Могилой (1596-1647) по католическому польскому образцу, гомилетика как богословская дисциплина, излагающая правила церковного красноречия или проповедничества, преподавалась по тем же руководствам, что и в католических школах. Здесь, в гомилетике, форма преобладала над содержанием, композиция над богословским учением. Ректор Киевской Могилянской коллегии архимандрит Иоанникий Голятовский (умер в 1688 г.), являвшийся выдающимся представителем южнорусской схоластической проповеди XVII в., составил первое русское





гомилетическое руководство “Наука о сложении казаний”, опубликованное в приложении к сборнику его проповедей “Ключ разумения” в 1659 г. в Киеве. В этом труде он изложил искусные правила для составления проповедей. Проповедь, по Голятовскому, обязательно должна состоять из трех частей: введения, наставления и вывода (*exordium*, *narratio* и *conclusio*) (Kataev, 1998, с. 90-91). В древней Киевской духовной академии стиль проповеди разделялся на множество видов, как например: “цветущий”, “остроумный”, “удивительный” и т. д. Эти разделения были заимствованы из западных руководств.

Противоположные позиции занимала северорусская проповедь. Ее представители сознательно придерживались византийской святоотеческой традиции, в которой форма непринужденной беседы считалась наиболее подходящей для проповеди. Здесь единство содержания считалось более важным, чем строгая композиция. Северорусские гомилеты XVII-XVIII вв. не обращали особого внимания на форму. Для них жизненность проповеди была важнее. Этой жизненности они достигали приспособлением проповеди к современным духовным нуждам своей паствы и способностям ее восприятия.

Однако со времен Симеона Полоцкого (1629-1680) Церковь Московского государства находилась под влиянием южнорусских ученых монахов и иерархов. Наиболее ярким представителем проповеди этой схоластической традиции на русской почве был Рязанский митрополит Стефан Яворский (1655-1722), ставший по желанию Петра I после смерти патриарха Андриана местоблюстителем патриаршего престола. Его проповеди изобиловали изощренными сравнениями и натянутой символикой. Композиция их была искусственная и чисто внешняя, при этом на содержание не обращалось должного внимания. В проповедях Яворского можно встретить рядом с цитатами из Священного Писания пассажи из мифологии, анекдоты об Александре Великом или слуге Ксеркса и описание какого-нибудь животного (Самарин, 1880, с. 362). В ущерб собственно христианской тематике, Стефан не упускал возможности включить в свои проповеди различные доказательства своей широкой общей образованности. Изобилие рассказов, притчей и анекдотов из мира животных и растений показывает, что Яворский охотно исполнял требование Голятовского читать книги “о зверях, птахах, гадах, деревьях, зельях, каменьях и разных водах” (Морозов, 1880, с. 79). Источниками сведений такого рода Стефану Яворскому и его коллегам служили многочисленные средневековые бестиарии, а также исторические сочинения и труды античной литературы. Все эти повествования о спорах в римском сенате, какому божеству надо оказать наибольшую честь, о Нероне или Дионисе Сиракузском, басня о мыши, грызущей пилу, и т. п. были мало пригодны к тому, чтобы освещать тематику проповеди и служить изложению различных аспектов христианского вероучения.

При таких установках неудивительно, что Стефан Яворский составлял свои проповеди в богато орнаментированном стиле, перегруженном метафорами, параллелизмами, повторами, восклицаниями, риторическими вопросами. Длиннейшие фразы создавались при помощи изобилия прилагательных. Только в менее патетических местах церковнославянский язык уступал место русскому.



Часто употреблялись иностранные слова, которые во время Петра I насильно вводились в русскую речь: фортецца (крепость), кавалер (солдат) и т. п. Как притчи и анекдоты часто в его проповедях занимали более важное место, чем христианское содержание, так и игра слов зачастую была самоцелью, предметом интеллектуальной гимнастики автора.

Отказ от схоластической традиции начался с архиепископа Феофана Прокоповича (1681-1736), выступавшего также главным идеологом петровских церковных реформ. По сравнению с проповедями предшественников его проповедь выглядела простой и ненадуманной. Композиция строилась уже не по определенным неподвижным рубрикам, а соответственно мысли проповедника. Феофан не только больше не старался постоянно удивлять своих слушателей чем-то новым и неожиданным, но и полемизировал против напыщенного стиля католических польских проповедников, против типичных для них пустых, бестактных анекдотов. Он также считал неприличным для христианского проповедника обращаться к языческим божествам или приводить примеры из драм и поэм как образцы для христианского бытия. Комические элементы встречались уже весьма редко. В центре внимания стояло Священное Писание. Прокопович старался доказывать гармонию между своими мыслями и Священным Писанием. С этой целью он разбирал каждую цитату из Священного Писания, чтобы найти ее точный смысл, приводя параллельные места. Анекдоты из истории или мифологии он заменил примерами из житий святых и, отвергая пример католических проповедников, требовавших знания светской литературы и мифологии, подчеркивал необходимость, прежде всего, основательных знаний Священного Писания, творений святых Отцов и истории Церкви. При составлении проповедей сам он пользовался только житиями святых. Для его проповедей характерно отсутствие введения (exordium), обязательного для схоластической проповеди. Он без всяких отступлений истолковывал текст, на котором основывал свою проповедь. Возможно, не без влияния протестантских теорий проповеди он требовал от проповедника четкого изложения материала.

С Феофана Прокоповича началось возвращение к настоящей задаче проповеди и подлинным ее источникам и корням – Священному Писанию и творениям святых Отцов. Необходимость такого характера проповедей указывалась в составленном Феофаном Прокоповичем “Духовном регламенте”, согласно которому также предусматривалась подготовка монахов для проповеднической деятельности в духовном училище в Александро-Невской монастыре.

Язык проповедей Феофана Прокоповича представлял собой смесь русского и церковнославянского. Он также содержал множество иностранных слов, из которых лишь немногие нашли распространение в русском языке. Его фразы с множеством придаточных предложений отличались сложной структурой. По замечанию некоторых исследователей, синтаксис проповедей Феофана свидетельствовал о явном влиянии латинской прозы. Прокопович лучше писал на латыни, чем на русском, многие свои выступления он сам переводил на латынь (Самарин, 1880, с. 449).



Окончательный и полный разрыв со схоластической традицией и завершение оформления своеобразного эталона языка и технологии русской проповеди связано с проповеднической деятельностью митрополита Филарета (Дроздова).

### **МИТРОПОЛИТ ФИЛАРЕТ (ДРОЗДОВ) И РУССКАЯ ЛИТЕРАТУРА. ПОЭТИЧЕСКИЙ ДИАЛОГ С А.С. ПУШКИНЫМ.**

“Я знаю только слог Карамзина и Филарета,” – таким выражением крупнейший реформатор первой половины XIX в. М.М. Сперанский оценил труд адмирала А. С. Шишкова о старом и новом слоге. По поводу этого сочинения та часть российского общества, которую привлекали литературные и языковые проблемы, разделилась на две враждующие партии (Корф, 1861, с. 77-78). Адмирал Шишков, в противоположность М.М. Сперанскому, упрекал митрополита Филарета в связи с его переводом Священного Писания на современный русский язык в том, что он желает «исказить и привести в неуважение священные книги, изменяя в них язык Церкви в язык театра» (Цит. по: Сухомлинов, 1868, с. 14-15).

Человек, вызывавший настолько противоречивые оценки – митрополит Московский и Коломенский Филарет (в миру – Василий Михайлович Дроздов, 1782-1867) – выдающийся церковно-общественный деятель синодального периода и крупнейший русский православный богослов XIX века. Он стоял во главе перевода Библии на русский язык. Это дело со временем составило славу его имени. Филарет являлся почётным членом (1827-1841) Императорской Академии наук и впоследствии ординарным академиком (1841) по Отделению русского языка и словесности<sup>1</sup>.

Здесь целесообразно привести мнение Берлинского архиепископа Марка (Арндта), изучавшего жизнедеятельность иерарха, о том, что проповедь Филарета, быть может, не в меньшей степени способствовала становлению современного русского языка, чем сочинения Пушкина (Марк (Арндт), 2003, с. 106). В связи с этим важно отметить то влияние митрополита на поэта, которое нашло отражение в творчестве Пушкина. Филарет не только знал и чтит творчество великого поэта и современника, но и вселял в него веру, волю к созидательному, мудрому труду и склонность к благочестивому поведению. К своим тридцати прожитым годам прославленный поэт пережил немало разочарований и потрясений. Не случайно у Пушкина 26 мая 1818 г. родились такие меланхолические размышления:

Дар напрасный, дар случайный,  
Жизнь! Зачем ты мне дана?  
Иль зачем судьбою тайной  
Ты на казнь осуждена?

Кто меня враждебной властью  
Из ничтожества воззвал,  
Душу мне наполнил страстью,

<sup>1</sup> В 1994 году Русской православной церковью митрополит Филарет причислен к лику святых в святительском чине



Ум сомненьем взволновал?...

Цели нет передо мною:

Сердце пусто, празден ум,

И томит меня тоскою

Однозвучный жизни шум. (Пушкин, 1941, с. 12)

Эти, как назвал их сам Пушкин, “скептические стихи” были напечатаны в 1828 г в литературном альманахе “Северные цветы”, издававшемся А.А. Дельвигом. Вскоре, благодаря Е.М. Хитрово (дочери М.И. Кутузова), стихи попали в руки митрополита Филарета, который поражал современников силой духа и глубокой проницательностью. Дар красноречия сочетался в нем с писательским даром. Современники также отмечали ясность, точность и образность слога Филарета. Из-под его пера вышли тесты многих законов, например, манифест о наследовании престола после бездетного Александра I и манифест 1861 г. об освобождении крестьян (Иоанн (Снычев), 1997, с. 24). Каждую работу, за которую Филарет брался, он делал с исключительной основательностью.

Прочитав «Скептические стихи», Филарет поразительно чутко на них откликнулся:

Не напрасно, не случайно

Жизнь от Бога мне дана,

Не без воли Бога тайной

И на казнь осуждена.

Сам я своенравной властью

Зло из темных бездн воззвал,

Сам наполнил душу страстью,

Ум сомненьем взволновал.

Вспомнись мне, забвенный мною!

Просияй сквозь сумрак дум, –

И созиждется Тобою

Сердце чисто, светел ум<sup>2</sup>

Поэтa ответ Филарета взволновал до такой степени, что он написал еще одно прекрасное стихотворение “Стансы” и уже в феврале 1830 г. опубликовал его в издаваемой им “Литературной газете”:

В часы забав иль праздной скуки,

Бывало, лире я своей

Вверял изнеженные звуки

Безумства, лени и страстей.

Но и тогда струны лукавой

Невольно звон я прерывал,

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<sup>2</sup> Стихотворение Филарета дошло до нас в разных редакциях



Когда твой голос величавый  
Меня внезапно прерывал. (Пушкин, 1941, с. 104)

Я лил потоки слез нежданных,  
И ранам совести моей  
Твоих речей благоуханных  
Отраден чистый был елей.

И ныне с высоты  
Мне руку простираешь,  
И силой кроткой и любовной  
Смиряешь буйные мечты.

Твоим огнем душа палима  
Отвергла мрак земных сует  
И внемлет арфе серафима  
В священном ужасе поэт. (Липунов, 2003, с. 39-40)

Важно также отметить, что современные ему писатели прониклись уважением и признательностью к ученому монаху, когда он выступал посредником между ними и духовной цензурой. Так, в 1814 г. у Г.Р. Державина возникли затруднения из-за его оды “Христос”. При посредничестве Филарета ода “с множеством ссылок и замечаний на Ветхий и Новый завет”, из которых “вероятно большая часть принадлежит Филарету” была напечатана (Марк (Арндт), 2003, с. 68). В известной мере наука обязана Филарету опубликованием Остромирова Евангелия, при издании которого встретились трудности, а также появлением ряда научных работ, например, таких как “Описание славянских рукописей Московской синодальной библиотеки А. Горского и К. Невоструева” (М., 1855).

## **ОСОБЕННОСТИ СОДЕРЖАНИЯ И ПОСТРОЕНИЯ ПРОПОВЕДЕЙ МИТРОПОЛИТА ФИЛАРЕТА**

В многосторонней деятельности митрополита Филарета составление и произнесение им проповедей занимало особое место. Общественность с интересом следила за проповедями и речами митрополита. По общему мнению современников, митрополит Филарет быстро приобрел славу самого блестящего проповедника своего времени, слова и речи которого свидетельствовали об обширных богословских познаниях, серьезности и четкости его языка. Одаренность Филарета как выдающегося проповедника вызывала интерес таких знаковых личностей той эпохи, как поэт Г.Р. Державин, историк и писатель Н. М. Карамзин, директор Публичной библиотеки А. Н. Оленин (Кашеваров & Кулик, 2020, с. 257).

Личность и деятельность этого выдающегося церковно-общественного деятеля и богослова привлекала внимание еще дореволюционных исследователей (Корсунский, 1883, с. 461; 1884, с. 27; Левашов, 1875; Покровский, 1908, с. 161-162; Смирнов, 1894, с. 26). В постсоветское время вышел ряд работ, посвященных в как





отдельным сторонам многогранной деятельности митрополита, так и различным периодам его жизни (Журавлева, 2003; Иоанн (Снычев), 1997; Кашеваров & Кулик, 2020; Марк (Арндт), 2003; Панская, 2008; Сегень, 2011, 2013; Ходзинский, 2010; Цыпин, 1997; Яковлев, 2003, с. 122–150, 2007). Однако до сих пор недостаточно изученным остается весьма важный вопрос о своеобразии технологии построения и языка проповедей митрополита. Специальное изучение этого вопроса позволит полнее выяснить значение его проповедей в развитии и эволюции церковной проповеди синодального периода.

Источником проповеднической деятельности митрополита Филарета, естественно, служило Священное Писание. Библейские тексты проповедник толковал с большой осмотрительностью и строгой основательностью. Первый исследователь проповеднической деятельности митрополита Ф. Левашов (1875) называл митрополита Филарета “единственным проповедником, при чтении которого чувствуешь самую тесную, полную, органическую связь между собой Заветов – Ветхого и Нового, чувствуешь полноту и целостность христианской религии” (с. 215). Опора в построении проповеди на Ветхий Завет отличает Филарета от других известных русских проповедников XIX в. – митрополита Платона (Левшина), архиепископа Иннокентия (Борисова), которые в большей мере ограничиваются Новым Заветом как в выборе текстов, которые они полагают в основу своих проповедей, так и тех, которые они употребляют для подкрепления своих мыслей. Митрополит Филарет почти никогда не посвящал свои проповеди одному разъяснению текстов Священного Писания. Они служили ему большей частью только исходной точкой для развития своих мыслей. В содержание проповеди он затем включал и Историю Церкви, и догматику и нравственное богословие. Цитаты из Священного Писания создавали основу, на которой он строил содержание своей проповеди.

В своих проповедях Филарет, трактовал, прежде всего, вопросы христианского вероучения, а также касался духовно-нравственных проблем, придерживаясь строгого порядка и логики в изложении своих мыслей, а также правилу, согласно которому надо оставаться на почве фактов. Для него характерна сдержанность и даже некоторый ригоризм как в построении проповеди, так и во внешнем поведении проповедника во время выступления. Требуя, чтобы проповедник “отдавал себя на суд слушающего”, митрополит Филарет принципиально высказывался против всякой импровизации в области проповеднического слова. Он считал, что “церковные поучения должны быть заблаговременно сочинены”, и что “всего предпочтительнее осторожность и предусмотрительность в таком деле, в котором малейшее небрежение влечет за собой гибельные последствия” (Филарет (Дроздов), 1873, с. 137).

При составлении своих поучений митрополит Филарет выбирал те темы и вопросы из христианского вероучения и церковной догматики, которые, по его мнению, были особенно важны для паствы. Так, например, он посвятил некоторые поучения теме благодарности Богу, ряд других – страху Божию, затем духовной нищете, очищению сердца, искушениям или небесной награде.

В собраниях проповедей, изданных самим митрополитом в 1844-1845 гг., на



первом месте стоят “Слова в Господские праздники” (Филарет (Дроздов), 1844-1845, с. 2-70). Первая проповедь на Рождество Христово, произнесенная в 1821 году, в Чудовом монастыре, разделена на 10 отделов разной длины. Проповедник почти не коснулся событий, связанных с этим праздником, но полностью сосредоточился на отношениях между Богом и человеком, забывшим возносить хвалу Богу. В целом же эта проповедь состояла из четырех частей: в первых двух отделах митрополит Филарет говорил об обязанностях человека по отношению к Богу; в третьем – пятом отделах он описывал сущность славы Божией; с шестого по девятый указывал на то, что человек разучился общаться со славой Божией; в последнем, десятом отделе он призывал христиан славить Бога. “Христианин! Пусть тьма покрывает землю! Пусть мрак на языки! Возстани страха и недоумения! Светися верою и надеждою на Спасителя!” (с. 90). После отчетливой цезуры между пятым и шестым отделом вторая половина этой проповеди несла основную смысловую нагрузку.

В проповеди на праздник Входа Господня митрополит Филарет уделил теме праздника гораздо больше места. Как и в предыдущем случае, эта проповедь состояла из десяти отделов. Первый отдел содержал обширную аллгорию: солнце – Иисус Христос. Во втором отделе упоминалось предсказание пророка Захарии, на которое ссылался евангелист Матфей в цитате, предпосылаемой проповеди в качестве эпиграфа. В третьем отделе говорилось о том, что иудеи не поняли этого пророчества о входе Господнем в Иерусалим. Данная мысль развита далее в четвертом отделе. В пятом подробно описывались события этого дня, а в шестом эта тема расширялась и совершался переход ко второй части проповеди. В седьмом отделе проповедник останавливался на значении входа Господня в Иерусалим, в восьмом он цитировал Иоанна Златоуста для толкования библейского события, а в девятом давал подробное объяснение приводимых слов Златоуста. В десятом отделе митрополит Филарет излагал свое поучение верующим как вывод из ранее сказанного. Таким образом, данная проповедь разделялась на введение (отдел 1), первую главную часть (2-6), вторую главную часть (7-9) и заключение (10).

Весьма разнообразны проповеди митрополита Филарета на Пасху. В одной из них проповедник выражал скорбь о том, что православные христиане знают землю, но о небе почти не задумываются – это имеет отрицательные последствия для них, поскольку земная жизнь человека есть только зародыш настоящей жизни. Воскресением Христовым земля объединена с небом, и власть ада сокрушена. Ветхозаветной символикой проповедник подчеркивал объединение неба и земли, выражающееся в том, что уверенность в воскресении – эта новость питает христиан духовно, ибо пасхальный агнец это Воскресший Христос, это радость о Его воскресении, питающая души. В предпоследнем отделе Филарет разъяснял значение воскресения для всех областей человеческой жизни.

В другой проповеди на этот праздник митрополит представил воскресение как средство к уразумению Божественной мудрости. Для познания духовных предметов необходим Божественный свет, который может дать только Богочеловек. Проповедь заканчивалась прошением о даровании света Христова,



который может просветить духовный ум. В первой рассмотренной выше проповеди на Пасху проповедник излагал свою мысль последовательно, в органически вытекающих друг из друга отделах. Во второй же проповеди можно проследить симметричное деление: отделы 1-6, переходный отдел 7, и отделы 8-13, т. е. две главных части, состоящие из шести отделов каждая и переход между ними.

Интересна проповедь на праздник Преображения Господня, и произнесенная в Преображенском соборе города Твери в 1820 г. и опубликованная в издании 1844 г. В ней митрополит Филарет только мимоходом упоминал сам праздник. Во вступлении проповедник указывал, что евангелист дважды приводит молитву Христа, и предупреждал, что именно на это он хочет обратить внимание. В первой части Филарет говорил о том, что молитва для всего человечества связана с почитанием Бога, и что “нет вещи, в которой молитва не могла соделаться действительной, если только предмет молитвы не противен премудрости и благодати Божией и благу молящегося” (Филарет (Дроздов), 1844-1845, с. 103). Во второй главной части, которая занимает самое большое место в этой проповеди, он сперва приводил исторические примеры – молитву пророка Илии, сотника Корнилия и Моисея – и подчеркивал, что молитва, которая во Христе привела к Преображению, должна в нас производить тоже действие. В последнем отделе он призвал христиан к молитве: “Молись о самой молитве, и ты сперва приобретешь молитву истинную и действительную, потом сия все победит с тобою и все тебе приобрящет, возведет тебя на Фавор, или в тебе откроет Фавор; низведет небо в душу твою, и душу твою вознесет на небо” (Филарет (Дроздов), 1844-1845, с. 107). В центре внимания проповедника стоял не праздник Преображения, а молитва, сила которой зависит от благодати Божией, дарованной молящемуся. Проповедь митрополита Филарета была основана на подробном разборе евангельского текста, в котором молитва упоминается.

Таким образом, даже немногие приведенные примеры показывают, насколько весьма разнообразны по содержанию и композиции проповеди митрополита Филарета к отдельным церковным праздникам. Если в одних он обращал внимание на совокупность событий, которые вспоминает Церковь в этот день, то другим он предпосылал цитату из Священного Писания, смысл которой он подробно раскрыл. Одни проповеди делились на четыре части, с возможными подразделениями, между тем другие имели двухчастную или трехчастную структуру.

В словах, сказанных при освещении храмов, Филарет пользовался этим поводом для объяснения принципиального значения храмостроительства или излагал отдельные положения христианского учения, связанные либо со святым, которому посвящен храм, либо с окружением, в котором он стоит – при больнице, при богадельне, при учебном заведении, при кладбище. Например, 12 сентября 1837 г. он произнес слово при освещении храма святой мученицы Татианы при Московском университете. В этом слове он подчеркивал связь между “домом молитвы и домом любомудрии”, объединенными под одной крышей. “Могильному познанию земли” он противопоставлял “животворящие основы мудрости Божией”. В центральной части проповеди, состоящей из пяти отделов, проповедник называл Бога просветителем, источником всякого просвещения, а Христа – светом. Исходя



из этой основы, он предостерегал против неправильно понятого образования, которое легко может привести к высокомерию. Филарет напомнил ученым, что “Господь просвещает разум и сердца блуждающих во тьме земного страдания. Освобождение от мук совести можно получить не философствованием по нашему разуму, но только милостью и праведностью Божией – милостью Бога, просвещающего нас, ослепленных” (Филарет (Дроздов), 1873, с. 68). Заканчивает он эту проповедь обращением к Богу: “Сего ради славлю тебя, Единственный Просветитель, и хотя недостойным гласом, с достойным служителем Твоего вечного просвещения, взываю о Тебе ко всем непросвещенным и просвещенным века сего: приступите к Нему, – благоговеющим умом, верующим сердцем, молящимся духом, послушной волей, приблизьтесь, приступите к Нему и просветитесь, и лица ваша не постыдятся” (с. 68).

### ЯЗЫК ПРОПОВЕДЕЙ МИТРОПОЛИТА ФИЛАРЕТА

Язык проповедей митрополита Филарета – живой русский язык с многочисленными славянскими вставками, прежде всего, в цитатах, но часто и в тексте самой проповеди. Проповедник пользовался множеством поэтических приемов. Например, использовал семантические повторы: “снисходительно со стороны Религии: возблагодарим ее снисхождению. Благоразумно со стороны Науки: похвалим ее благоразумие”. Между этими повторами стоят, выделенные заглавными буквами, семантические элементы данной проповеди – Религия и Наука. Напряжение создавалось антитезой: “Не скажу высочайший мудрец, ибо это наименование было бы низко, о ком теперь думаю” (Филарет (Дроздов), 1873, с. 61). Ознакомление с земными предметами автор сравнил с вхождением в могилу и даже говорил о “могильном познании” и стеклянном познании”. В ряду семантических повторов сначала употребляется слово “царство”, которое сменяется церковнославянским словом “владычество”, а от этого переходит к слову “царствие”. Этим создается сложное переплетение мирских и духовных представлений. В целом у митрополита Филарета прослеживается тенденция употреблять инверсию между существительным и прилагательным, когда он говорит об области духовной так, что она выступает особенно ярко, если употребляется в связи с земными предметами. Например, “от болезней душевных, от смерти духовной”. Этими словами митрополит Филарет подчеркивал свою мысль “о врачебной науке душ”. Инверсия или ее отсутствие в тех местах, где она ожидается, особенно возбуждает читателя или слушателя: “Внимательное исследование священных книг показывает, что Бог являлся в образе существа сотворенного, ангела, человека, но с Божиим именем, с Божеским действием” (с. 61). Инверсия здесь влияет и на ритм, и на смысл. Все значимые по содержанию места подчеркиваются употреблением разных стилистических приемов и попеременным употреблением русских или церковнославянских слов и оборотов. Естественно, что эти приемы менялись в зависимости от содержания и направления проповеди. Примечательно, что изменения, внесенные самим автором в более



поздние издания, свидетельствуют об огромном значении, которое он придавал каждому слову.

## **НУЖДЫ И ДУХОВНЫЕ НЕДУГИ ПАСТВЫ В ПРОПОВЕДЯХ МИТРОПОЛИТА ФИЛАРЕТА**

В проповедях митрополита Филарета разворачивалось не только широкое изложение всего христианского учения, но и его практическое применение к отдельным моментам человеческой жизни, включая обличение пороков современного общества. Проповеди Филарета обращены преимущественно к столичному обществу. Это общество страдало от влияния мистицизма и от влияния западных – католических и протестантских идей. Оно было если не вовсе отчужденным от православия, то все же не достаточно утвержденным в нем.

Как истинный пастырь, митрополит Филарет полагал, что проповедник должен всячески узнать свою паству, прежде всего, ее духовно-нравственное состояние, а также земные потребности. О том, что он старался ознакомиться с нуждами паствы и учесть их при составлении проповеди свидетельствует его обширная переписка и его интерес к современной литературе. В проповедях, произнесенных в сельских местностях, он вполне учитывал их восприятие этой категорией верующих, используя в своей речи народные пословицы и поговорки. Приводя, например, одну из них: “До Бога высоко”, он объясняет, что Бог всегда близок; в другой проповеди митрополит о поговорке “мы люди темные” говорит, что она происходит не от смирения, а от лености” (Филарет (Дроздов), 1873, с. 117).

Во всех своих проповедях митрополит Филарет избегал резких выражений. Так, “В речи к любителям духовного просвещения” он говорил: «Мудрость христианская должна быть кротка. Об этом качестве особенно нужно в настоящее время напоминать имеющим притязание на просвещение. Дух порицания бурно дышит в области русской письменности. Созидает ли дух порицания или разрушает?» (Филарет (Дроздов), 1873, с. 215). Нередко он смягчал резкость своих обличений тем, что обращался непосредственно к слушателям, говоря: “если вам угодно”, “сделайте одолжение”, “прошу не погневаться” и т.п. Этим он одновременно вовлекал слушателей в ход своих мыслей. Духовные недуги современного общества Филарет обличал, не делая их единственным и главным содержанием своей проповеди, но, указывая на события из библейской истории и поведение изображенных там лиц и анализируя эти явления, выявлял поведение и мышление своих современников. Такого рода проповеди он обычно заканчивал фразой из Евангелия от Матфея: “имейя уши слышати да слышит”. Митрополит предоставлял слушателям возможность задумываться о своей жизни и самим обличать себя и указывал направление, согласно которому они призваны продолжать думать и действовать. Таким образом, не бросая вызова, стараясь не ожесточить паству упреками за ее образ жизни, митрополит Филарет стремился развивать в ней на христианской основе нравственное чутье, которое может дать каждому возможность по собственной инициативе направить свой жизненный путь сообразно принципам христианства.





## ЗАКЛЮЧЕНИЕ

Хотя митрополит Филарет ставил Священное Писание и творения святых Отцов в основу своей проповеднической деятельности, но в содержании своих проповедей он развивал значительно более обширную тематику. “Проповеди его невозможно делить на те группы, на которые обыкновенно делят проповеди других проповедников, то есть, на проповеди догматические, нравоучительные, исторические и др.”, – писал Ф. Левашов. На эти группы мы можем делить только общую сумму содержания проповедей Филарета, а не в отдельности его проповеди. В последнем случае нам пришлось бы почти каждую проповедь отнести к каждой группе” (Филарет (Дроздов), 1873, с. 138). Таким образом, проповеди митрополита Филарета ни по содержанию, ни по композиции не подчиняются строгим схемам и не поддаются четкой классификации в соответствии с правилами традиционной гомилетики.

Важно отметить, что полного собрания всех слов и речей Филарета при его жизни не было издано. Эта задача была выполнена только к 1885 г. после длительного поиска по разным журналам. Таким путем было составлено единственное полное собрание слов и речей Московского митрополита в пяти томах, опубликованных с 1873 г. по 1885 г. в Москве. Всего до нашего времени дошло 445 слов, речей и поучений владыки Филарета.

Следует заключить, что митрополит Филарет способствовал оживлению проповеди и высоко поднял ее значение в богослужении. Тематика, подходы к построению и язык его проповедей стали образцом для проповедничества во второй половине XIX в. Благодаря этому – в отличие от предшествующего времени, когда проповедь могла развиваться лишь в весьма узком кругу высших церковных иерархов, – из среды приходского духовенства выделился целый ряд крупных и известных проповедников. Например, протоиереи И. Полисадов (1823-1886) и М. Я. Предтеченский (1833-1883) в Петербурге, протоиерей И.М. Херасков (1836-1901) во Владимире, протоиерей М. И. Разногорский (1839-1892) в Харькове, протоиерей М. А. Поторжинский (1839-1896) в Киеве и др., считавшие митрополита Филарета своим учителем в области проповеднического слова.

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Research article

## AI vs. Human: Translating Cultural Nuances in Naguib Mahfouz's *The Cairo Trilogy*

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### Abstract

This study investigates the performance of the AI translation system ChatGPT in comparison with human translators in rendering culturally embedded expressions from Naguib Mahfouz's *The Cairo Trilogy* into English. Cultural expressions – particularly idioms, metaphors, and religious references – present major challenges to translators, who must interpret meaning not only at the linguistic level but also at the pragmatic, emotional, and socio-cultural levels. Adopting a qualitative content analysis approach, the study conducts a comparison of AI-generated and professionally published human translations. The evaluation employs Baker's equivalence-based framework, assessing semantic accuracy, pragmatic equivalence, cultural adequacy, naturalness, and functional alignment. Through this analytical lens, the study explores how effectively each translator – human or AI – handles the interpretive demands of culturally and pragmatically rich expressions. The findings reveal that while ChatGPT performs well in producing fluent, structurally coherent translations, it frequently struggles with figurative language and culturally specific nuances. These limitations stem from the absence of embodied cultural knowledge and self-evaluative judgement, which are essential for interpreting implicit meanings and cultural resonance. Human translators demonstrate stronger interpretive and cultural sensitivity, particularly in challenging areas such as metaphorical imagery and religious references. The study concludes that although AI systems increasingly contribute to efficient and accessible translation workflows, culturally intricate texts like the *Cairo Trilogy* still require human expertise. A hybrid human – AI translation model, therefore, emerges as the most effective approach for balancing efficiency with cultural and pragmatic depth.

**Keywords:** Translation strategies; AI; ChatGPT; Literary translation; Cultural nuances; Pragmatics

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Научная статья

## Искусственный интеллект против человека: Перевод культурных нюансов в “Каирской трилогии” Нагиба Махфуза

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### Аннотация

В данном исследовании изучается эффективность системы перевода на основе искусственного интеллекта ChatGPT в сравнении с переводчиками-людьми при переводе на английский язык выражений, имеющих культурную подоплёку, из “Каирской трилогии” Нагиба Махфуза. Культурные выражения – в частности, идиомы, метафоры и религиозные отсылки – представляют собой серьёзную проблему для переводчиков, которым необходимо интерпретировать смысл не только на лингвистическом уровне, но и на прагматическом, эмоциональном и социокультурном уровнях. С помощью качественного контент-анализа в исследовании проводится сравнение переводов, выполненных искусственным интеллектом, и профессионально опубликованных переводов, выполненных людьми. В оценке используется основанная на эквивалентности модель Бейкера, оценивающая семантическую точность, прагматическую эквивалентность, культурную адекватность, естественность и функциональное соответствие. Через эту аналитическую призму исследование изучает, насколько эффективно каждый переводчик – человек или ИИ – справляется с интерпретационными требованиями культурно и прагматически богатых выражений. Результаты показывают, что, хотя ChatGPT хорошо справляется с созданием беглых, структурно связанных переводов, но часто испытывает трудности с образным языком и культурно специфическими нюансами. Эти ограничения обусловлены отсутствием воплощенных культурных знаний и способности к самооценке, которые необходимы для интерпретации скрытых смыслов и культурного резонанса. Переводчики-люди демонстрируют более высокую интерпретационную и культурную чувствительность, особенно в сложных областях, таких как метафорические образы и религиозные отсылки. Исследование приходит к выводу, что, хотя системы ИИ все больше способствуют эффективным и доступным процессам перевода, культурно сложные тексты, такие как “Каирская трилогия”, по-прежнему требуют экспертных знаний человека. Таким образом, гибридная модель перевода, сочетающая человека и ИИ, представляется наиболее эффективным подходом для достижения баланса между эффективностью и культурной и прагматической глубиной.

**Ключевые слова:** Стратегии перевода; Искусственный интеллект; ChatGPT; Художественный перевод; Культурные нюансы; Прагматика

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## INTRODUCTION

Language is a tool for communicating, understanding, building relationships, and creating a sense of belonging. It is accepted that all languages have culturally distinctive expressions, and they serve an important function. These expressions are actually difficult to translate since the translator needs to be sufficiently knowledgeable of both languages and cultures, as well as be able to recognize and handle unforeseen problems while translating and matching interlingual cultural pairs. Both English and Arabic have cultural and ideological components that influence how meaning is communicated. It's challenging to accurately convey the meaning of preset statements without considering translation concerns. The difficulty is that these manifestations were formed by religious or cultural ideas. These words are exclusive to a language and culture, making them incomprehensible to others. Language and culture are intrinsically intertwined. A high-quality translation from a linguistic and cultural standpoint involves incorporating figurative meanings to recreate the original beauty of cultural pieces (Al-Jabri et al., 2021).

Translating cultural elements between English and Arabic is complex. The task becomes even harder with literature because these works often use language strongly linked to their culture, which makes translation quite challenging. Books and poems frequently use expressions and references unique to their cultural and social contexts. Translators must skilfully manage these cultural aspects to preserve the original meaning and tone of the text. This requires a deep understanding of both the language and the cultural background, making the task both demanding and fascinating. For example, texts such as Naguib Mahfouz' Cairo Trilogy are rich in cultural references, idiomatic expressions and social contexts which are intricate within the Egyptian society and the Arabic culture. These cultural dimensions normally convey denotative or emotive meanings which lack corresponding equivalents in the target language. Translating such elements, therefore, exceeds the task of finding linguistic equivalents to understanding the deeper cultural meanings that influence language.

According to Mona Baker (2006), translation is not merely converting texts into other languages, it is also understanding the socio-cultural structure behind them. With respect to *The Cairo Trilogy*, the translator has to go beyond looking at the surface meaning of the word to its historical, political, and social aspects within which the characters interact. The task of preserving linguistic integrity and cultural contextualisation thus becomes a great challenge for the translator, especially when these cultural nuances are unfamiliar to the target readers. Although recent translation technologies such as AI systems are trained to deal with a wide variety of texts, they may demonstrate more satisfying results tackling a more straightforward translation project, than dealing with the complexities of cross-cultural nuances embedded in such literary texts (McCorduck, 2004). The process of translating cultural expressions in Mahfouz's trilogy underscores the complexities which require human understanding and cross cultural comprehension in the process of translation.

The purpose of this research paper is to examine the efficiency with which ChatGPT translates Arabic cultural expressions from Mahfouz's *Cairo Trilogy*. It aims to compare the translations produced by AI with those completed by human translators in order to



assess how both human and AI translators approach the task of translating these expressions into English. The study's outcomes will shed light on ChatGPT's advantages and disadvantages in capturing the linguistic features as well as the subtle cultural and emotional connotations conveyed in the selected expressions. Through this comparison, the study aims to assess how well AI translation systems can match the benchmarks set by qualified human translators and pinpoint the enhancements required to improve their cultural competency in translation. The findings of this research will contribute to the broader debate on machine translation's potential to assist, or possibly replace, human translators in certain situations. Additionally, it will provide important viewpoints on the role of AI in translating not just words, but the rich, culturally important expressions.

### Objectives of the Study

This study attempts to evaluate how well AI systems such as ChatGPT translate Arabic cultural expressions from *The Cairo Trilogy* into English by examining how well these translations fit the pragmatic and cultural context of the original text. It assesses how well AI satisfies the standards set by human translators by contrasting its translations with those of human translators paying particular attention to how each handles idioms, social references, and culturally embedded language. Additionally, the study aims to indicate areas where AI could be further developed to improve its cultural competence in translation as well as the strengths and limitations of AI translation systems in maintaining the emotional and cultural nuances of Arabic expressions.

The study aims to answer the following question:

1. How accurately do AI systems like ChatGPT translate Arabic cultural expressions from *The Cairo Trilogy* compared to human translators?
2. How well do AI translation systems capture the cultural and emotional nuances of Arabic expressions from *The Cairo Trilogy*?
3. What are the strengths and limitations of AI in translating culturally rich Arabic expressions, and how can it be improved?

## LITERATURE REVIEW

### Culture and Translation: The Role of Skopos Theory

The concept of culture is crucial to translation studies because it has a basic impact on how language is used and understood in various communities. Culture is that complex whole that includes all of the skills, information, and beliefs that individuals develop while belonging to a society. As a result, culture includes a wide range of traits that together form the unique fabric of every civilization, including social heritage, beliefs, customs, values, traditions, and language.

As Peter Newmark (1988) observes, culture is profoundly ingrained in a group's lifestyle, which is articulated through the language they employ. According to Newmark (1988), foreign cultural expressions are classified into three types: ecological, material, and social. These categories include social organizations, politics, religion, art, gestures, and habits. Proverbs, collocations, phrasal verbs, and figures of speech (such as metaphors) are all examples of cultural expressions. Translating literature with cultural



characteristics is difficult since translators must comprehend both the original and target cultures.

Baker (1992) broadens the definition of culture, describing it as a multidimensional combination of elements – including history, religious beliefs, and social institutions – that impact individual relationships within a society. These cultural components provide significant obstacles in translating, especially when it comes to rendering expressions that are strongly embedded in a source culture. In her book, *In Other Words*, Baker (2011) suggests that SL expressions can convey concepts that are unfamiliar in TL society, whether abstract or tangible. It could be a religious belief, a social norm, or simply a sort of food. Baker identified common non-equivalents in translating from SL to TL, as both languages have unique cultural expressions. She arranged them in the following sequence. a) Culture-specific expressions, b) Unlexicalized SL expressions, c) Semantically complex SL expressions, d) Different meaning distinctions, e) Lack of top ranking, f) Lack of a specific expression, g) Physical differences, h) Dissimilarities in expressive meaning, i) Dissimilarities in form, j) Dissimilarities in frequency and tendency of using specific forms, k) The use of loan words in the SL.

Olive Classe (2000) makes the assumption that cultural differences between SL and TL could result in translation loss because certain contextual elements have characteristics unique to SL culture that are absent from TL culture. These characteristics are peculiar habits or lifestyles of specific individuals that are not mentioned in the target language. Skopos Theory, developed by Katharina Reiss and Hans Vermeer in 1984, offers significant insight into translation practices; this approach posits that a translation must extend beyond merely aligning words and phrases across languages; it should consider the role the translated text will play in the target culture. Translators need to make sure that the translated material is easy to understand for those who will read it. The term "Skopos," which comes from a Greek word for "purpose," highlights that translation decisions should align with the audience's goals and cultural background. This involves thinking about who the readers are and what the translation aims to achieve, so it is clear and culturally appropriate for them. Translating books such as Naguib Mahfouz's *Cairo Trilogy* involves more than just switching words between languages. A translator needs to convey the cultural essence of the work. According to Skopos Theory, translations should capture not only the words but also the work's purpose and tone. This task is challenging because it is hard to grasp all the subtle details.

The Skopos Theory offers further valuable context for conceptualising the evaluation of AI translations, like that of any contents produced by ChatGPT, because it looks at how cultural expressions are evaluated. However, although AI systems can provide speedy translation of individual words and phrases into another language, they do not always reflect the cultural and emotional nuances to culture-bound phrases. As an example, AI might output the literal version of an idiom or culturally relevant phrase, without preserving the emotional value of the original resonance that a human translator might be familiar with. Cultural sensitivity is an integral component not only in an overall translation but particularly in translating a culture-bound expression (Baker, 2006); hence, AI systems still need to be refined when it comes to resolve the nuances of a language that come to a human translator as a second nature.





Hans Vermeer (1996) expands on Skopos Theory by emphasizing that translation should be guided by the needs and cultural context of the target audience. This perspective is key to making sure that AI translations of *The Cairo Trilogy* are not just accurate linguistically, but also culturally meaningful and emotionally engaging for English-speaking readers. Based on this, the current research draws on Skopos Theory as its foundation.

### **Categories of Cultural Expressions in Translation**

Cultural expressions, as explained earlier, are an essential component of translation studies. However, transferring them into another culture cannot be done by just mastering the language; it is required that a translator is equipped by a deep understanding of the culture, history, and social context that shape these words (Valencia & Asmarani, 2016). Scholars have proposed different ways to categorize these expressions, focusing on their unique aspect of culture which poses a challenge to translators. These categories can be helpful to translators, guiding them to choose the right strategies for dealing with cultural differences. In the following sections, some of these categories will be explored using insights from important translation models.

#### **Cultural Referents**

Cultural referents are words or ideas that are specific to a culture, such as traditions, historical events, or landmarks. Translators often find these challenging because the culture they are translating into might not have a direct equivalent. For instance, the Arabic word "iftar" describes the meal Muslims eat at sunset to break their fast during Ramadan, and it doesn't have a direct match in many Western cultures. Newmark (1988) explores methods for translating cultural concepts. One approach is substitution (which involves replacing a term with a similar one that aligns with the target culture). Another approach is paraphrasing, because it means explaining the idea in different words. Baker (2006) emphasizes the significance of understanding cultural references during translation; she points out that grasping these references is crucial for preserving the meaning and impact of the original text. However, this can be a challenging task. Although this is the case, translators must navigate these complexities.

#### **Idiomatic Expressions**

Idioms and cultural expressions are a collection of words that cannot be predicted based on their individual meanings. For example, the English idiom "kick the bucket" means "to die". Arabic speakers would not be able to understand the meaning of this idiom if translated literally into يركل الدلو. Given these explanations, it is clear that theorists and translators are extremely concerned with the transmission of cultural words and ideologies.

Because the methods translators employ to convey the text might result in differences in translation and can represent various ideological viewpoints, they perceive the process of translation as a delicate endeavor. This implies that a translator must be



bicultural rather than bilingual and use caution when translating such a work (Dweik & Suleiman, 2013). Furthermore, Yameng Zhang (2020) explains that translators must be equipped with pragmatic skills to be able to understand the literal and figurative meaning of idiomatic expressions and how they function in their cultural context.

### **Cultural and Religious Expressions**

Religion and language are closely connected, often serving to bring people together. In other words, those who speak the same language tend to share a stronger bond than those who do not understand each other's language (Young, 2001). Understanding and translating religious expressions can be particularly challenging, especially when the translator is not deeply familiar with the cultural or religious context. In some cases, a translator may misinterpret the meaning of a text, especially if it is not in their native language. Religious expressions pose unique challenges because, as Myron Lustig and Jolene Koester (2003, p. 16) point out, "religion is an important institutional network that binds people to one another."

Moreover, religious expressions are deeply rooted in the Arabic culture. Religious expressions are used "in a variety of forms, and in private and public settings, as wishes, offers of congratulations, greetings, farewell and gratitude expressions, curses and other forms" (Al-Rojaie, 2021, p. 3). Thus, translators must be sensitive to the differences between Arabic and Western cultural beliefs and concepts. Arabic and English also have distinct grammatical structures and religious terminology, with each language containing its own set of religious expressions. In fact, the religious terminology in one language may carry different meanings than the same term in another language. This lack of direct correspondence between religious expressions further complicates the translator's task. Religious writings can be interpreted in two different ways, according to Eugen Nida (1964): first, as texts that speak to a community's historical or current religious beliefs; and second, as texts that are essential to the formation and maintenance of a believing community. Nida (1964) underlines that translators should interpret a text's meaning through the eyes of the believing community, which recognizes its authenticity and strongly values its relevance to their beliefs and practices.

### **Cultural Humor and Irony**

Irony and humor present another challenge to translators since they rely significantly on shared experiences, social norms, and cultural knowledge. In some cultural contexts, the Arabic term "مساكين هؤلاء" (the sad souls, these) can imply irony or ridicule. If the target audience is unfamiliar with the cultural context, the subtleties may be lost during translation. Humor usually employs subtle cultural cues; therefore, appreciating it requires knowledge of both the cultural context and the linguistic forms used. According to Hurtado Albir (2001), in order to preserve sarcasm or comedy, translators may need to replace culturally particular references with ones appropriate in the target culture; if this is not possible, an explanation may be required.



### **Metaphors and Symbolic Expressions**

Metaphors and symbolic expressions can sometimes present serious challenges for translators. James Dickins (2005, p. 228) indicates that metaphor is “a figure of speech in which a word or phrase is used in a non-basic sense, this non-basic sense suggesting a likeness or analogy (whether real or not [...]) with another more basic sense of the same word or phrase.” These expressions usually have several interpretations that are influenced by cultural concepts and social conventions. According to George Lakoff and Mark Johnson (1980), metaphors are often rooted in cultural experience and have an impact on our conceptual thinking. For example, according to the target culture, the Arabic metaphor "بحر من الدم" (a sea of blood) may refer to a gory battle, however its exact meaning may differ. It is essential to comprehend these cultural peculiarities in metaphors and ensure that their meaning and emotional impact are preserved in the target language during translation. Translators may need to alter or reinterpret the metaphor to ensure its emotional relevance in the target culture.

### **Everyday Objects and Practices**

Everyday objects and practices also reflect cultural identity and provide insight into a society's lifestyle. These include terms related to food, clothing, tools, and rituals. Lawrence Venuti (2008) emphasizes that translating these expressions requires not only linguistic knowledge but also an understanding of how such objects and practices fit within their cultural context. For instance, "مخبز" (bakery) in Arabic culture is not just a place where bread is baked but a site embedded in specific cultural traditions. Mark Shuttleworth and Moira Cowie (2014) argue that translating such expressions often requires either substitution with culturally appropriate terms or detailed explanations to preserve the practice's significance in the target culture.

### **Artificial Intelligence and Translation**

Machine translation (MT) is the use of artificial intelligence (AI) and machine learning algorithms to translate one language to another. MT is an essential AI application that has grown in popularity in recent years due to advances in natural language processing (NLP) and deep learning techniques (Lauriola et al., 2022). AI-based machine translation has become an effective tool for organizations, governments, and individuals to connect with people all over the world (Hager et al., 2017). In the late 1940s and early 1950s, researchers from the United States and Europe made the first documented attempts at machine translation.

Among the most innovative language uses of AI are translation and interpretation. Translating between two languages, such as Arabic and English, has historically been quite challenging because of differences in syntax, grammar, and cultural idioms (Ali et al., 2012; Al-Jarf, 2022; Banikalef & Naser, 2019). Machine translation (MT) has evolved greatly with AI, and tools are now available to help bridge these linguistic and cultural differences more effectively than ever before (AlAfnan, 2024). AI-powered translation systems, particularly those based on NMT, have the potential to eliminate language



barriers in a wide range of contexts, including media, education, trade, and diplomacy. Even while AI provides groundbreaking solutions, there are still issues with accuracy, context, and nuance in Arabic-to-English translations.

Neural Machine Translation (NMT) marks a major advancement in the translation capabilities of artificial intelligence (Siu, 2024). In contrast to traditional rule-based or statistical translation approaches, NMT employs deep learning algorithms to interpret entire sentences as cohesive units, enabling the AI to better understand context and generate more fluent translations (Mandal et al., 2020). This method proves effective when the languages involved in translation are structurally distinct such as the case with Arabic and English. While Arabic language is characterized by a complicated morphological system in which word roots are reinforced by prefixes, suffixes, and suffixes that express meaning, English is known for its relatively basic morphology and flexible sentence construction; NMT systems, such as those used by Google Translate and DeepL, considerably improve the ability to manage these linguistic complexities.

Despite the fast advancements in AI-powered translation, the current research paper points out that some problems still persist. One difficulty is to ensure training AI systems on high-quality, diversified datasets that capture the complete cultural nuances in Arabic and English. While AI has enhanced translation accuracy and efficiency, human translators are still crucial, particularly for complex texts like literature that require cultural insight. AI is effective with routine and large-scale translations, but it is human translators who bring essential context, subtlety, and cultural awareness to ensure meaningful communication. Although AI performs well in many cases, it does not match the deep understanding that human translators have. Thus, both AI and human translators are needed.

In November 2022, OpenAI released the AI chatbot ChatGPT, initially based on the GPT-3 series of large language models. Since its launch, it has been improved using supervised and reinforcement learning methods. Originally designed for use in conversational applications such as chatbots and messaging systems, ChatGPT has evolved from the GPT-3.5 model that completed training in early 2022. Recent upgrades led to the release of GPT-4, the latest version in OpenAI's deep learning scaling initiative. GPT-4 is a large multimodal model that processes both text and image inputs, producing text outputs. Although it is still less capable than humans in many real-world tasks, GPT-4 performs at a human-like level on various academic and professional benchmarks.

Although AI increasingly produces fluent translations, scholars of embodied cognition argue that understanding culture requires lived experience (Lakoff & Johnson, 1980). Cultural expressions often rely on embodied emotions, social practices, and tacit knowledge that cannot be fully encoded in training data. Moreover, AI cannot evaluate its own translations pragmatically, nor does it possess experiential grounding. Thus, certain dimensions of cultural – pragmatic judgment remain tied to human embodiment.

## METHODOLOGY

This study investigates how cultural expressions from Naguib Mahfouz's *The Cairo Trilogy* are translated from Arabic to English. It compares translations by ChatGPT with those by human translators to see how well AI handles these expressions. Literary works



often have deep cultural meanings. While AI translations can be effective, human translators catch subtle details better. Even though AI has made a great process in translation, this research aims to indicate where AI still needs improvement in some areas.

This study employs a purely qualitative research design, as its primary aim is to analyse culturally embedded expressions and their pragmatic functions within literary translation. Because the phenomena under investigation – cultural nuance, figurative meaning, and translator decision-making – are inherently interpretive, the study does not incorporate quantitative measurements or statistical analysis. Instead, it relies on close textual reading, thematic coding, and comparative interpretation to evaluate the differences between AI-generated and human translations.

### **The Cairo Trilogy**

The Cairo Trilogy (authored by Naguib Mahfouz) is essential to modern Arabic literature; it includes three novels: "Palace Walk," "Palace of Desire," and "Sugar Street." These books narrate a story of (the) al-Jawad family living in Egypt during the early 1900s. They delve into themes such as power struggles, family relationships and societal changes. A key figure in the story – Ahmad al-Jawad – represents the clash between traditional values and modern ideas. However, this offers a view into the cultural (and political) scene of Cairo at that time, although it reflects complexities that remain relevant today. The trilogy is renowned for its rich storytelling and depth, and it played a crucial role in Naguib Mahfouz being awarded the Nobel Prize in Literature in 1988. The Arabic version of *Palace Walk* came out in 1956 with the title *Bayn-al-Qasrayn*. *Palace of Desire* followed in 1957, first published in Arabic as *Qasr al-Shawq*. The third book in the series, *Sugar Street*, was also originally published in Arabic in 1957 under the title *al-Sukkariyya*. The English-language translation of *Palace Walk* was completed by William Maynard Hutchins and Olive E. Kenny. The translation of *Palace of Desire* was undertaken by William Maynard Hutchins, Lorne M. Kenny, and Olive E. Kenny. *Sugar Street* was translated into English by William Maynard Hutchins and Angele Botros Samaan.

### **ChatGPT**

The study will use translations produced by ChatGPT, a computer program from the company OpenAI, which came out in November 2022. ChatGPT is built on the GPT-3 series of language models that were developed in 2020 by Brown and other researchers. It was originally intended for use in chat applications, such as chatbots and messaging services. Over time, it has improved through techniques known as supervised learning and reinforcement learning, which were detailed by Radford and other researchers in 2019. The first version used a model from the GPT-3.5 series, which finished training in early 2022. Recently, ChatGPT was upgraded to GPT-4, which marks a major advancement in OpenAI's work in deep learning, according to OpenAI in 2023. GPT-4 is a large model that can process both text and images and generates text outputs. While it still doesn't quite reach human abilities in many real-world tasks, GPT-4 has shown it can perform at human levels in several academic and professional areas, as noted by OpenAI in 2023.





All AI-generated translations in this study were produced using ChatGPT (GPT-4), accessed in March 2025, ensuring consistency across all outputs. To maintain methodological transparency and reproducibility, the same standardized prompt was used for every excerpt:

*"Translate the following Arabic passage into English, paying careful attention to cultural expressions, pragmatic meaning, and figurative language."*

This controlled prompt design minimizes variability in the model's responses that could arise from changes in instructions or contextual cues.

To reduce researcher bias and ensure that the dataset reflected the system's default, unoptimized performance, only the first output generated by the model for each excerpt was considered. No iterative prompting, regeneration, or ranking of alternative outputs was conducted. This choice follows established best practices in machine-translation evaluation, where repeated querying can introduce subjective selection effects and undermine the reliability of comparative analysis.

#### **Data Selection**

The study will draw its primary data from *The Cairo Trilogy* by Naguib Mahfouz. This series is abundant in cultural expressions and social references depicting Egyptian life. The research will concentrate on specific Arabic cultural expressions within the trilogy, particularly those that are challenging to translate into other languages. These expressions will encompass a range of cultural referents, idiomatic phrases, social practices, and religious or spiritual references that are inherently tied to Egyptian society and the Arabic language. The goal is to examine how these expressions are handled by both AI and human translators and assess the extent to which each translation preserves the original's cultural and emotional resonance.

The human translations used for comparison, as explained earlier, are the officially published English translations of the *Cairo Trilogy* by William Maynard Hutchins, Olive E. Kenny, Lorne M. Kenny, and Angele Botros Samaan between 1956-1957. These translations were selected because they are the canonical English editions, produced by professional translators and widely recognized in scholarship.

#### **Translation Methods and Evaluation Criteria**

To compare how AI and human translators handle the cultural expressions of the text, two sets of translations will be analyzed: AI Translations using the latest version of OpenAI's ChatGPT, and Human Translations produced by professional translators. The current research paper aims to evaluate the accuracy of AI translations of Arabic literary texts. It places a special focus on how AI handles social and cultural aspects, including idioms and religious phrases that are unique to Arabic culture. Additionally, it compares these AI translations to those done by human translators to evaluate the similarities and differences in handling these unique aspects. Understanding cultural expressions needs a grasp of their cultural background. This evaluation aims to see if AI can accurately translate references or sayings specific to a culture without changing their meaning. It also examines human translations to evaluate how well they preserve these cultural aspects.



This study adopts a qualitative content analysis approach, which is well suited to examining nuanced linguistic and cultural features embedded in literary texts. The method emphasizes the systematic identification, coding, and interpretation of meaningful units of data – in this case, Arabic cultural expressions that pose translation challenges. The excerpts were selected through purposive sampling, a strategy commonly used in qualitative translation studies to isolate segments that are information-rich and analytically relevant. Priority was given to expressions with high pragmatic load, dense cultural or religious connotations, and figurative meaning – features that are most likely to expose differences between human and AI translation performance. This purposive selection ensures that the analysis focuses on segments where translation decisions carry significant semantic and cultural implications rather than on routine or literal passages.

Each selected excerpt was then coded deductively using a predefined category system comprising three analytical domains:

1. Religious expressions,
2. Idiomatic expressions, and
3. Metaphors and figurative language.

These categories derive from established classifications in translation studies (e.g., Baker 2011; Newmark 1988) and reflect recurrent challenges documented in Arabic – English translation scholarship. Coding the data in this structured way enables the researcher to trace patterns in how ChatGPT and human translators handle different expression types.

To evaluate whether one translation can be considered superior to another, this study adopts a set of criteria grounded in Baker's (1992, 2011) typology of equivalence and widely applied in translation studies. These include semantic accuracy (correspondence of propositional meaning), pragmatic equivalence (the preservation of intended illocutionary force and implicature), cultural adequacy (alignment with the socio-cultural context encoded in the source text), naturalness and fluency in the target language, and functional alignment with the Skopos of the translation. Within this framework, "capturing cultural valence" is not treated as the sole marker of translation quality; rather, it forms an integral component of both pragmatic equivalence and cultural adequacy as defined by Baker. A translation is therefore considered "better" when it maintains the denotative meaning of the source text while also reproducing its culturally embedded connotations, emotional resonance, and communicative intent in a manner that is linguistically natural and contextually appropriate for the target readership.

### DATA ANALYSIS

This analysis explores the translations of ChatGPT and human translators when dealing with Arabic cultural expressions drawn from Naguib Mahfouz's *The Cairo Trilogy* into English. It aims to evaluate the quality of the English translations produced by ChatGPT when processing Arabic idiomatic and religious expressions in the context of literary texts. The accuracy and cultural sensitivity of the English translations will be compared to the original Arabic text as well as the English translations produced by human translators. These expressions are deeply rooted in Arabic culture, history, and society, which makes them challenging for translators, especially when direct English equivalents are not available.



The study investigates how translations by AI measure up against those by professional human translators. This analysis reveals the strengths and weaknesses of AI, especially in maintaining cultural and emotional meanings. By comparing AI and human translations directly, the study seeks to determine how well AI can reproduce the cultural and practical elements of the original Arabic text. This section also explores how well AI systems handle idiomatic phrases, culture-specific references, and social dynamics embedded in Mahfouz's work. The findings aim to highlight areas where AI translation has succeeded in capturing the intended meaning and areas where further development is needed to enhance its cultural competence.

The examples will be categorised into three sections: religious expressions, idiomatic expressions, and metaphors.

### Religious Expressions

#### Example 1

وبين هذا وذاك تسجع في باطنه أنغام حلوة لطيفة مما تردد في المجلس السعيد فذهب معها وجاء وهتف وراءها من أعماق قلبه: "آه الله أكبر" هذا الغناء الذي يحبه كما يحب الشراب والضحك والصحاب.

*ChatGPT:* Between this and that, sweet and gentle melodies resonate within him, echoing from the joyful gathering. He followed them, coming and going, and cried out from the depths of his heart: 'Ah, Allah is the Greatest.' This song he loves, just as he loves drink, laughter, and companions."

*Human translator:* Now and then some of the sweet, catchy tunes that were sung at their happy parties ran through his head. He abandoned himself to them and sighed, as they drifted away from him, "God is most great." He loved the singing as much as the drink, laughter, companions.

"الله أكبر", translating to "God is the Greatest," is a well-known Arabic phrase used in many contexts. It is common in religious ceremonies, at celebrations, and during times of strong emotion. The phrase serves as both a formal prayer and a spontaneous expression of amazement or deep feeling. The phrase "الله أكبر" expresses strong feelings such as happiness or excitement. For example, Ahmad Abdujawwad remembers good times with friends, enjoying drinks and music he loves. He uses this phrase to convey the joy the music brings him. The translations "Ah, Allah is the Greatest" and "God is most great" produced by AI and human translators, however, emphasize the religious aspect of the Arabic phrase failing to capture the character's joy and emotional release. A more fitting translation might be "Oh my God," because it conveys similar feelings of joy or surprise (much like the phrase "الله أكبر").

#### Example 2

وأخيراً تساءل دون أن يرفع رأسه عن فنجان القهوة الفارغ: استرددت صحتك؟ فقالت أمينة بصوت خفيض: الحمد لله يا سيدي.

*ChatGPT:* Finally, he asked without lifting his head about the empty coffee cup: 'Have you regained your health?' Amina said in a soft voice: 'Praise be to God, sir.'



*Human translator:* Finally, without raising his head from his empty coffee cup, he asked, "Have you recovered?" Amina replied in a subdued voice, "Yes, sir, praise God."

The Arabic phrase "الحمد لله" translates to "Praise be to God" or "Thanks to God" in English. People who speak Arabic use it in various situations to express gratitude and recognize their circumstances, beyond just religious settings. For instance, Amina said "الحمد لله" to express her thankfulness for feeling healthier. While translations like "Praise be to God" or "Praise God" convey the meaning, the human translator added "Yes, sir," which emphasizes Amina's acknowledgment of her improved health. However, the AI translation misses the deeper significance of the phrase in this particular context.

### Example 3

فجرى بصره على جسمها في عجلة ونهم كما يجري الفأر على جوال أرز ليجد لنفسه منفذاً، وقال  
بإعجاب: بسم الله ما شاء الله! فواصلت تقدمها بعد التوقف باسمه وهي تقول في خوف مصطنع:  
عينك! ... أعوذ بالله!

*ChatGPT:* "His gaze hurriedly and greedily scanned her body, like a mouse running over a sack of rice to find a way out. He said with admiration: 'In the name of God, what God wills!' She continued moving forward after stopping, smiling, and saying in feigned fear: 'Your eye! ... I seek refuge in God!'"

*Human translation:* His eyes ran over her body as quickly and greedily as a mouse on a sack of rice looking for a place to get in. He said admiringly, "In the name of God. God's will be done." After her pause, she continued to advance, smiling. She said with pretended fear, "Your eye! God protect me from it."

The phrase "بسم الله ما شاء الله" translates to "In the name of God, what God wills" or "God has willed it." It is a widely used Arabic expression to convey wonder or admiration when witnessing something beautiful or extraordinary. It shows respect for remarkable things. The phrase "أعوذ بالله" means "I take refuge in God" or "I seek refuge in God." People use it to request protection from danger, evil, or threats like the "evil eye." When someone feels vulnerable or scared, they say it to seek God's help against negative things, including jealousy and hostility.

The English translations of the Arabic phrases بسم الله ما شاء الله and أعوذ بالله produced by ChatGPT reflect the literal meanings of the phrases missing the richer feelings and subtleties. Human translators, however, resorted to the strategy of addition for the first phrase as they included words like "with admiration" to explain that this phrase is used to express admiration. In the second translation, they resorted to paraphrase to express the original emotions and intentions embedded in the second phrase أعوذ بالله reflecting a deep understanding of the context. The translation flows naturally and smoothly, providing a deeper understanding of the message and appears emotionally connected to the context, capturing the woman's concern in a more intimate, natural way. Thus, human translations capture cultural and emotional nuances more effectively, making religious expressions sound natural in English while preserving their protective and respectful meanings. In contrast, AI translations miss the emotional depth that human translations provide.

### Example 4

كنت قبيل حضورك أتذكر منظر الفار وهو يرقص الله يقطع.



*ChatGPT:* I was just about to recall the sight of the mouse dancing, may God cut it off, before you arrived.

*Human translator:* Just before you arrived I was remembering last night and what al-Far looked dancing. May God strike him down.

The Arabic expression "الله يقطعه" translates to "May God cut him off," but in casual discourse especially amongst friends, it conveys a desire for someone to be dealt with in a notably strong or dramatic fashion. This phrase is frequently employed humorously, sarcastically, or when an individual feels a touch of annoyance, depending on the context. In such instances, it is designed to elicit laughter. The speaker is not genuinely irate; rather, they utilize this expression in a light-hearted manner to convey mild irritation or amusement – much like when they observe "الفار" (al-Far) engaging in a dance.

When ChatGPT translates it to "May God cut it off," the fundamental meaning remains intact; however, the humor and irony dissipate. The translation may also cause confusion to the target audience who are not aware of the pragmatic function of this expression. In English, "cut it off" comes across as excessively serious, which leads to a misinterpretation of the intended context. Furthermore, by transforming a clever joke about a human into an odd reference to an animal, the term "mouse" causes confusion. "May God strike him down" more successfully expresses the intended sarcasm. Even while it is still a powerful term, it is more appropriate for the humorous goal, particularly when used to refer to a specific individual.

#### Example 5

فَقَالَتْ خَدِيجَةُ، وَهِيَ تَبْسُطُ رَاحَةَ يُمْنَاهَا فِي وَجْهِهِ مَفْرَجَةً بَيْنَ أَصَابِعِهَا الْخَمْسِ: وَمِنْ شَرِّ حَاسِدٍ إِذَا حَسَدَ!

*ChatGPT:* Khadija said, as she extended the palm of her right hand towards him, spreading her five fingers: 'And from the evil of the envious when he envies!'

*Human translator:* To ward off the evil eye, Khadija spread her fingers apart and held up her hand with the palm facing Yasin, reciting, "And from the evil of the envious person in his envy" (Qur'an 113:5).

The phrase "ومن شر حاسد إذا حسد" translates to "And from the evil of the envious when he envies." This is a verse from the Qur'an – specifically Surah Al-Falaq, verse 113:5. It serves as a prayer asking for protection from harm; particularly, harm that arises from envy. People often recite this verse to seek safety from negative emotions or harmful intentions that others might have toward them. It underscores the importance of turning to a higher power for protection against jealousy and ill will. The phrase invokes the idea of seeking refuge from the harm caused by someone's jealousy, which in Arabic culture is often believed to have the power to cause misfortune, illness, or other negative consequences.

The phrase is translated correctly by ChatGPT; however, it does not provide much significant additional context that could aid an English-speaking audience in understanding the cultural relevance or religious context. The phrase "the envious when he envies" derives directly from Arabic; however, it lacks essential spiritual and cultural nuances, which diminishes its ritual significance – such as its role in providing protection





against the evil eye. A human translator effectively incorporates cultural context by adding where this phrase comes from- Surah Al-Falaq in the Qur'an (verse 113:5), a frequently overlooked detail that is crucial for understanding these customs.

#### Example 6

فأدركت خديجة ما وراء كلامه من التعريض بها، وقالت له وهي تهز كتفها متظاهرة بالاستهانة:  
وَقَالَ يَسْعَى بَوَاقِيَةَ بَيْنَ أُخْتَيْنِ  
– أنا؟ حسبي الله، فهو المطلع على حسن نيتي.

*ChatGPT:* Khadija realized the insinuation behind his words, and said to him while shrugging her shoulders, pretending to disregard him: 'A backbiter who seeks to create discord between two sisters?'  
– Me? God is sufficient for me, for He knows the purity of my intentions.

*Human translator:* she scolded him: “A troublemaker is trying to stir up dissension between two sisters.

Me?...God forbid. God knows my intentions are good.

The phrase "حسبي الله," which translates to "God is sufficient for me," holds great importance in Arabic culture. People often say it when they feel unfairly treated or misunderstood, asking for God's help and justice. This expression shows a belief in a higher power capable of fixing wrongs and dealing with false accusations. When someone says "حسبي الله," they are trusting that God will make things right, offering support and fairness during difficult times. Although the English version produced by ChatGPT "God is sufficient for me" suggests dependence on God and a declaration of innocence, it does not fully capture the intense emotions conveyed by the original Arabic expression. In Arabic, the phrase emphasizes how Khadija defends herself and her belief in God's fairness when she faces accusations. The human translation “God forbid; God knows my intentions are good.” reflects the defensive essence of the Arabic phrase “حسبي الله.” It communicates God's awareness and fairness; remaining true to the original, it highlights self-defense and honesty.

### Idiomatic Expressions

#### Example 1

عثمان: ألم لا يوجدان في بيت واحد مثل بابا وماما...؟  
رضوان: القسمة والنصيب، هذا ما تقوله جدتي الأخرى.

*ChatGPT:* Othman: "Why don't they live in the same house like Papa and Mama...?"  
Radwan: "It's fate and destiny, that's what my other grandmother says."

*Human translator:* Uthman: “Why aren't they in one house like my papa and mama?”

Ridwan: “Fate and destiny. That's what my other grandmother says.

The Arabic saying "قسمة ونصيب" which translates to "fate and destiny" in English illustrates situations that are beyond our control; suggesting they are dictated by fate or a superior force. In Arab cultures, individuals frequently employ this phrase when discussing relationships – marriage or circumstances – where they perceive a lack of agency. However, this expression captures an existential truth, for it reflects a belief in the inevitable nature of life's outcomes. Although some may argue otherwise, the



sentiment remains deeply ingrained in the social fabric of these cultures, because it encapsulates the struggle between personal choice and external influences. Such a concept provides rationale for why events may not unfold as anticipated, particularly in instances of breakups, love, or aspirations that remain unrealized. However, although "fate and destiny" serves as an accurate English rendition, it fails to encapsulate the entire cultural richness of "قسمة ونصيب". In Arabic culture, this is a saying that shows belief in God's plan. In English, these words, although used, are not tied to one particular culture or religion. When this Arabic saying is translated into English, it implies accepting whatever happens, yet it loses important cultural and spiritual meanings. Although the translation is straightforward and works in English, it does not capture the full depth and richness of the Arabic phrase "قسمة ونصيب." This phrase carries a unique perspective that's difficult to fully convey in English.

### Example 2

ثم قال في عدم اكتراث: أذنًا من طين وأذنًا من عجين، هذا ما تعلّمته من التجربة.

*ChatGPT:* Then he said nonchalantly: 'One ear of clay and the other of dough, this is what I have learned from experience.'

*Human translator:* Then he responded with apparent disinterest, "I act as though one of my ears was made of clay and the other of dough. This is what I've learned from experience."

The phrase "أذن من طين وأذن من عجين" is a well-known Arabic idiom. It literally translates to "an ear of clay and an ear of dough," and it is used figuratively to express indifference or disregard for something or someone. The expression signifies that an individual is not paying attention or perhaps does not care about what is being articulated, as if their ears are composed of clay and dough, which are incapable of hearing or reacting. Although the translation is precise, the cultural richness may not be fully conveyed. In Arabic, this phrase communicates indifference and is frequently employed in a humorous or dismissive context. In English, its meaning might not be readily apparent, because "one ear of clay and the other of dough" fails to naturally express indifference in daily conversation.

The human translation (I act as if one of my ears were made of clay and the other of dough) elaborates on the idiomatic expression by clarifying the action, rather than merely translating the words. The phrase "I act as if" serves as a more accessible means to convey the cultural notion of indifference or detachment. This adjustment helps English speakers recognize indifference or a lack of concern. The translation connects languages and cultures by preserving the relaxed tone and clarifying the message. However, some people worry that the original sentiment might be lost in translation. This concern is valid because subtle details can be difficult to maintain, even though some aspects might still stay the same.

### Example 3

وهي تضحك ضحكة خافتة: يا بخت من وفق راسين في الحلال.

*ChatGPT:* She laughed a soft laugh and said: 'Blessed is the one who brings two heads together in lawful union.'



*Human translator:* She laughed gently and replied, “How lucky the man is who brings two people together in a moral way.”

The expression "يا بخت من وفق راسين في الحلال" is an idiomatic expression used in Arabic-speaking cultures that can be understood as a statement of praise for someone who has successfully brought two people together in a moral, lawful, or respectable way – typically referring to marriage or a union that is legitimate according to societal and religious norms.

While ChatGPT used the phrase “lawful union” describing the relationship as morally right and religiously accepted, the phrase “two heads together” can sound awkward in English; since “heads” is not commonly used to mean people coming together. It is clearer to say “two people together” or “two hearts together” in English.

The human translation focuses on the ethical aspect of bringing two people together by using “moral way” instead of “lawful union.” This approach fits naturally in English, highlighting the ethical side while honoring the original intent. Moreover, saying “two people together” rather than “two heads” makes it clearer and reflects how people typically talk about forming a moral or legitimate relationship in everyday speech.

#### Example 4

فدارت ابتساماً بعثها الثناء، ثم تظاهرت بالدهشة، وهي تقول: لا أفهم مما تعني شيئاً، الظاهر أنك في واد وأنا في واد.

*ChatGPT:* A smile formed, brought on by the praise, then she feigned surprise as she said: ‘I don’t understand what you mean at all, it seems that you’re in one valley and I’m in another.’

*Human translator:* She hid the smile his praise had inspired and pretended to be astonished as she said, “I absolutely do not understand what you mean. It’s clear that we’re mountains apart.”

The idiomatic phrase "الظاهر أنك في واد وأنا في واد" (it seems that you are in one valley and I am in another) is utilized when two individuals are engaged in a conversation, but find themselves not comprehending each other or harboring disparate thoughts and opinions. This phrase is commonly used in Arabic to express a disconnection or lack of understanding between two parties. It is often used humorously or to acknowledge that the conversation has taken an unexpected or confusing turn, suggesting that the two people involved are not understanding each other’s point of view or are not even talking about the same thing. The ChatGPT translation is a literal reflection of the original; the metaphor of “valleys” might not fully connect with English speakers. The phrase “in one valley and I’m in another” suggests a sense of disconnection, but it could appear unfamiliar to those who are not accustomed to this metaphor. However, the metaphor “mountains apart” used by the human translator is culturally relevant in English and far more familiar than “valleys.” It also emphasizes the distance between two individuals, potentially suggesting a greater disconnect. The phrase “mountains apart” is more idiomatic in English and aligns well with the general cultural understanding of being far apart in thought, action, or understanding because this expression captures the essence of emotional and intellectual separation.



## Metaphors

### Example 1

قال بلهجة مطمئنة، ولعلّه كانَ يشيرُ إلى الرواج الذي لم تزل تشمل السوق بسكرته: الحال معدن، والحمد لله.

*ChatGPT:* He said with a reassuring tone, and perhaps he was referring to the prosperity that still intoxicates the market with its sweetness: 'The situation is good, and praise be to God.'

*Human translator:* Ahmad replied in a reassuring tone, "Business is great, praise God."

The phrase "الحال معدن" literally translates to "the situation is a mine" or "the situation is a resource"; it serves as a metaphor indicating that the current circumstances are promising and holds valuable potential. This suggests, in a manner similar to a mine filled with resources, that the situation is rich. The English phrase (the situation is good) merely conveys that things are acceptable; however, it inadequately captures the essence of the Arabic phrase "الحال معدن". In the business realm, "معدن" denotes far more than mere satisfactory conditions. It characterizes a scenario teeming with potential and a plethora of opportunities for success. This term suggests an environment that actively fosters growth and development. "معدن" in a business context signifies substantial prospects for success and advancement, because the circumstances are ideally suited for expansion. The translation offered by ChatGPT overlooks this nuanced meaning and fails to emphasize the concept of prosperity as effectively as human translators do. Human translators excel at conveying positivity and prosperity because they use more natural phrases. For example, saying "business is great" clearly communicates abundance and success, reflecting the true meaning of "الحال معدن". Automated translations tend to miss crucial nuances and, although they may seem efficient, they lack the warmth and personal touch of human translators. This absence can diminish the richness of the language, though it isn't entirely lost.

### Example 2

فقالت أمينة ممتنة لتوددهُ: ياسين رجل طيب، والرجل الطيب لا يمتنع عن الزواج إلا مضطراً. الحق أن لك أن تفكر في استكمال دينك.

*ChatGPT:* Amina said gratefully for his kindness: 'Yasin is a good man, and a good man only refrains from marriage when he is compelled. The truth is, it's time for you to think about completing your faith.'

*Human translator:* To show her affection for him, Amina commented, "Yasin's a fine man who stays away from marriage only if he's forced to. The fact is that it's time for you to think about getting married again, if only to comply with the teachings of religion."

The metaphorical phrase "استكمال دينك" – "completing your faith" – or "completing your religion," particularly indicates getting married in Islam. In this regard, marriage is viewed as an integral component of fulfilling religious duties and attaining spiritual wholeness. It serves as a means to lead a balanced and healthy existence in accordance with Islamic principles. The translation supplied by ChatGPT – "It is time for you to



consider completing your faith" – was excessively literal; however, it overlooked deep religious implications of the metaphor. It depicted marriage as an abstract notion associated with spiritual fulfilment, which could seem overly formal. This strategy fails to reflect the cultural depth, making it difficult for readers to appreciate the full weight of the concept.

The human translation, to comply with the teachings of religion, succeeds in providing a more natural and culturally rich rendering. It portrays marriage as a religious obligation, which is more aligned with the way the original Arabic phrase would be understood by a native Arabic speaker.

### Example 3

لَجَّتْ به الحيرة، فازدرد ريقه، وقال بصوت منخفض: لعلي لا أعرفها، (ثم يبتسم متوددا) لو كنت أعرفها ما كان بي حاجة إلى طلب تعلمها.  
فسأله مستنكرا: إذا كنت لا تعرفها فبأي حق اخترتها؟ هه؟ هل تهيم بالضعة لوجه الله؟

*ChatGPT:* He was overwhelmed with confusion, swallowed his saliva, and said in a low voice: 'Perhaps I don't know her,' (then he smiles warmly) 'If I had known her, I wouldn't have needed to ask to learn about her.' He then asked him in disbelief: 'If you don't know her, then by what right did you choose her? Huh? Are you infatuated with her for the sake of God?'

*Human translator:* Kamal was overwhelmed by confusion. He swallowed and said in a low voice, "Perhaps I don't really know." Then, smiling ingratiatingly, he continued: "If I knew, I wouldn't need to study it."

His father asked incredulously, "If you don't know what it is, what grounds do you have for choosing it?...Huh? Are you simply infatuated with a life of humiliation, for no reason at all?"

The phrase "لوجه الله" literally translates to "for the sake of God". In this context, it is used to refer to something being done purely for divine or spiritual reasons, without any personal benefit or ulterior motive. In the cultural context of Arabic, this expression carries a sense of sacrifice and selflessness, as it is commonly used to describe actions that are intended to please God, without seeking reward or recognition.

The translation of ChatGPT lacks the cultural context and the sharp critique that the Arabic phrase carries, especially with using the pronoun *her* instead of *it* which can be misleading. The questioning tone of the phrase in the translation is preserved, but the underlying sarcastic or critical tone in the Arabic is muted in English. The Arabic "هل تهيم بالضعة" can be interpreted as mocking or scornful, especially in the context of questioning someone's motivations. This sarcasm might not come across clearly in the English phrase "Are you infatuated with her for the sake of God?"

The human translation, "Are you simply infatuated with a life of humiliation, for no reason at all?" adds a more specific critique of the person's actions. The phrase "life of humiliation" directly translates the concept of "الضعة" (humiliation or degradation), which is a key part of the original Arabic. This makes the translation more culturally and contextually accurate, as it highlights that the speaker is criticizing the potential foolishness of devoting oneself to something that leads to humiliation or degradation.





The human translation retains the sarcasm and mockery of the original phrase by using "a life of humiliation" instead of a more neutral term like "infatuation." This translation effectively captures the critical tone of the Arabic, which questions the value or wisdom of the person's choices. The use of "for no reason at all" mirrors the foolishness implied by the original phrase and emphasizes the absurdity of the situation.

#### Example 4

فأرسل صوته وراءها قائلاً في جزع: تذهبين دون تحية! اشرب رأسها فوق حبل الغسيل، ثم قالت: البيوت من أبوابها، هذه تحيتي.

*ChatGPT:* He sent his voice after her, saying in distress: 'You're leaving without a greeting!'

She lifted her head above the clothesline and then said: 'Homes are known by their doors, this is my greeting.'

*Human translator:* He called after her anxiously, "Are you leaving without saying goodbye?"

She lifted her head high to look back over the laundry and remarked, "Enter 'houses by their doors.' That's my farewell message for you." (Qur'an, 2:189.)

In this instance, the phrase البيوت من أبوابها is used to emphasize that a legitimate and acceptable approach to forming a union (typically marriage) is to approach it through the correct, lawful channels. In the Arabic culture, this expression reinforces the importance of formalities and traditions in marriage. The phrase "البيوت من أبوابها" is being used by the woman to communicate that a man should not approach her directly without following societal and religious norms.

While ChatGPT translates the literal meaning, it does not fully convey the moral and societal weight of the phrase as it is intended in the context of marriage. The woman is essentially saying that, in order for the relationship to progress, the man must approach her family through the correct, formal process – in this case, marriage.

The human translation delves into the significance of proposing marriage to a woman within traditional social and religious frameworks. By citing Qur'an 2:189, it demonstrates that her words extend beyond mere personal preferences, being deeply grounded in religious and cultural beliefs. The phrase "farewell message" indicates that she is not simply exchanging pleasantries with the man; however, she is laying down explicit guidelines for future interactions. This approach renders the translation both more robust and more in harmony with cultural traditions, although it might challenge some contemporary perspectives.

#### Example 5

ولكن من بنت الحلال التي قررت أن تتخذها زوجة؟

*ChatGPT:* But which righteous woman have you decided to take as your wife?

*Human translator:* But who's the fine girl you've decided to take for your wife?

The phrase "بنت الحلال" is a common expression in Arabic, which literally translates to "a daughter of lawful" or "a girl of righteousness." In this context, it refers to a woman who is considered moral, virtuous, and socially acceptable, especially in the context of marriage. The word "حلال" in Arabic is used to denote things that are permissible or lawful



according to Islamic principles, and when paired with "بنت" (daughter or girl), it emphasizes that the woman in question is viewed as morally upright and appropriate for marriage. In traditional and conservative communities, this term refers to a woman from a respected family, making her an ideal choice for a wife.

The ChatGPT translation is culturally neutral but might miss the informality or everyday tone of the original Arabic. The translation employs "righteous" to signify the woman's good morals; however, it may not completely encompass the precise meaning of "بنت الحلال." The human translator uses the phrase "fine girl" which refers to a lady who is seen as respectable and suitable for marriage, similar to the Arabic expression "بنت الحلال." Both phrases relate to women who are regarded honorable and appropriate for marriage, and they are frequently used with positive connotations in everyday conversations. They reflect society's respect and expectations for women classified as "بنت الحلال."

#### **Example 6**

فأجاب بالصمت المتجهم حتى زعقت: خير أسود ... أولئك الذين شمتوا بنا في أجل مصاب؟

ChatGPT: He responded with a grim silence until she shouted: 'A bad omen... those who took pleasure in our greatest misfortune?'

Human translator: His only response was glum silence. She screamed, "What dreadful news! Those people who gloated over our greatest misfortune?"

The phrase "خير أسود" literally means "black news." In this example, "أسود" (black) is a metaphor for something sad, tragic, or bad. Arab people use it to indicate news or events that bring sorrow, misfortune, or disappointment. Both ChatGPT and human translations produce the sad tone embedded in the original metaphor.

## **DISCUSSION**

The results of this study highlight the considerable advances in AI translation systems regarding the translation of cultural expressions. This research paper specifically focuses on the translations of cultural expressions of The Cairo Trilogy by Naguib Mahfouz and thus highlights the manner in which AI systems resolve issues that human translations would generally tackle, especially in contextually rich languages. However, some key results also illustrate the limitations of AI in capturing the nuance of pragmatic language and provide avenues for future advancement.

Although human translators may also differ in style and interpretation, the purpose of comparing AI with a professionally published translation is not to claim that human translation is monolithic. Rather, it is to identify systematic patterns in AI performance – especially consistent weaknesses in pragmatic, cultural, and idiomatic interpretation. These patterns differ from the natural variation found between human translators. Therefore, the conclusion is not simply that translation should be collaborative, but that present AI lacks culturally embodied judgement that human translators apply instinctively.

While this study compares ChatGPT's output to a single set of published human translations, it is important to acknowledge that human translation is not monolithic and



does not constitute a single, universally accepted “gold standard.” As previous scholarship has shown, different human translators may render the same culturally loaded expression in distinct yet equally valid ways, depending on their stylistic preferences, cultural background, and interpretive stance. The aim of the present study is therefore not to establish one definitive or “correct” translation, but rather to evaluate how AI performs in relation to a well-regarded professional benchmark. Future research could expand this comparison by incorporating multiple human translators of varying backgrounds, conducting back-translation exercises to reveal latent interpretive differences, or employing inter-rater reliability measures to assess the consistency of evaluative judgments across a panel of translation experts. Such methodological extensions would provide a more comprehensive picture of translation variability and further illuminate the specific strengths and limitations of AI in relation to human translational diversity.

### **AI vs. Human Translation in Pragmatic Accuracy**

The main goal of this study was to check how accurate AI translations are, especially when it comes to phrases that are culturally loaded. For example, the phrase "الحال معدن" (which means "the situation is full of possibilities") shows how well AI systems like ChatGPT can create translations that are correct in terms of grammar and structure. But there is a striking difference in the level of subtlety of culture preserved with AI vs human translation. Although ChatGPT did retain the basic meaning of many expressions, human translators did far better at cultural sensitivity, changing the expressions so that the original social and emotional nuances were kept. Examples included "استكمال نصف دينك" which failed to capture the broader set of contextual meaning implicit in the utterance in the culture of Arabic.

AI has treated those expressions similarly in the examples provided, but they seldom really cared about their actual usage in colloquial Arabic. For instance, "لوجه الله" (for God's sake) and "من شر حاسد إذا حسد" (from the harm of an envious person when they envy) are both revered phrases with heavy emotional and spiritual meaning in Arabic. Although both human and artificial intelligence translators interpreted the text fairly similarly, human translation conveyed far more cultural significance and emotional depth to such expressions. This reflects, in turn, higher language and cultural awareness.

The study also highlighted the importance of cultural sensitivity and contextual awareness in the translation of cultural and religious expressions. Although AI models like ChatGPT have advanced in handling straightforward translations, they still struggle with context-dependent meanings, especially when translating idiomatic expressions that carry deep cultural significance. For instance, the cultural nuance embedded in the metaphor "البيوت من أبوابها" (A home is known by its door) is completely missed in the AI translation unlike the human translation which was socially and religiously appropriate. This finding basically points out the need for a better context-aware training of AI systems using cultural references and social dynamics.

Furthermore, even though AI translations can be accurate in certain cases, they did not manage to convey the emotional tone or nuanced speech acts involved. Expressions of irony or humor, for example, "الله يقطععه" "May God cut him off," warranted varying success at best. The ironical undertone that is crucial for maintaining the intended tone of



humor or sarcasm in the AI translation was lost. On the other hand, human translators were much better reproducing the sensitive nuances of these expressions.

AI excels at translating huge quantities with speed and correct grammar. It works fast and saves money, making it useful for big jobs. But it has flaws. AI struggles to grasp deep cultural meanings and social context. ChatGPT can miss the point in some cases, producing translations that are grammatically and structurally correct but lack emotional or cultural dimension. The results show that while AI has made progress, it still misses small cultural details that humans catch. Future work should focus on training AI models on context and cultural data. AI should learn not just from language data, but also from culture to better understand certain phrases and sayings.

## CONCLUSION

This study contributes to the growing body of research on the role of pragmatics in translation, especially in the context of AI-powered systems like ChatGPT. While AI translation systems have shown promise in handling many aspects of language translation, significant gaps remain in their ability to effectively translate context-dependent pragmatic expressions. The findings underscore the importance of incorporating cultural awareness and contextual understanding into AI models. By addressing these challenges, we can move closer to achieving translations that are not only accurate but also emotionally and culturally sensitive, bridging the gap between human and machine translation in the process of cross-cultural communication.

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Research article

## The Impact of Visual Elements in Pedagogical Texts – An Investigation of Economics and Engineering Students

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### Abstract

The aim of the study is to identify the degree of impact of visual elements of educational materials, such as infographics, highlights in the text, images, as well as ‘emotional background’ of graphic and textual components. It focuses on the impact on cognitive processes (information analysis) and on learning outcomes (quality of case solutions) for students of economics and engineering. The experimental study involved 82 first-year economics and engineering majors. These were divided by random sampling into teams of 5-7 persons. The study consisted of two main phases: active and reflexive. In the active phase, students were asked to complete a case study on environmental topics, and in the reflexive phase they answered questions concerning their case study work. Specially designed case assignments included both emotionally neutral and emotionally intense descriptions of the same environmental situations, accompanied by various visual elements. The results showed that visual elements, such as highlighting key phrases in bold, dramatising images and manipulating the scale of graphs, significantly influenced students' conclusions and elicited an emotional response from them. Emotionally colored presentations pushed students towards prohibitions, whereas neutrally colored case solutions were characterised by constructive and differentiated suggestions for preventing the effects of an environmental disaster-color. The use of emotionally charged visual elements had a greater impact on engineering students than on economics students. The obtained conclusions allowed us to formulate practical recommendations for teachers and methodologists. These were aimed at improving the efficiency of the educational process by becoming aware of the heightened responsibility that comes with visual rhetoric. Figurative presentations should be accompanied by textual ones, and case-study learning should be grounded in reality to counteract virtualization through visualization. The conclusion emphasises the importance of a careful development and moderation of teaching materials, as well as the need to develop critical thinking in students throughout the learning process.

**Keywords:** Visualisation; Typography; Infographics; Emotional coloring of tasks; Case study; Manipulation; Perception of graphic information

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Научная статья

## Исследование влияния визуальных элементов в педагогических текстах на студентов экономических и инженерных специальностей

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### Аннотация

Настоящее исследование посвящено изучению роли педагогического дизайна в кейсовых заданиях и его влиянию на восприятие учебных материалов студентами и результаты обучения. Цель исследования – выявление степени воздействия визуальных элементов учебных материалов, таких как инфографика, выделения в тексте, изображения, а также “эмоциональный фон” графических и текстовых компонентов в кейсовых заданиях на когнитивные процессы (анализ информации) и результаты обучения (качество решения кейсов) студентов. В экспериментальном исследовании приняли участие 82 бакалавра первого курса экономического и инженерного направлений подготовки. Для минимизации влияния неконтролируемых факторов студенты были разделены на команды по 5–7 человек методом случайной выборки без перемешивания студентов разных направлений подготовки. Исследование состояло из двух основных фаз: активной и рефлексивной. В активной фазе студентам предлагалось выполнить кейсовое задание на экологическую тематику, а в рефлексивной фазе они отвечали на вопросы анкеты, касающиеся их работы над кейсами. Специально разработанные кейсовые задания включали как эмоционально нейтральные, так и эмоционально напряженные описания одной и той же экологической ситуаций, сопровождаемые различными визуальными элементами. Результаты показали, что визуальные элементы, такие как выделение ключевых фраз полужирным шрифтом, драматические изображения и манипуляции с масштабом графиков, значимо влияют на выводы студентов и вызывают у них эмоциональный отклик. Решения нейтрально окрашенных кейсов отличались более конструктивными предложениями по предотвращению последствий экологической катастрофы, тогда как эмоционально окрашенные задания подтолкнули студентов к запретительным мерам. Как показали результаты опроса, дизайн кейса оказал большее влияние на студентов инженерного направления подготовки, чем на студентов экономического направления. Полученные выводы позволили сформулировать практические, направленные на повышение эффективности образовательного процесса, рекомендации для педагогов и методистов с целью повышения качества подготовки контрольно-измерительных материалов для формирующего и суммативного оценивания, а также презентаций и наглядных пособий. В заключении подчеркивается важность тщательной проработки и модерации учебных материалов, а также необходимость развития критического мышления у студентов на протяжении всего процесса обучения.

**Ключевые слова:** Визуализация; Типографика; Инфографика; Эмоциональный окрас заданий; Кейс; Манипуляция; Восприятие графической информации

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## INTRODUCTION

With the rapid digitalisation of education and the unprecedented development of artificial intelligence, the teaching community is facing questions about the effectiveness of traditional and innovative methods of learning and assessment. AI tools promise personalisation, automation, and new forms of interaction, transforming the entire educational landscape and exposing the failure of traditional approaches to assessing learning outcomes. However, despite technological breakthroughs, working with case-studies retains its unique position as one of the most effective tools for formative assessments that track student progress as well as summative assessments of students' competence levels. Its strength lies in its ability to simulate complex, multifaceted real-life situations that require students not just to reproduce knowledge, but to critically analyse it, synthesise information, make decisions under conditions of uncertainty, and develop professional judgement – skills that remain fundamental and difficult to automate even in the era of AI.

Recognising the enduring benefits of case studies as a key assessment tool in higher education was the premise of this study. While its potential for developing practice-oriented skills and integrated assessment is undeniable, the role of the pedagogical design of the case study materials themselves is often underestimated. Visual elements (infographics, images, textual accents), the structure of information presentation and, most importantly, the 'emotional background' of case study materials – all this is not a neutral shell, but actively influences learners' cognitive processes, including perception, analysis of information, drawing conclusions and, ultimately, the quality of proposed solutions. In an era of information overload and increased emphasis on emotional intelligence, understanding how case design guides students' thinking and emotions becomes critical to ensure objective assessment and the realization of educational goals.

Thus, the relevance of this study stems from the lack of research on the impact of visual design of case study instructional materials on student learning outcomes, especially in the early years of higher education, and the urgent need for a focused effort to improve this technology. It is possible to maximise the potential of this method only through the conscious design of case assignments, taking into account the influence of visual and emotional components on cognitive processes and performance. Improving the methodology of using cases is inextricably linked to the in-depth study of their design.

The empirical basis of the following study includes data obtained as a result of an experiment with the participation of first-year students from economic and technical areas working on case assignments. This includes the results of a survey of students with reflections on the influence of visual elements on their answers. The study used various visual elements, including emotionally colored and neutral images, graphs, diagrams, text highlights, to assess their impact on students' perception and analysis of information.

This study contributes to the understanding of the role of visual elements in the educational process and suggests ways to optimally utilise them to achieve pedagogical goals. The findings highlight the challenge of objective and balanced design of learning materials for developing analytical skills and preventing the manipulation of learners' opinions. The practical significance of the study lies in the development of recommendations for creating learning materials that promote a balance between



engaging design and objectivity of presentation, as well as the development of critical thinking in students. The results of the study can be useful for teachers, educational program developers and methodologists seeking to avoid unintentional manipulation of students' opinions and improve the effectiveness of learning.

## PROBLEM STATEMENT

Education has undergone a long process of transformation, adapting to changes in how people perceive information in the digital economy (Akour & Alenezi, 2022). In the 21st century, the role of visualisation as a means of delivering knowledge is growing, driven by the development of digital technologies and changes in the psychophysical characteristics of young people (Meguid & Allen, 2022). The use of visualisation as an important component of pedagogical design is becoming a generally accepted standard in modern teaching. Teachers are increasingly using various visual aids to improve the assimilation of educational material, develop students' imagination and promote a deeper understanding of the phenomena being studied.

A number of factors contribute to the widespread use of visualisation in education. First and foremost are psychological factors (Bhattacharya & Bhattacharya, 2015): the younger generation is accustomed to consuming information quickly via gadget and computer screens, so text-based information is losing its appeal and visual symbols are becoming more preferable. The growth of technical capabilities for visualisation has a significant impact (Ostanina, 2021): the increased availability of digital devices such as smartphones, laptops and tablet PCs opens up wide opportunities for the visualisation of educational material. Economic factors (Larionova, et al., 2021) cannot be ignored: the use of visual aids makes it possible to replace expensive laboratory experiments and tests with much cheaper models and simulators.

Despite the many positive aspects of using various methods and techniques for visualising content in the educational process, as outlined below, the use of visualisation is controversial due to its emotional impact on students and, in some cases, indoctrination, which requires a conceptual rethinking of the application of this technology in the educational process. Thus, one of the negative aspects of visualisation in education is the superficiality of students' perception of information, as visualisation simplifies complex concepts, which can lead to a lack of deep reflection. In addition, frequent use of visual aids contributes to an increase in screen dependency, a decline in reading and writing skills, and a weakening of critical analysis skills. At the same time, visualisation requires significant effort on the part of teachers, which increases the cost of educational content and reduces the return on investment of educational programmes.

Table 1 lists the main types of visualisation and their specific applications in the educational process.





**Table 1.** Types of visualisation and their specific applications in the educational process

Types of visualisation in the educational process	Forms of visualisation	Methods of application	Examples of use
<b>Illustrative visualisation (Rautek et al., 2008)</b>	Illustrations, photographs, drawings and diagrams.	Accompanying educational information, supplementing the textual part of the lesson and contributing to better perception.	<ul style="list-style-type: none"> <li>– Textbooks with vivid illustrations;</li> <li>– PowerPoint presentations with images;</li> <li>– Display of photographs of historical monuments or natural landscapes.</li> </ul>
<b>Information and graphic visualisation (Kabanov et al., 2020)</b>	Charts, maps, infographics and graphs.	Conveying quantitative and qualitative information, facilitating the perception of data.	<ul style="list-style-type: none"> <li>– Diagrams and histograms to demonstrate statistical data;</li> <li>– Maps of the area for subjects where spatial knowledge, navigation skills and understanding of natural conditions are important;</li> <li>– Infographics explaining various processes.</li> </ul>
<b>Modelling and simulation (Stoffa, 2004)</b>	Simulation models of experiments and laboratory tests.	Reproducing physical phenomena or processes, allowing students to experiment and explore the laws of nature. These techniques develop thinking and practical problem-solving skills.	<ul style="list-style-type: none"> <li>– Chemical experiments demonstrating the reactions of substances;</li> <li>– Biological laboratory with cell modelling;</li> <li>– Simulation of physical laws in computer programs.</li> </ul>
<b>Interactive visualisation (Wang et al., 2018)</b>	Interfaces for interactive whiteboards, tablets and computers.	Opening up wide opportunities for actively involving students in the learning process. Students can independently control the image, move objects, and change the parameters of the experiment.	<ul style="list-style-type: none"> <li>– Interactive posters on humanities subjects;</li> <li>– Electronic tests with animation and feedback;</li> <li>– Internet resources with multimedia components.</li> </ul>

The use of images, models, presentations, and interactive tools allows us to expand learning opportunities, increase student motivation, ensure deep knowledge retention, and develop students' intellectual abilities. Educational technologies are developing rapidly, and visualisation has become an integral part of modern learning processes.



Whether we are talking about traditional teaching or distance learning, the inclusion of visual elements increases the effectiveness of teaching and learning. Let's consider how visualisation fits into various pedagogical technologies (Table 2).

**Table 2.** Application of visualisation in educational technologies

Teaching technologies	Forms of visualisation	Ways to use visualisation	Positive aspects of using visualization
<b>Traditional teaching technologies involve lectures, seminars and laboratory classes.</b>	Illustrations and diagrams	Explain complex concepts by demonstrating clear examples.	Images are perceived faster and easier than text, which facilitates easier assimilation of educational material.
	Demonstration stands	Allow students to study the subject independently.	The inclusion of visual aids attracts the attention of students, increases motivation and interest among the audience, and contributes to better perception of the material.
	Presentations	Provide direct observation of physical phenomena and chemical reactions.	
	Laboratory classes		
<b>Modern active teaching methods</b>	Case studies	Use presentations with graphs and tables to analyse real-life cases.	It helps students visualise abstract ideas and theories by translating them into an understandable and clear form, encourages them to delve deeper into the learning material, increases their interest in learning, and stimulates cognitive activity. It allows students to model behaviour in real life. It allows them to acquire practical skills and learn to apply theory in practice.
	Business games	Create game situations using graphic images.	
	Project method	Visualise ideas and results through drawings, models, and videos.	
<b>Distance learning technology</b>	Video lectures	Visualise lecture material using animation and graphic inserts.	Visualisation helps students grasp abstract concepts by translating them into a visual form, stimulates imagination and creativity, and promotes the development of creative thinking and original solutions. It increases student interest and helps overcome distance barriers, making the learning process lively and engaging.
	Infographics	Compact and clear presentation of complex data and concepts	
	Virtual tours		
<b>Blended learning combines face-to-face classes with distance learning.</b>	Interactive presentations	Use of online platforms for collaborative editing and discussion.	When viewing images and models, students think in images, which develops their imagination and creative abilities. Students begin to make associations and compare objects, finding similarities and differences. Active student participation in learning through visual stimuli stimulates mental activity, develops analytical skills and critical thinking
	Simulators and trainers	Virtual reproduction of laboratory experiments and real production processes;	
	Forums and chats	Active communication with teachers and classmates with the ability to add visual elements.	



In traditional educational environments, visualisation is achieved through the use of illustrations, diagrams, posters, drawings and models. New technologies open up a wide range of possibilities for interactive and active teaching methods. Visualisation has gained a new lease of life, becoming an integral part of methods such as case studies, business games and project-based learning. Visualisation allows students to immerse themselves more deeply in the learning material.

In online learning, content visualisation is actively used in the creation of online courses. Teachers use presentation materials containing infographics, record video lectures, and incorporate virtual technologies into their courses. Visualisation increases student interest and helps overcome the lack of face-to-face communication with the teacher, making the learning process more lively and engaging.

In blended learning technologies, visualisation becomes a unifying element that flows smoothly from the traditional classroom to the online environment. This combination of traditional and distance learning is complemented by visualisation capabilities, which enriches the educational experience.

Thus, visualisation has taken a firm place in the modern educational process. Regardless of the chosen pedagogical technology, visual elements have become essential tools in pedagogical design. Competent use of visualisation increases the effectiveness of learning, improves the assimilation of material and attracts the attention of listeners, which contributes to their motivation and academic performance.

It should be noted that visualisation is closely linked to the phenomenon of indoctrination – the imposition of certain attitudes and ideas through the targeted use of educational technologies. Visual images have the ability to influence students' minds, shaping stereotypes and beliefs. This property makes visualisation a powerful tool for propaganda and manipulation if it is used dishonestly with a specific intent. At the same time, visualisation for the purpose of indoctrination can have both positive and negative effects on learning. On the one hand, it contributes to the formation of a positive worldview and universal competencies in students. On the other hand, it imposes certain views and beliefs, manipulating the opinions of learners. It is important for teachers and course developers to exercise caution when selecting visual aids to minimize negative impacts of visualisation on learning outcomes.

As mentioned earlier, the existing variety of educational tools, especially traditional ones, is currently being supplemented by new educational formats: distance learning, online learning, and blended learning (Walz & Kane, 2024). Traditional lectures, which represent the teacher's narration are transformed into interactive lectures 'press conferences', problem lectures, lectures-conversations, lectures-discussions, lectures-two-person, lectures-visualisations, lectures-provocations (Gorshkova, 2017).

According to Natalia Zyleva (2015) the task of a university lecturer in modern times is not just to give out ready-made material, but to encourage the student to search activity, to teach him to think and reason. One of the pedagogical techniques, which has a great developing and teaching potential, is the rarely used technique 'Planned Error.' The author concludes that evidentiary error detection requires from students attentive perception of information, actualisation and transfer of knowledge from other spheres outside the discipline, striving for accuracy and correctness of judgments and actions,



ability to build a logically correct and clear oral speech. However, according to Anna Andryunina (2024), interactivity at lectures is often limited to the interactivity of the teacher, leaving students as passive listeners. According to researchers, interactivity should be comprehensive, providing a holistic approach to the organisation of the educational process, changing not only the educational environment using digital tools, but also transforming the positions of the teacher and students (Korotaeva & Andryunina, 2021).

In order to improve the understanding of theoretical teaching materials and to develop students' analysis skills, teachers are increasingly using practice-oriented tasks in the form of case studies. Often, case studies include not only textual but also graphical components. Infographics, diagrams, photos, schemes and even text design (color accents, font highlights) are designed not just to illustrate information, but to perform important didactic functions: to structure complex data, visualise cause-and-effect relationships, emphasise key facts, create context and form a certain perception of the situation being described. They are powerful catalysts of cognitive processes and provide learning motivation.

Thus, in an effort to engage students in the thinking process, to increase their learning motivation, to provoke them to critically evaluate the obtained materials, teachers use various techniques (Hao et al., 2024). Thus, Igor Sharshov and Ilya Bubnov consider the peculiarities of visualisation as a way of visual presentation of information that affects the efficiency of students' learning new knowledge and the formation of skills to critically reflect on the studied material, analysing the possibilities of using visualisation in connection with the specifics of students' perception of visual information (Sharshov & Bubnov, 2022). The authors conclude that, despite the need to use visualisation, there are certain difficulties in implementing its tools in the educational process of higher education, but if we take into account all the features, nuances and risks, the result of utilizing visualizations will be an increase in the quality of the educational process. According to Yulia Katkhanova, Elena Korzinova, and Sergey Ignatiev, this visualisation of educational information is the most striking trend in the development of educational information space (Katkhanova, et al., 2018). The implementation of this trend results in fundamentally new communicative, cultural, and educational phenomena that significantly transforms the environment and affects all its components: educational, social, informational and cognitive processes. The authors note the significant role of visualisation in the modern educational space and conclude that the translation of verbal images into graphic images – or vice versa – always results in the structuring and systematisation of educational information. Accordingly, there is never a single predetermined solution for a case-study task. Instead it emerges from the process of comparing statements and conditions of the set tasks, transforming information from one sign system to another by means of generalisation, system analysis and comparison of the obtained data.

Studying aspects of motivation in students' learning activities, Aleksandr Moshkin, Anatoly Kolesnikov, and Natalia Kokh note that the uniformity of exercises used to consolidate knowledge and the monotony of homework are strongly demotivating factors. In contrast, a creative and individualizing approach to learning activities and an emotional



coloring of educational material contributes to increasing interest in learning (Moshkin et al., 2017). However, there is a question of the ethicality of manipulation through visuals – does visual manipulation limit viewers' freedom of choice, is it addictive, does it disadvantage them? To the extent that they involve indoctrination, are visual and other persuasive technologies ethical (Cheng, 2024)?

According to David Lewin (2022) the negative connotation of the term indoctrination may not be appropriate since, after all, indoctrination is the way by which educators support and defend a normative view of education: Education should be directed towards something intrinsically valuable. Comparing education and indoctrination Lewin concludes that education and indoctrination always mutually influence each other. Whether there is a difference between education and indoctrination depends on how justified the influence is. Lewin believes that if the educator sincerely intends to improve the student's attitude towards something, indoctrination can be interpreted as a variant of education.

However, visual perception is influenced not only by the content of the materials offered to students, but also by their appearance and emotional coloring. Thus, according to Mustafa Günay (2024), typography serves as a tool to reinforce the meaning of the text, as different fonts, colors and layouts emphasise emotions and messages, the right choice of typography allows for a more effective connection with the target audience. The author notes that readability is influenced by factors such as font size, line size, spacing between headings and letters to ensure that the text is clearly understood.

According to Galina Nikulova (2006), the color design of educational materials affects the nature of their perception by students. She gives examples of coding information with color that increases the efficiency of its assimilation and the sustainability of students' attention. Elina Adieva, Marat Yunusov, and Aleksandr But, studied the role of images in information perception by conducting experiments on the influence of images on presentation slides on their perception by student viewers (Adieva et al., 2020). Based on a survey of students the authors concluded that through understanding how people perceive visual information and identifying patterns it is possible to improve the educational process. Thus, according to the respondents, the most preferable background for images is light, and text of two colors is perceived better by highlighting key words or main sentences in a brighter color. Edward Tufte and Peter Graves-Morris in their study of the visual display of quantitative information examine the various ways in which information graphics can distort data and even mislead users (Tufte & Graves-Morris, 1983). The authors note the importance of proportionality and removal of unnecessary data to improve visualisation.

However, there is a dearth of experimental studies in the literature evaluating the extent to which visual provocation affects student learning outcomes.

## METHODOLOGY

The research methodology for our empirical investigation is based on the use of an experimental approach aimed at studying the influence of visual elements on the perception and analysis of educational material by first-year undergraduate students.





The experiment involved 82 first-year undergraduate students, of which 45 students were studying in economic areas of training and 37 students were studying in technical areas of Ural Federal University. The students were divided into teams of 5 to 7 people by random sampling method. The study consisted of two main phases: active and reflexive.

In the active phase of the experiment different groups of students were randomly offered case studies. The students had to study and analyse the situation described in the assignment either independently or by using Internet sources (there was no restriction on the use of external sources of information). Specially developed by the authors case studies were devoted to the environmental problems of the Kerch Strait, in which the same situations were described in emotionally neutral and emotionally tense ways.

The descriptions of situations were accompanied by various visual provocations – bold text, graphs, diagrams and images with different emotional backgrounds. Students had to familiarise themselves with an environmental problem, analyse the options for solving the problem proposed in the case study task and propose their own options, as well as prepare an information poster about the environmental problem. The teams were given 60 minutes to complete the task, after which they defended their case solutions based on the information posters they had prepared.

One week after the active phase of the experiment, the students were offered a reflection phase. To conduct the reflexive phase of the experiment, the authors of the study developed a survey including questions about the perception of the visual elements, about the use of additional information sources, and emotional reactions to the images in the case study tasks.

The aim of the case study was to develop measures for the conservation of representatives of the Kerch Strait fauna. These represented were, firstly, the second representative was the Black Sea porpoise or dolphin-azovka as a rare, declining subspecies of the Black Sea. The second representative was these a pigeon, or slender-billed gull – a rare bird species from the gull family.

The environmental problem to be solved consisted in oil pollution of the Kerch Strait water area, disturbance of the environment in the Strait area by various anthropogenic impacts (construction of the Crimean Bridge, organisation of oil products transportation by tankers, accidents during cargo transportation) and the influence of these impacts on the life activity of these fauna representatives. The description of the situation was accompanied by photos, graphs, diagrams showing some related numerical indicators. In the text of each case study, options for improvement of the described situation were proposed. Each description was designed as an A4 sheet printed on a color printer.

Both quantitative and qualitative methods were used to analyse the results. Quantitative analysis of the obtained survey data included their statistical processing, while qualitative analysis was aimed at interpretation and evaluation by expert teachers of case solutions proposed by students and identification of key points in their group work.



All ethical standards were observed in the study, including voluntary participation of students and confidentiality of data. Students were informed about the aims and procedures of the study and had the opportunity to withdraw at any time.

## FINDINGS

To identify the degree of influence of visual provocation on the students' conclusions, they were asked to study the main causes affecting the number of the marine representatives, analyse the proposed measures for their conservation, and develop effective measures aimed at preserving the population. Table 3 presents for the experimental and control groups the key phrases highlighted by the students from the text of the case study task and in the following lines their descriptions of visual elements in their information poster as well as their proposed solutions to the environmental problem.

**Table 3.** Results of students' work in the active phase of the experiment

Results of student work	Case study about the Black Sea porpoise - azovka	Case study on the Black-billed Gull, the Black Sea dove
<b>Neutral text, visual elements, graphics</b>		
<b>Key phrases</b>	Anthropogenic impact, environmental conditions, piling, discomfort, don't like noise, crashing, etc.	Transport artery, changing ecological situation, feeds on small fish, etc.
<b>Visualisation on an information poster</b>	Smiling sun, palm trees, blue water and happy dolphins swimming. (Figure 1 in Table 4)	Cheerful birds, sewage treatment plants, artificial reservoirs, bright colors blue, green, pink predominate.
<b>Proposed solution to an environmental problem</b>	Azovka is crying only on one poster, but she is drawn in a fishing net, over a spot of fuel oil and near the propeller of the ship. In the drawing the colors are bright – the vessel is pink, the fuel oil stain is multicolored (pink, green, lilac). (Figure 2 in Table 4)	Enlightenment, environmental education, protected areas. (Figure 3 in Table 4)
<b>Emotional text, visual elements, graphics</b>		
<b>Key phrases</b>	In the text of the assignment, the students emphasised the text in bold: ecological disaster, polluted sea, fishing nets, anthropogenic impact, above the maximum permissible norms, etc.	In the text of the assignment, students placed emphasis on the text in bold: ecological disaster, oil products, 500 tonnes annually.
<b>Visualisation on an information poster</b>	Calls for banning shipping, banning noise, banning fishing nets (note that for hamsa, the main food of azovka). (Figure 4 in Table 4)	In addition to the text in bold, the following was noted: Red Book of the Russian Federation, pollution from industrial effluents. (Figure 6 in Table 4)



Proposed solution to an environmental problem	Elimination of noise, fish protection zones, islands with food, creation of artificial reefs to restore the marine ecosystem. (Figure 5 in Table 4)	Crying birds.
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Examples of posters prepared by students when solving case studies with neutral and emotionally charged visualisations are presented in Table 4.

Table 4. Examples of posters prepared by students when solving case studies with neutral and emotionally charged visualisations

Neutral text, visual elements, graphics	Emotional text, visual elements, graphics
<p>Figure 1</p>	<p>Figure 4</p>
<p>Figure 2</p>	<p>Figure 5</p>

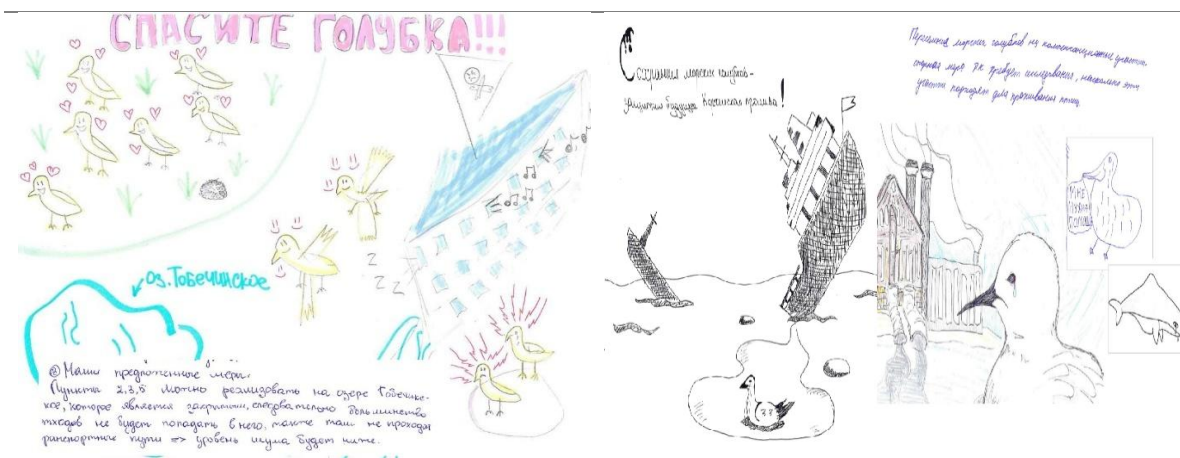


Figure 3

Figure 6

As the results of the analysis of the active phase of the experiment have shown, students in most cases perceive the teaching material offered by the teacher as dogma and do not check the adequacy of information.

**Graphs and diagrams.** Students were offered to study three graphs – an information-rich and reliable graph, a graph with an embedded error (deliberately changed scale on the vertical axis) and a pie chart with no reliable sources (Fig. 7):

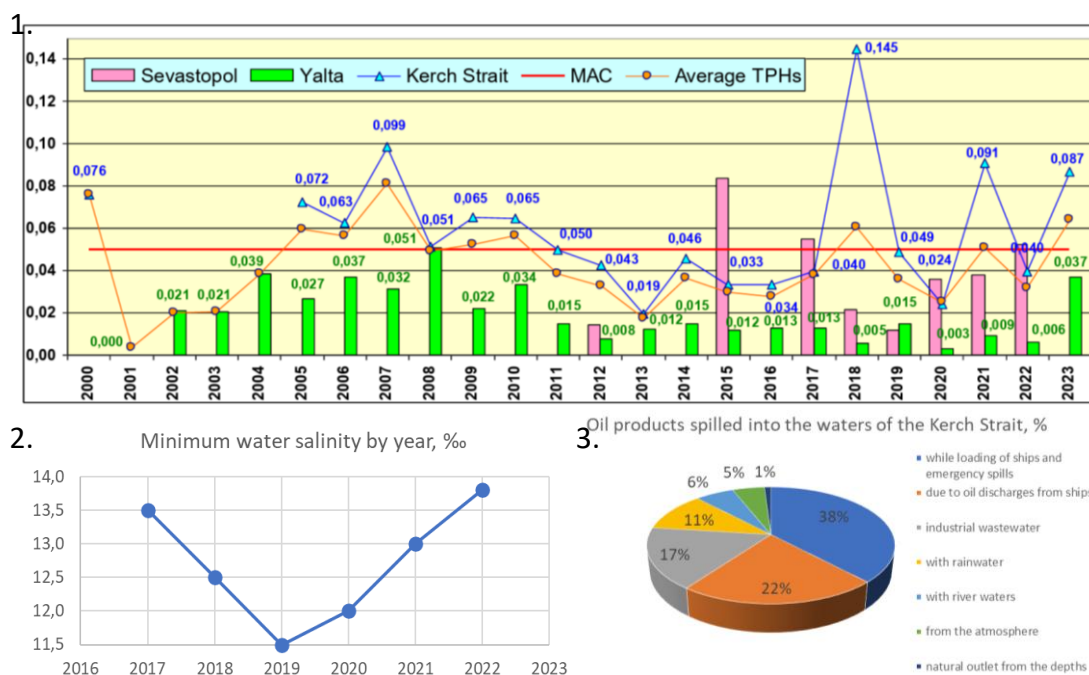


Figure 7. Graphs and diagrams inserted into the text of case assignments

It should be noted that the distorted graph and pie chart were considered by students and accepted as grounds for thinking about the situation in the case study with the same confidence as the reliable graph. Moreover, the most complex and information-rich graph





of multi-year dynamics of petroleum hydrocarbon concentrations in the coastal waters of Crimea was least used by students for decision-making. According to the authors, this was due to the fact that students did not want to study complex information in detail and understand it. If we refer to this fact in terms of Bloom's taxonomy, students 'know' and 'understand' relatively complex information, but have not yet developed the skill to 'apply' it.

**Pictures of fauna.** To give an emotional background to the information, different pictures of azoids and bluebirds were used (Fig.8). On the left are dramatic, emotionally negative pictures, and on the right are neutral pictures.



**Figure 8.** Pictures with images of Kerch Strait fauna representatives presented in case studies

Visualisation in the case study task had a greater impact on engineering students than on economics students. Neutral and negative images provoked different images on information posters and different proposals to eliminate the consequences of the environmental disaster. Thus, students who received neutral images used bright colors, positive images and smiles when preparing posters. Conversely, students who received tasks with negative pictures used dark colors, images of tears, and a large number of appeals reinforced with exclamation marks on their posters. As a result, the solutions of neutrally colored cases were characterised by more constructive proposals to prevent the environmental situation, whereas the negatively colored assignments pushed students towards more prohibitive measures, which provoked proposals to relocate fauna, ban fish catching, etc.





*Task text.* To provoke emotions in students, separate phrases in the text of emotionally colored tasks were highlighted in bold and capital letters. As expected, students emphasised their attention mainly on these phrases, fully trusting the instructor. In neutral tasks there were no text highlights, and students independently made more highlights of phrases important in their opinion, emphasising details. That is, in this case they perceived the initial information more broadly, and proposed programmes for monitoring and protection of fauna, environmental education of the population, as well as proposals for reproduction of the species in question.

It should be noted that students did not critically evaluate the information proposed in the tasks. For example, 500 tonnes of oil products were mentioned in the text, but the source of information was not indicated. Nevertheless, students took this figure on faith and did not try to find additional information.

*Formulated solution.* Under time constraints (1.5 hours), students prioritise the tasks in the most obvious order:

1. study the material on the case sheet,
2. analyse already proposed solutions,
3. formulate their own solution which included drawing on Internet sources.

Other parts of the survey showed that students of economics direction used Internet sources more actively than students of engineering. Nevertheless, when formulating solutions to improve the situation, in most of their answers students did not go beyond the options proposed in the text of the case study task, i.e. they remained in the information field of the text. The reason for this, in our opinion, may be that the teams did not have (or did not develop in the allotted time) ‘idea generators’ – people capable of self-organising themselves to formulate meanings different from the proposed ones within a limited time. All teams of engineering students gave specific proposals, but were not very confident about their originality. Students of economics were more confident about the originality of their proposals, but one team out of thirteen could not formulate a proposal.

In the reflexive phase of the experiment, students individually answered questions related to the work they had done on the case at the previous stage. The results of the survey were analysed in two directions:

1. in regard to different fields of study, a comparative analysis of engineering and economics students was carried out;
2. in regard to the different designs of assignments a comparative analysis of answers to neutrally colored and emotionally charged case assignments was carried out.

In the first case, the research question was posed whether there is a difference in the perception of graphic information by students of different fields of study or training. In the second case, the hypothesis was tested that the emotional coloring of case tasks has an impact on students' responses regardless of their area of training.

As a result of the survey, it was revealed that students paid most attention to the text description when analysing the case: 89.2% of engineering students and 82.2% of economics students. Engineering students were more critical of the text than economics students (22.6% and 13.3% respectively), finding contradictions and false assumptions. Most students considered the text description ‘quite sufficient’ to solve the case (91% of

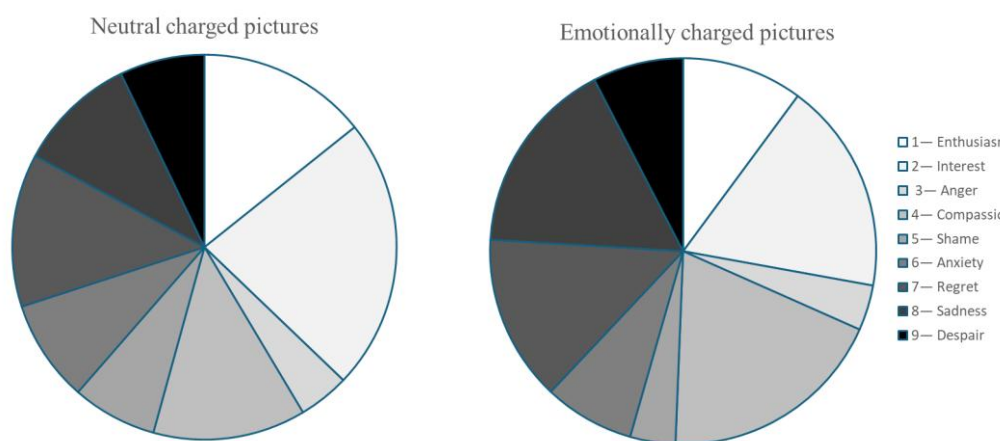


economics students and 81% of engineering students), but economists paid more attention to the marks in the text than engineers, taking them as ‘key phrases’ (53.3% and 46% respectively).

Secondly, pictorial elements like photos, graphs, or charts were analysed by 56.8% of engineering students and 44.4% of economics students. At the same time, 75.6% of economics students tried to apply them to extract information, while the share of engineering students was unexpectedly lower in this question – 67.6%. The majority of students (89.2% of engineering students and 84.4% of management students) tended to believe that graphical information helped them find a solution.

The students from different fields answered in almost the same way the questions related to the content of the charts: 82-84% of students responded correctly to questions about the information-filled chart, 31-32% about the ‘distorted’ chart, and 16–20% about the pie chart.

Special attention in the study was paid to the analysis of students' emotional response to the presented case tasks. Figure 3 shows the results of students' answers to the question ‘What emotions were evoked by the pictures with animals inserted in the text?’



**Figure 9.** Emotional response of students to pictures presented in the case study task

The following emotions on the scale from more active to more passive are marked by shades of colors from white to black, where white – enthusiasm; black – despair; shades of gray from light to dark – interest, anger, compassion, shame, anxiety, regret, sadness, accordingly. A comparative analysis of the answers of students solving cases of different designs has shown that compassion and sadness are expressed 1.3–1.4 times more often by students solving cases with emotionally negative pictures, while interest and enthusiasm in solving the problem are experienced 1.5–1.7 times more often by students solving cases with neutral pictures. Significantly more students of the first group experience shame (2.2 times more often), anger and anxiety (1.3 times more often). This supports the view that emotionally negative pictures cause passive emotions that do not stimulate action: they do not contribute to the generation of their own ideas when solving cases.



The negative emotional background of case study tasks had a greater impact on engineering students than on economics students. They empathised with the injured animals to a greater extent. However, students felt shame least of all (15.6% of economists and 10.8% of engineers). Nevertheless, the main emotion of the majority of students was interest, which, in the authors' opinion, was caused by working on the case study and (or) the active form of class organisation as more active, communicative and team-based and less 'academic' (44.4% of economists and 48.6% of engineers).

Thus, it cannot be denied that pictures have an impact on students' emotions, and this should be taken into account when developing teaching materials, based on the pedagogical goals set by the teacher. In this regard, it is important to notice that students working with case assignments with neutral design were more optimistic in evaluating their solutions: 72% of students responded that their solution was characterised by originality, whereas only 66.7% of students who received negatively colored case studies considered their solution to be original.

## CONCLUSIONS

The results obtained in the course of the study indicate that case study design plays an important role in pedagogical design and that the use of visual elements that are unjustified from the point of view of learning objectives can have a significant impact on learners' cognitive processes and even impose certain ideas and beliefs on them. In the literature, such a technique is called indoctrination. It is often deliberate on the part of the educator and deprives learners of the opportunity to critically reflect on what they have heard or to question their ideas. As a rule, teachers give students only the information that corresponds to their pedagogical goals, and the student, with full trust in the teacher, has no desire to learn other points of view and draw conclusions independently. Biased information is based on selective data and subjective evaluations to convince the listener of a certain point of view.

Let us consider the results of the experimental study from this perspective. To evaluate the role of visual elements in the educational process, a dramatic illustration of a bird in fuel oil was added to the text of one of the case studies, a phrase in bold capital letters, which should cause a feeling of guilt before nature, about 'ECOLOGICAL CATASTROPHE!' was highlighted in order to convince students of the need for radical measures to reduce emissions without providing a complete picture of the amount of pollution and its sources. The experiment showed that students trusted the information in the case study without questioning the information presented in them. For example, in the case study assignment the amount of pollution of seawater by oil products was given as 500 tonnes. Students did not even think about whether it was a lot or a little, and did not search for confirmation of this information, although open sources have data on 9,000 tons of oil and oil product discharges only from loading, discharges and accidents (Nemirovskaya et al., 2018).

In the text of the case study, the authors also bolded some phrases to attract the attention of students: 'feeds mainly on small fish', 'likes silence.' This provoked the



students to propose artificial cultivation of small fish as a solution to the environmental problem, as well as the creation of noise shields on barges.

The mention of hamsa as a food source for azovka led students to conclude that it is necessary to increase the population of this particular fish without considering alternative food sources for this fauna species. Intentional visual distortion of the scale on the graph of salinity changes in the Kerch Strait waters and mention of dove nesting on the shores of saline waters led students to the idea of measures to keep water salinity at some average level. At the same time, students unfamiliar with the units of salinity (ppm) failed to realise that the scale of the graph indicates that there is no change in water salinity and that temporal fluctuations in the salinity index are not significant.

These examples show that visual elements, text, and the presentation of information in the text of the assignment can be used to manipulate students' opinions and even indoctrinate them, inclining them to a certain conclusion without considering the full picture. However, such case study assignments can be aimed at making students understand the importance of critical attitude to information. In this case, the instructor deliberately include false information in the case and asked students to find untrue facts and distortions. From the point of view of pedagogical design, the final stage of a case study should be a reflection with a full analysis of errors in case tasks and students' final decisions.

In general, educators should seek out infographics that strive to be objective, presenting data in context and without bias. As opposed to biased infographics, instructive infographics avoid imposing a particular point of view.

Students, regardless of their field of study, generally showed the expected result for their level of preparedness (1st year) of working with the case study material, which can be formulated as follows: superficial consideration of the topic under time constraints with non-unique final results. In the course of the experiment, statistically significant differences were found in the attitudes towards information in students of two different areas of training. At the same time, there was a clear dependence of the quality of final solutions and their originality on the emotional background of the case being solved by the students. The results of the experiment indicate that manipulations using visual elements of the simplest type (emotional background of pictures, marks in the text, distortion of the scale of graphs) have an impact on first-year students and affect learning outcomes.

These findings are consistent with those of Janssen et al. (2024) who studied the effect of anecdotal information and data visualisation on the conclusions of 56 medical students and found that visualisation influenced prescription of medications.

In this regard, it is important to note several methodological recommendations that arise from the findings:

1. Educational materials for 1st year students should be moderated by the criterion of absence of various kinds of distortions and errors, which imposes additional responsibility on the developers of educational materials. When introducing new methods of teaching in higher education institutions, such as online learning, VR-trainers, interactive presentations, etc., appropriate methodological work with teachers is necessary. This applies especially to young teachers who are just starting to develop



teaching and learning materials. They should be taught the basics of pedagogical design and methods of questioning their materials, helping them become aware of unintentional ‘manipulation’ of the learner's cognitive processes. Yushen Liu, Stanislav Pozdniakov and Roberto Martinez-Maldonado, in their study of the impact of visualisation on teachers' cognitive skills, note the need for a simpler interface for inexperienced teachers (Liu et al., 2024). Also, different pedagogical purposes have different requirements for content and its design. For example, for the transfer of knowledge in full it is necessary to be guided by the criterion of ‘no distortion,’ while for formative and summative assessment it is acceptable, and in the game form it is even advisable to use the method of ‘embedded error’.

2. Textual ‘sign system’, based on the given results of the study, was closer and more understandable to the students, caused more trust and less difficulties than the structured figurative ‘sign system’ (graphs). The unstructured figurative ‘sign system’ (drawings) had a secondary, additional character. This conclusion can be used in the preparation of presentation training materials, applying on the slides necessarily at least two ‘sign systems’: textual and figurative. However, in order not to make a slide ‘boring’, one should be guided by the well-known requirements of not overloading it with text, and with circumspection add emotional background. Also, following Katkhanova et al. (2018), it is necessary to create conditions for conscious transitions of students as their reflections move from one ‘sign system’ to another. This is achieved, for example, by discussing the slide materials, students' comparison of figurative and textual information on the slide.

3. Critical and analytical thinking of 1st year students should be developed by using a variety of cases. However, it is important that they are based on real-life examples. In this sense, it is important, from the authors' point of view, to focus the student's attention on details, their critical and emotional reflection. This is the advantage of real tasks over solving classical tasks that are methodologically and didactically established and isolated from context. The latter help to structure thinking, develop skills in applying analytical methods, but being devoid of ‘vitality’ and emotional content, they are necessary but not sufficient for the development of students' thinking. Thus, transforming a ‘life’ situation into an analytical scheme or set of equations and correlation with known laws and theorems, gives students an understanding of the applicability of fundamental knowledge and motivates them to study it. This agrees with the findings of Oleksandr Chastnyk and collaborators who concluded that the use of interactive teaching methods and techniques significantly contributes to the creation of communicative relationships in the group and with the teacher. These contribute to the maintenance of a positive atmosphere, and in combination with a high level of professional motivation for learning, contribute to the professional growth of students, effective accumulation and use of knowledge and skills (Chastnyk et al., 2024).

It has been shown in numerous studies that interactive forms of cooperation with students play a significant role in the success of the latter, influencing the effectiveness of achieving educational goals (e.g., Chastnyk et al., 2024). The opinion of teachers also agrees with the need to use interactive teaching methods. For example, Walz, Kane





showed the importance of using puzzles, quizzes, case assignments, role-playing games and group work in teachers' work (Walz & Kane, 2024).

Within this context, the results of the present study emphasise the importance of careful development and moderation of teaching materials, including their content and design, and the need to develop critical thinking in students throughout the learning process.

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Research article

## Natural Language Processing and the Representation of Phenomenal Experience

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### Abstract

This article is an interdisciplinary study of phenomenal judgments through the lens of linguistic correlations using computational linguistics and data mining. The research focus includes perceptual judgments describing interoceptive and olfactory states, considered in the context of the theory of embodied cognition and Charles Sanders Peirce's theory of perceptual judgments. The authors demonstrate that the linguistic expression of interoceptive and olfactory experiences reflects a deep connection between the body, culture, and language, and also reveals culture-specific strategies for conceptualizing sensory experiences. Particular attention is paid to the comparison of “natural” and “synthetic” olfactory judgments that was generated using large language models (LLMs). The developed methodology allows for the identification of parametric differences in lexical diversity, syntactic complexity, and stylistic richness of olfactory descriptions. The conducted analysis confirms that olfactory experience has high semantic instability and polymorphism, which complicates its formalization and automated processing. Nevertheless, the use of modern NLP methods opens up new opportunities for the parameterization of phenomenal judgments and an in-depth study of their structural and cognitive features. The work is of interest from philosophical, humanitarian, and engineering points of view, offering a methodological toolkit for studying the properties of embodied consciousness using methods of computer processing of a natural language.

**Keywords:** Perceptual judgments; Embodied cognition; Interoception; Olfactory experience; NLP; Large language models; Phenomenal experience; Corpus analysis

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Научная статья

## Компьютерная обработка естественного языка и представление феноменального опыта

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### Аннотация

Данная статья представляет собой междисциплинарное исследование феноменальных суждений через призму языковых корреляций с использованием методов компьютерной лингвистики и анализа данных. Исследовательский фокус включает в себя перцептивные суждения, описывающие интероцептивные (внутрителесные) и ольфакторные состояния, рассматриваемые в контексте теории воплощенного познания и теории перцептивных суждений Ч. С. Пирса. Авторы демонстрируют, что языковое выражение внутрителесного и ольфакторного опыта отражает глубокую связь между телом, культурой и языком, а также выявляют культурно-специфичные стратегии концептуализации сенсорных переживаний. Особое внимание уделено сравнению “естественных” и “синтетических” ольфакторных суждений, сгенерированных с помощью больших языковых моделей (LLM). Разработанная методология позволяет выявить параметрические различия в лексическом разнообразии, синтаксической сложности и стилистической насыщенности ольфакторных описаний. Проведённый анализ подтверждает, что ольфакторный опыт обладает высокой семантической нестабильностью и полиморфностью, что затрудняет его формализацию и автоматизированную обработку. Тем не менее, применение современных NLP-методов открывает новые возможности для параметризации феноменальных суждений и углублённого изучения их структурных и когнитивных особенностей. Работа представляет интерес как с философско-гуманитарной, так и с инженерной точек зрения, предлагая методологический инструментарий для изучения свойств воплощённого сознания методами компьютерной обработки естественного языка.

**Ключевые слова:** Перцептивные суждения; Воплощённое познание; Интероцепция; Ольфакторный опыт; NLP; Большие языковые модели; Феноменальный опыт; Корпусный анализ

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## INTRODUCTION

The challenge of studying bodily experience through the lens of linguistic correlations using data science methods points to a new interdisciplinary area of research, in which common concepts and definitions are only just being formed. Natural language processing technologies (hereafter referred to as NLP) allow identifying new properties of the representation of bodily experience, both in regard to linguistic material and to philosophical epistemological. The proposed study results are obtained in the course of research at the intersection of several disciplines: analytical philosophy of consciousness, sensory linguistics, and computer data science.

The problematic dimension of this work lies in the paradigm of “embodied cognition” as opposed to classical computationalism (Baryshnikov, 2022). According to the body-focused approach, perception, action, and cognition are deeply interconnected and conceptualized during a person’s physical interaction with the environment. In contrast, the computational paradigm argues that the neural structures of the brain perform computations similar to those performed by a computer, and that all mental states and cognitive processes can be reduced to basic symbols.

The results of empirical research in recent decades convincingly demonstrate the profound interconnection between human cognitive processes, bodily experience, and the characteristics of natural language both as a system and as an activity. Language plays a special role here, acting as a key instrument for reflecting this connection (Boroday, 2020). The unique property of language is that its use leaves an extensive “textual trace,” which, given the current state of development of computer technology, can be recognized as a data set for computer analysis.

The proposed interdisciplinary approach expands the methodological arsenal and the existing understanding of the role of bodily experience in the formation of linguistic constructions. Data was collected while working with the Russian National Corpus (hereinafter referred to as the RNC). An own experimental collection of Russian literary texts was also created, and illustrative material from exotic languages, borrowed from studies in linguistic anthropology, was used (Kraska-Szlenk, 2023). Despite the new round of development of universalistic approaches (in connection with the revolutionary progress of the Large Language Models (LLMs), we believe that the relativistic approach allows gaining a deeper understanding of how bodily modes of sensation and processes of perception are reflected in the structures of language, and, conversely, how the structure of language influences the results of cognitive processes.

What can data science and natural language processing methods contribute to philosophical studies of phenomenal consciousness? This body-focused approach rejects traditional Cartesian dualism and sees cognition as something we do through our bodies as we interact with the environment. Some contemporary studies criticize the dichotomy often drawn between language and bodily experience, where language is seen as a mechanism structuring unstructured experiences. For example, Christoph Durt argues that such a view ignores how language and pre-linguistic behaviors are rooted in human interactions and how they shape our phenomenal experiences (Durt 2014). Today, the



analysis of language data allows for the extraction of useful information even in those practical areas where mental states are almost indescribable (Gamma & Metzinger, 2021).

Before the neural network revolution, there had been successful attempts to extract markers of mental states from text arrays using traditional algorithmic methods. The results of applying the NLP methods in behavioral science have been described in detail and systematized (Feuerriegel et al., 2025). The strength of these approaches is that computer analysis of texts allows for “visualizing” some objective correlations that are invisible when using other methods of analysis. Texts are data sets (Gentzkow et al., 2019), a kind of “digital traces” of the ways, in which linguistic signs are used. Statistical parameterization of texts allows extracting certain linguistic units and their contextual environment and identifying the features of word usage.

This approach opens up broad possibilities for comparative studies. Today, it is possible to extract linguistic data from phenomenal judgments without any serious technical difficulties, organizing them according to various characteristics: national language, era, age, profession, gender, literary authorship, situational context, emotionality, etc.

Particularly interesting is the comparison of phenomenal judgments that are natural (created by humans) or synthetic (created on retrained LLMs) (Muñoz-Ortiz et al., 2024). One of the stages of the proposed study includes precisely this kind of parametric comparative analysis based on the material of olfactory judgments.

## WHAT DO PERCEPTUAL JUDGMENTS INDICATE?

According to Charles Sanders Peirce perceptual judgments are the first and immediate judgments about what a person perceives with their own sensory system at the moment (Peirce, 1978, 5.116). This type of judgment is the starting point or first premise for all subsequent acts of thinking and reflection.

There are several most significant criteria of perceptual judgments:

- Lack of control and impossibility of criticism. Peirce insists that the process of perceptual judgments formation is uncontrollable and, therefore, is not subject to criticism by logic since the subject is not able to consciously influence how they interpret the primary perception in the form of a judgment (Peirce, 1978, 5.55; 5.115).
- Distinction from percept. A perceptual judgment is not an absolute copy or direct reflection of a percept (perception of a visual image, sensation). It is a statement about the nature of the percept in propositional form.
- First premises of knowledge. Perceptual judgments are the fundamental type of judgments in relation to all other types of rational activity. All other judgments are theories whose validity is based on whether they are confirmed by perceptual judgments (Peirce, 1978, 5.116).
- Perceptual judgments as a case of abduction. Peirce considers perceptual judgments as a limiting case of abductive inferences (hypothetical conclusions). It is important to note that perceptual judgments are the result of a process of interpretation, not of passive reception of sensory signals. This process can be represented as an infinite series of abductions merging into a single act of perception (Peirce, 1978, 5.182; 5.184).



Perceptual illusions, where the interpretation of a figure changes (e.g., the Necker cube, the Penrose triangle), indirectly indicate the kinship of perception and abduction. Such a representation of the perceptual process brings it closer to the modern cognitive theory of “predictive processing” (Mudrik et al., 2025).

It is also important to note that “perceptual judgments” correspond to iconic signs, which are linked to each other by a similarity relation (Peirce, 1978, 5.119). In other words, iconic signs directly stand for the qualities or features described in perceptual judgments.

As a result, based on the Peirce’s definition, we can say that a “perceptual judgment” is a statement in propositional form about the nature of a percept, directly given in experience. Perceptual judgments are closely related to the process of perception, which does not imply passive processing of sensory signals of one of the modalities. This type of judgment is also based on the interpretation of the percept itself for the representation and an understanding of the surrounding reality. Thus, such expressions as „my stomach is all balled up“, “there’s a squeezing feeling in my chest”, “my chest feels tight”, “citrus scent”, “smells like freshly cut grass” are examples of perceptual judgments, since they contain a subjective interpretation of the perceptual signal.

In the context of body-oriented approaches, metaphor is seen as a conceptual and structuring aspect of cognition. Based on the Theory of Conceptual Metaphor (TCM) (Casasanto, 2017; Gibbs, 2004; Zhao, 2023), proponents of “embodied cognition” construct arguments in support of the view that the linguistic representation of bodily experience is extracted from the interaction of the embodied agent with the environment. An earlier version of TCM formed a universalistic view of bodily experience, while representatives of a modern iteration of this theory emphasize the culture specific features of metaphor (Yu, 2020). This approach allows asserting that the properties of linguistic conceptualization are not simply the result of abstract representations, but are extracted from sensorimotor activity and the interaction within the “body – language – culture” triad.

### **Interoception and olfactory experience**

Interoception is a critical aspect of perceiving and processing signals emanating from the intra-body space (e.g., hunger, thirst, fever, pain, etc.). It is also an important mechanism for maintaining the internal physiological state of the body. In recent years, interoception has become an important research object in psychology, neuroscience, neurophysiology, and clinical medicine (Murphy, 2024). Modern empirical data in the field of cognitive science indicate that interoception plays a key role in social cognition, emotional experience (Feldman et al., 2024), self-awareness (Seth & Tsakiris, 2018), and other high-level mental processes.

In this study, we consider the influence of linguistic mechanisms for conceptualizing intra-body experience, since there is an ontological gap between the objective bodily event and the experience of interoception in the first-person perspective. This difference points to the importance of considering not only the neurophysiological correlates of interoception, but also the culturally conditioned forms of conceptualization, by which the speech agent formulates judgments about their own bodily experience. The



interoceptive and olfactory narrative reflects cultural features that influence the qualitative characteristics of subjective experience.

It is generally accepted that the conceptual apparatus of olfactory experience is referential, i.e., referring to an object that emits a certain smell. For example, “smells like a banana,” “the smell of a rose,” “smells like asphalt after rain.” The specific linguistic representation of olfactory experience presupposes the existence of an external object, to which the concept refers. In this regard, it is difficult to talk about the existence of an adequate language, in which independent olfactory concepts exist, as, for example, in the language of visual experience (“red”, “white”, “purple”, etc.).

In the context of cross-cultural linguistic research (Zhang, 2011; Shaules, 2020), telling arguments have been put forward against the thesis that linguistic constructions expressing olfactory experience are poorly suited for naming olfactory phenomena. To prove this, we can give some examples from the Jahai language. This is a Mon-Khmer language spoken by nomadic hunter-gatherers on the Malay Peninsula and it has a rich olfactory vocabulary. This linguistic system includes words for odors that are not associated with the source of the odor (Majid & Burenhult, 2014). For example, in Jahai one can find concepts expressing

- “the smell of blood that attracts tigers (e.g., crushed lice, squirrel blood)”
- “to be fragrant (e.g., various types of flowers, perfume, soap)”
- “the smell of mustiness (e.g., old shelter, mushrooms, stale food)” (Ibid., p. 269).

Unlike English speakers, who tend to use descriptive constructions that point to the actual source of the smell, Jahai speakers tend to use abstract concepts to describe olfactory and visual experiences. These examples demonstrate how cultural practice and linguistic structure influence cognitive perception.

Among the Jahai people, the body serves as a kind of metaphorical template for describing the physical world. For instance, local neighborhoods, houses, and landscapes are described through bodily concepts (Burenhult, 2006). It is noteworthy that this language is distinguished by its referential discreteness in relation to somatic concepts. A consequence of this is the fact that this language does not have a term for “face” or “mouth,” but has a wide range of categories for the constituent parts of the face: frontal tubercle, upper/lower lip, baby tooth, root of the nose (refers to the wrinkles between the eyebrows), etc. (Burenhult, 2006, p. 167).

The above example suggests that perceptual judgments, embodied cognition, and culturally specific conceptualizations of bodily and sensory experience reveal the mechanisms, through which language serves as a tool not only for describing but also for shaping phenomenal experience mediated by the body and culture. The question arises: Can one with current methods teach Large Language Models (LLMs) the principles required for understanding this deep and implicit relationship? Will the generated artificial perceptual judgments have the metaphorical features of bodily conceptualization?





## STATISTICAL PARAMETERIZATION OF OLFACTORY JUDGMENTS

Today, cognitive aspects of olfactory experience attract representatives of various disciplines – from the philosophy of consciousness and cognitive linguistics to applied psychology and AI methodology (Hörberg et al., 2022; Jraissati & Deroy, 2021; Martina, 2023; Young, 2016). Natural language processing (NLP) technologies can help identify the linguistic properties of bodily experience and examine their connections to central epistemological categories in philosophy.

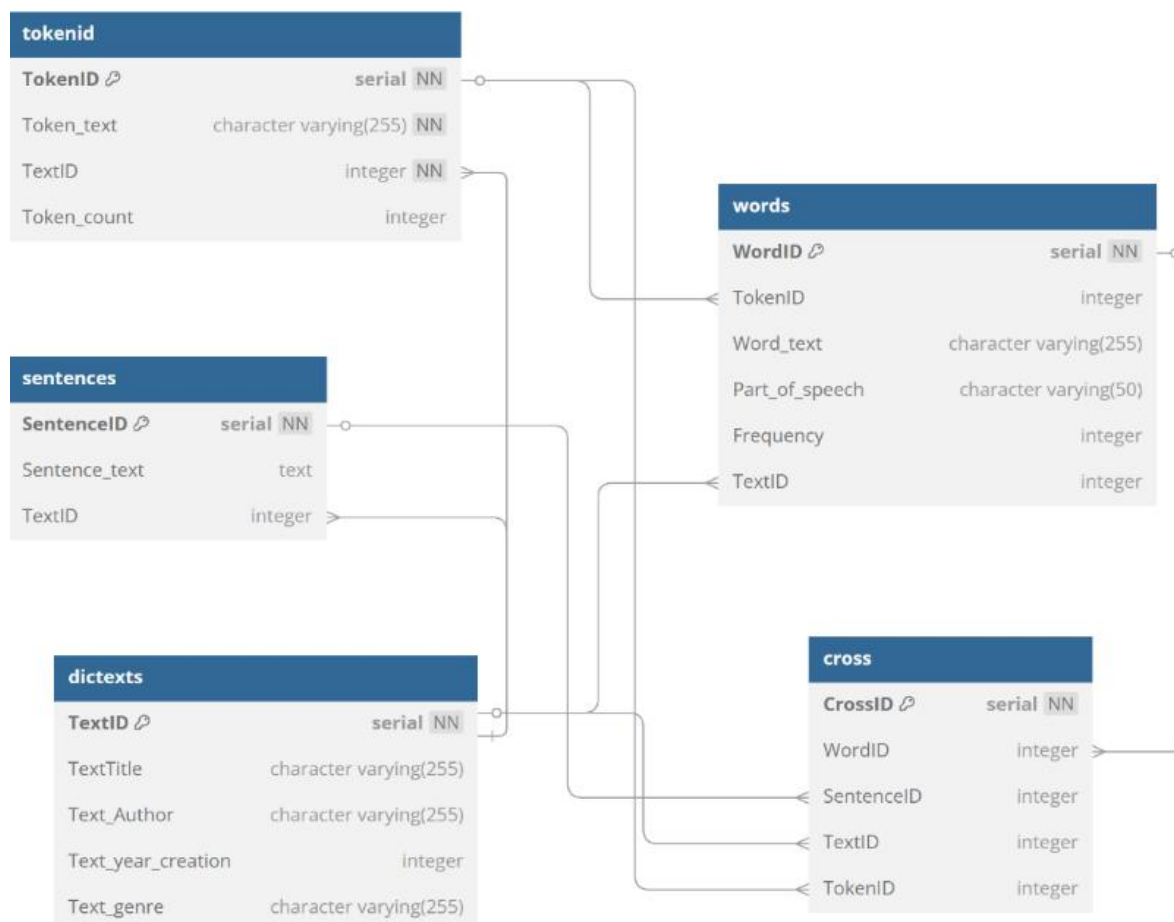
Modern computational linguistics methods allow conducting a wide variety of textual studies. Here are a few possible approaches to the study of olfactory vocabulary:

1. Text analysis by search word (SW). Here, morphosyntactic analysis is used to collect dependent words, i.e. the contextual environment associated with the search word and a related dependent word, e.g., “smell” of „burning.“ This method is convenient when it is necessary to view the frequency of the search word or to derive the frequency of the dependent words.
2. Text analysis for the presence of olfactory code using NER (Named Entity Recognition) or search by a named entity. This method requires a pre-trained model for recognizing named entities. This method is convenient when it is necessary to recognize all possible olfactory descriptions in the text at once. However, there are several significant drawbacks – firstly, the very process of model training, which requires a large amount of labeled data, and secondly, the complexity of verifying the results obtained.

The proposed practical results of the study were obtained through research at the intersection of several disciplines: analytical philosophy of consciousness, sensory linguistics, and computer data science. The study used NLP technologies for the analysis of the text corpus (frequency analysis, clustering, topic modeling). Such an interdisciplinary approach expands the philosophical methodological arsenal and the existing understanding of the role of bodily experience in the formation of linguistic constructions. Data were collected from the Russian National Corpus (RNC), namely our own experimental collection (hereafter referred to as LC\_69) of 69 prose texts of Russian literature (19th–20th centuries).<sup>1</sup> It consists of 690,000 sentences and includes more than 3,000 descriptions (direct and indirect) of olfactory experience.

The relational database consists of five tables linked by an external key according to the M2M principle (“Many-to-Many” is a database relationship where multiple records in one table link to multiple records in another, typically resolved using a junction table.):

<sup>1</sup> The collection of texts is presented here: [https://github.com/kagort/tolstoy-words-local/blob/PN\\_test/verbal\\_forms/data/processed/dicttexts.csv](https://github.com/kagort/tolstoy-words-local/blob/PN_test/verbal_forms/data/processed/dicttexts.csv)



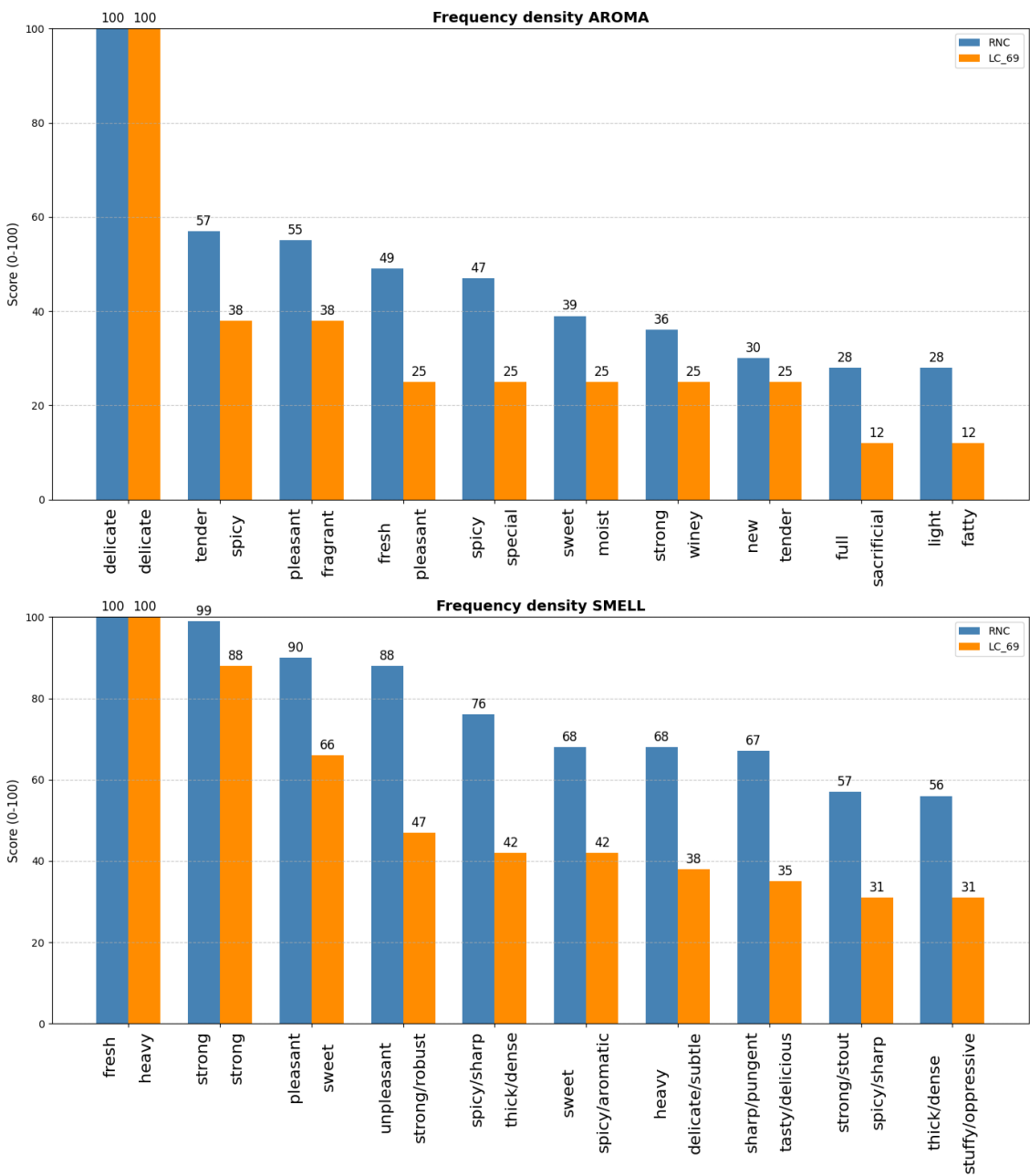
**Fig. 1.** ERD structure of the database of texts from Russian literature

The final list of the top 5 search words includes: “smell” (запах [zapakh]) (1019), “aroma” (аромат [aromat]) (92), “spirit” (дух [dukh]) (74), “stench” (вонь [von]) (57), “stink” (смрад [smrad]) (39). A problem arose with the inconsistent machine lemmatization of the word “perfume” (духи [dukhI]): only by way of manual verification it was possible to determine how many times out of 74 occurrences in the text the word “perfume” (духи [dukhI]) was used and how many times the word “spirits” (духи [dUkhi]) (they are spelled identically but differ in pronunciation and meaning). Taking this into account, the final sample was limited to 4 search words: “smell,” “aroma,” “stench,” and “stink.” For each of the words, its contextual environment was selected according to the following parameters: N+ADJ, N+N.gen (common noun phrase structures: noun + attributive adjective, and noun + noun in the genitive case).

The idea of comparing absolute values of the frequency of the most representative collocates in the RNC and in LC\_69 is dictated by the need to check the dependence of the curve on the frequency density. In other words, the larger the corpus, the smoother should be the drop in values from maximum to minimum.



**Table 1.** Noun + adjective (RNC – blue, LC\_69 – yellow)



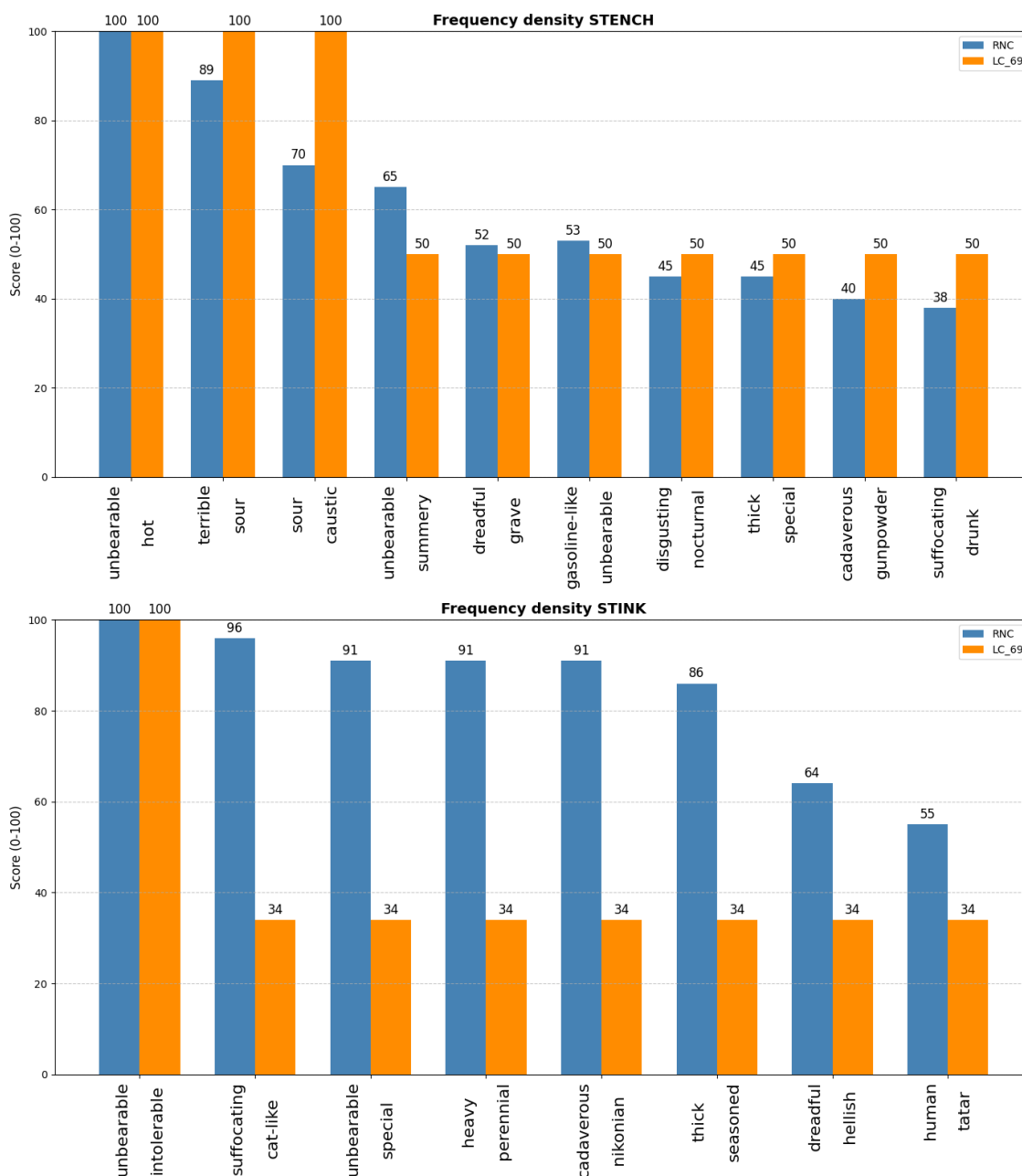


Table 1 shows that with a larger volume, the curve of the collocates (common word pairs) decline is smoother. The only exceptions are cases with the “aroma” lexeme, which may indicate the specificity and contextual limitations of the use of the lexeme itself. Moreover, in the sample of literary texts, the decline is even more pronounced, which may also indicate that “aroma” is not very popular among early classics.

More representative results are shown by the method of lexical series clustering both for the entire corpus and for individual works. As part of the experiment, an algorithm for semantic clustering of lexical units was implemented based on pre-trained



language models and machine learning methods. A table with 662 collocates of the keywords “smell” and “aroma” and a data set of the following structure was submitted for analysis:

**Table 2.** Collocates (N+ADJ, N+N.gen.) and their rates of frequency

Russian Collocation	English translation	Frequency
тяжёлый запах	heavy smell	91
запах духов	smell of perfume	78
сильный запах	strong smell	76
сладкий запах	sweet smell	58
крепкий запах	intense smell	55
запах пота	smell of sweat	53
запах цветов	smell of flowers	49
тонкий запах	subtle scent	44
густой запах	thick smell	40
пряный запах	spicy smell	35
горький запах	bitter smell	32
запах крови	smell of blood	32
запах травы	smell of grass	31
...	...	...

At the first stage, the words were prepared for analysis: for more accurate processing, the data were expanded taking into account the frequency rate of each phrase. After that, each phrase was matched with a numerical representation (a vector) reflecting its meaning in the linguistic context. For this, the neural network model “intfloat/multilingual-e5-large” was used, capable of capturing subtle differences in the meaning of expressions by constructing embeddings for each expression.

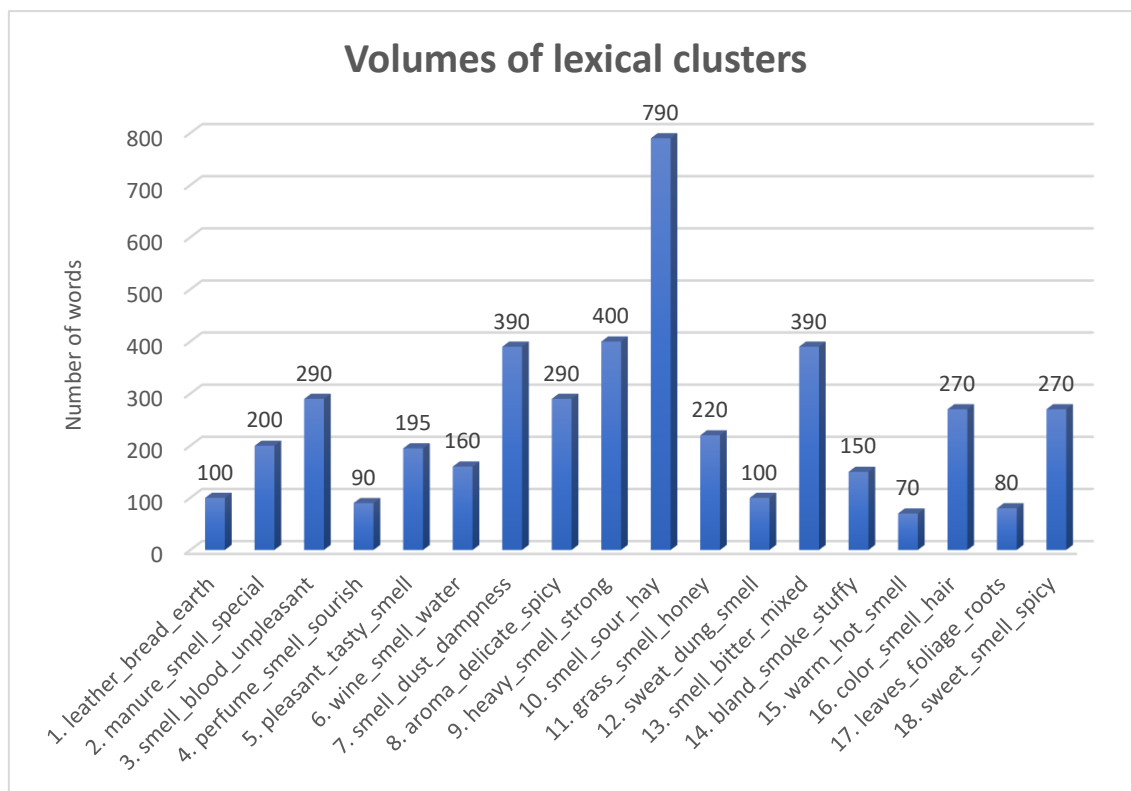
At the next stage, the phrases were combined into groups (clusters) based on thematic proximity. One of the popular machine learning methods, the KMeans algorithm, was used as a basis. To determine how well the resulting groups, correspond





to the natural structure of the data, a special silhouette coefficient was used. This is a kind of “quality assessment” of the grouping, which helps to understand how organically the data is divided into clusters. Each group received a name reflecting its semantic content, based on the most characteristic words.

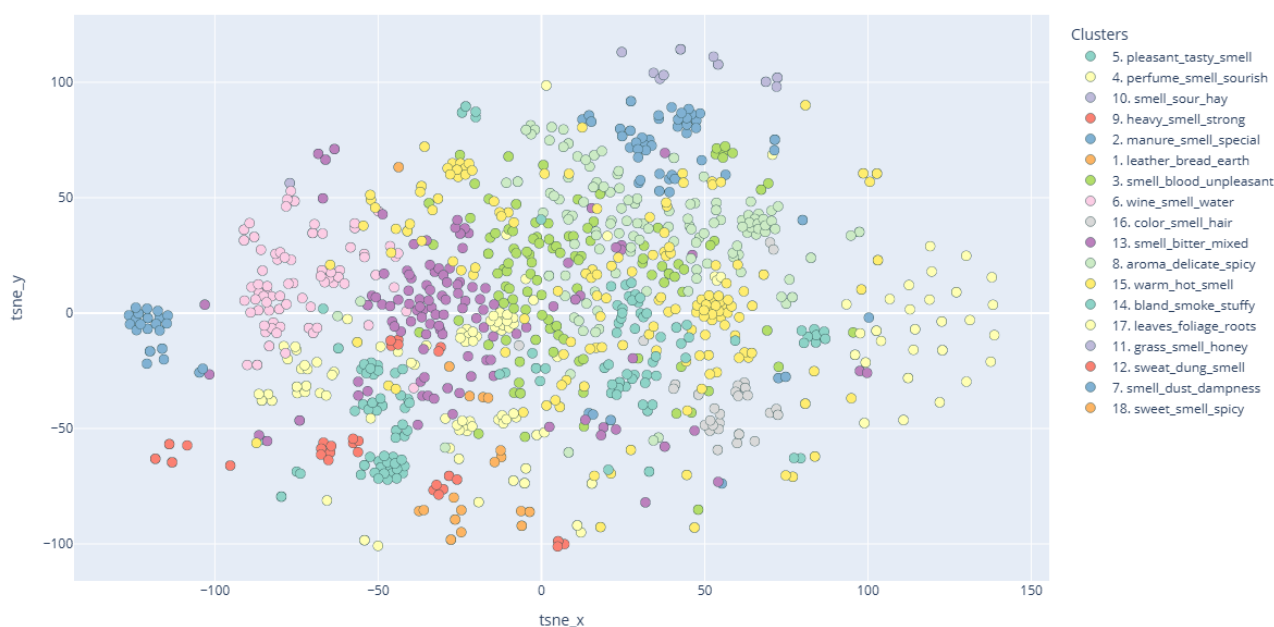
The clustering results were visualized in two-dimensional space using the t-SNE algorithm. This allowed us to see for different phrases how close or far from each other they were in meaning. Cluster distribution diagrams were also generated. However, it should be noted that the results are not always reproducible precisely. When the algorithm is re-run, the cluster structure may change slightly, although the data and parameters remain the same. This is the effect of the operating principles of the model.



**Fig. 2.** Volumes of lexical clusters



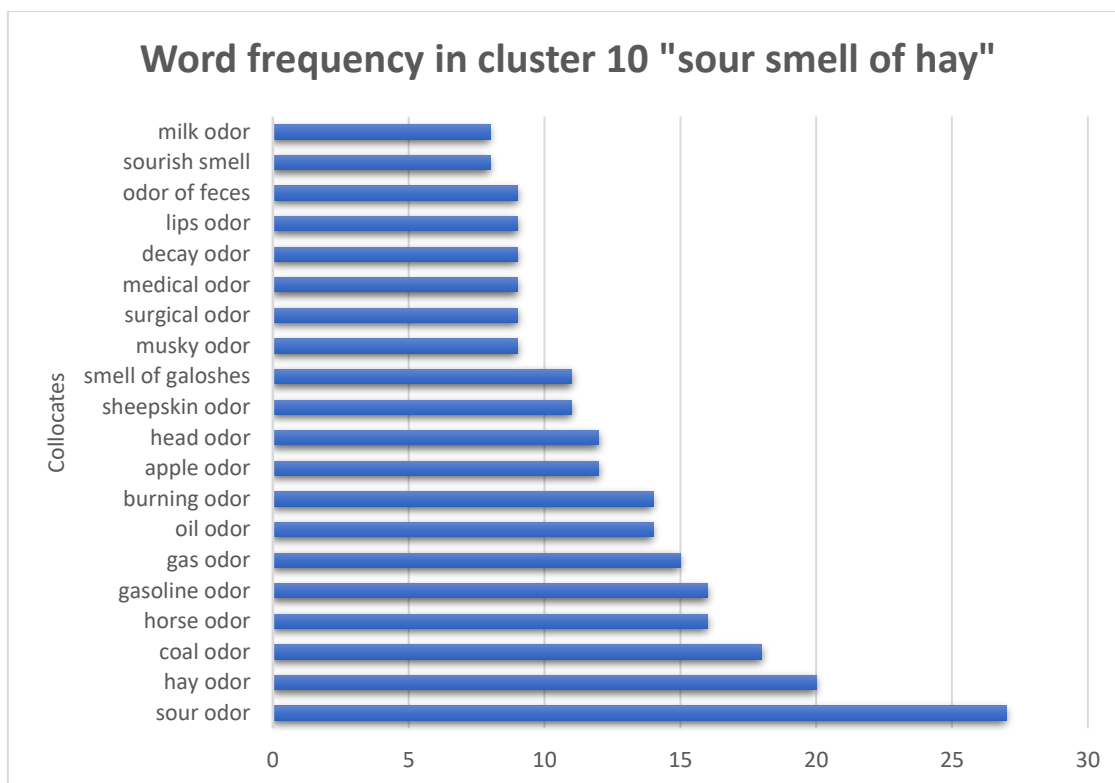
Semantic clustering: 18 thematic groups



**Fig. 3.** Volumes of lexical clusters

This method allows us to identify a unique olfactory trace throughout the text corpus. Cluster 9 named “smell sour\_hay” (the slightly sour smell of aged hay) obviously dominates. “Sour” and “hay” are included in the cluster name due to the largest number of occurrences of one of the collocates. To understand the conditional logic of the model, we decided that it was necessary to build an associative map for a given lexical series related to the concept of smell. We extracted data from the N.gen cluster and, based on these formed strings of pre-calculated wordembeddings. Then these strings were transformed back into NumPy arrays (NumPy arrays — numerical arrays for fast computations in Python). After that, a matrix of cosine similarities between the embeddings of the selected words was calculated, based on which pairs of words with a semantic proximity level above a given threshold (0.7) are formed. Next, an undirected graph was built using the NetworkX library, where nodes represent words, and edges represent significant associative links between them.

It is also important to note that if there is a dominant cluster with volume significantly larger than the average, then its content will appear the least associative. A dominant cluster becomes a "catch-all" category – so broad that the things inside it don't strongly remind us of each other. Hence, its content appears less tightly connected by meaning, perception, or usage.



**Fig. 4.** Word frequency in cluster 10

Automatic thematic grouping of words included in the cluster so far leads to unsatisfactory results. If we group the collocates “hay smell”, “sour smell”, etc., then the graph density becomes very close to 1, i.e. the model recognizes all data as belonging to the “smell/aroma” group. If we analyze a list of dependent words, then the graph density disintegrates.

If we analyze the content of cluster 9, we obtain the following set of 218 dependent lexemes, which can be thematically grouped as follows. See the below Table.

**Table 3.** Results of thematic grouping of lexemes from Cluster 9 using the expert assessment method

Category	Category composition
<b>1. Smells / Descriptions of odors</b>	угля (coal), кислота (acid), кал (feces), кошачий (cat's), гошпитальным (hospital (adj., obsoletism)), эфира (ether), дегтярный (tar (adj.)), ментол (menthol), чесночный (garlic (adj.)), перегар (booze breath), кизячного (dung (adj.)), клоака (cesspool), гумен (manure pits), извержение (eruption), подмышка (armpit), моча (urine), йодоформ (iodoform), хирургический (surgical), больничный (hospital (adj.)), гаря (soot), ржи (rye), хрена (horseradish), калошный (galosh), тлена (decay), асфальт



		(asphalt), угарный (carbon monoxide), звериный (animal (adj.)), ил (silt), сеной (hay (adj.)), гвардейский (guards (adj.)), мужицкий (peasant (adj.)), машины (machine's), уксус (vinegar), хмельной (intoxicating), мазь (ointment), мех (fur), миндальный (almond (adj.)), мускус (musk), клоп (bedbug)
<b>2. Natural/plant sources of odors</b>		герань (geranium), донник (sweet clover), тубероза (tuberose), можжевельник (juniper), васильковый (cornflower (adj.)), чабрец (thyme), чернобыль (полынь) (wormwood), кора (bark), березняк (birch), луговой (meadow (adj.)), глина (clay), зола (ash), воск (wax), чеснок (garlic), лук (onion), капуста (cabbage), картофель (potato), клубника (strawberry), яблоко (apple), груша (pear), фрукт (fruit), огурец (cucumber), сено (hay), травяной (herbal), фиалковый (violet (adj.)), багульник (wild rosemary)
<b>3. Food / Drinks / Dishes / Cuisine</b>	/	яйцо (egg), сок (juice), котлета (meat ball), кушанье (meal), блюдо (dish), кабак (pub (obsoletism)), маслина (olive), квасной (kvass (adj.)), бражный (molasses mash-like), браги (molasses mash), столовый (table (adj.)), каша (gruel), каша (porridge), каравай (round bread (obsoletism)), кухня (kitchen), кухонный (belonging to kitchen), еда (food), корм (food for animals), ветчина (ham), селедка (herring), масло (butter), жир (fat), молоко (milk)
<b>4. Objects / Places / Phenomena</b>	/	утюг (iron), юбка (skirt), бельё (linen), занавеска (curtain), илак (slag), упряжь (horse harness), почка (bud), склянка (bottle (obsoletism)), картуз (cap (obsoletism)), рот (mouth), губы (lips), головы (heads), испражнение (excrement), кот (tomcat), кулиса (drop cloth), воз (cart (obsoletism)), машина (car), дорога (road), пыль (dust), пепел (ashes), лазарет (infirmary (obsoletism)), аптека (pharmacy), больница (hospital), церковь (church), рабфак (workers' faculty (obsoletism)), склеп (crypt), ус (mustache), баз (base), железо (metal), железный (metal (adj.)), железнодорожный (railway (adj.))
<b>5. Chemistry / Medicines / Reagents</b>	/	кислота (acid), эфир (ether), йод (iodine), йодоформ (iodoform), нафталин (naphthalene), хлор (chlorine), керосин (kerosene), бензин (gasoline), угарный (carbon monoxide), уксус (vinegar), спирт (alcohol), одеколон (cologne), клейстер (flour paste), клей (glue), ржавчина (rust), смола (resin), сажа (soot), одеколонный (cologne (adj.))
<b>6. Animals / Animal Smells</b>		коровий (cow's), кобыла (mare), кот (tomcat), котлета (meat ball), конь (horse (male)), лошадь (horse (female)), кошка (cat (female)), тюлень (seal), мышь (mouse), крыса (rat), муравей (ant), паук (spider), комар (mosquito), клоп (bed bug), пчела (bee), оса (wasp), муха (fly), собака (dog), змея (snake), свиной (pig (adj.)), конский (horse (adj.)), лошадиный (equine (adj.))



<b>7. Colors / Textures / Properties</b>	белёный ( <i>bleached</i> ), зелёный ( <i>green</i> ), кисленький ( <i>slightly sour</i> ), кисловатый ( <i>sourish</i> ), кислый ( <i>sour</i> ), бархатистый ( <i>velvety</i> ), лакированный ( <i>varnished</i> ), томительный ( <i>languid</i> ), густой ( <i>thick</i> ), жидкий ( <i>liquid</i> ), сладкий ( <i>sweet</i> ), горький ( <i>bitter</i> ), острый ( <i>spicy</i> )
<b>8. Metaphors / Abstractions / Images</b>	юность ( <i>youth</i> ), время ( <i>time</i> ), воспоминание ( <i>memory</i> ), страх ( <i>fear</i> ), радость ( <i>joy</i> ), любовь ( <i>love</i> ), дом ( <i>home</i> ), детство ( <i>childhood</i> ), старость ( <i>old age</i> ), весн ( <i>spring</i> ), лето ( <i>summer</i> ), осень ( <i>autumn</i> ), зима ( <i>winter</i> ), вечер ( <i>evening</i> ), рассвет ( <i>dawn</i> ), ночь ( <i>night</i> )

The results of experiments with olfactory vocabulary demonstrate limited functionality, which indicates, on the one hand, the technical limitations of the NLP models used, and on the other hand, the peculiarities of olfactory experience as one of the types of sensory perception. Olfactory experience is characterized by high individual variability and emotional coloring. The perception of smells is closely connected to associative memory, which makes the linguistic expression of the olfactory profile of perception extremely unstable and polymorphic – a smell can be described through objects, metaphors, textures, colors, as well as abstract images and affective states.

Unlike visual or auditory perception, which have stable categorical systems (colors, shapes, volume, timbre), olfaction does not have a developed conceptualized structure, which complicates its verbalization and formalization. The language of smells turns out to be extremely conditional and therefore is difficult to classify by machine learning tools focused on the rational-conceptual organization of language. The presented results can be analyzed in two projections:

Negative projection. The poor quality of clustering points to a fundamental characteristic of olfactory vocabulary, namely the dependence of this perceptual mode on bodily experience. This characteristic is an important factor limiting the possibilities of automatic analysis and requiring the development of specialized approaches that take into account the somatic and affective nature of odor perception.

Positive projection. The clustering and thematic modeling of olfactory judgments requires a different engineering approach. For example, labeled training datasets of olfactory judgments (see Table 3) will help to further train LLMs in order to navigate the conceptual blurriness of olfactory judgments based on statistical relationships and patterns.

After the first stage of additional training, sets of “synthetic” olfactory judgments were obtained, for the analysis of which additional metrics were developed. The use of these metrics should be aimed at obtaining a verifiable result that allows distinguishing the features of “natural” and “machine” types of conceptualizations.





## OBTAINING “SYNTHETIC” OLFATORY JUDGMENTS

One of the stages of the experiment was further training of the model for the task of generating perceptual judgments with olfactory description.

This process was carried out on the Qwen 2.5-7B model, namely, on its adapted version for the Russian language (Hugging Face: RefalMachine/ruadapt\_qwen2.5\_7B\_ext\_u48\_instruct). The initial data were sentences containing olfactory vocabulary, taken from Russian classical literature. The model was further trained using the Unsloth library, which supports dynamic 4-bit quantization (Unsloth - Dynamic 4-bit Quantization).

Along with the quantization of the model, LoRA (Low-Rank Adaptation) was used. LLMs (Large Language Models) are pre-trained on a large corpus of general data and can then be customized for specific task(s). Due to the large size of the LLM, full customization of all parameters becomes prohibitively expensive. Using LoRA reduces the number of parameters to be trained, which results in reduced training time and GPU memory usage while maintaining the quality of the output data. Thus, additional training of the Qwen 2.5-7B model using quantization and LoRA allowed us to adapt a large pre-trained model to a specific task and dataset without retraining the entire model. LoRA is embedded only in certain layers of the model, which reduces the number of parameters to be trained, reduces GPU memory requirements, speeds up training, and improves the accuracy of the model for specialized tasks.

Each sentence from the corpus was designed as an instruction + response, using the Alpaca style prompt structure. This dataset organization allows the model to correctly extract the necessary information from the instruction. The texts were then converted into a list of dictionaries and loaded into the HuggingFace Dataset format.

For additional training, SFTTrainer (supervised fine-tuning) from the Unsloth library was used, which made it possible to efficiently use the available video memory (15 GB) and significantly reduce computational costs while maintaining the efficiency of training.

After completing the additional training stage, several inference runs were conducted to evaluate the generative capabilities of the model. The values of the temperature parameter (which regulates the randomness of model output) were iterated from 0.40 to 0.85 with a step of 0.05.

For each temperature value, the model generated 100 sentences using a random instruction:

*“You are an author writing about your olfactory experience. Your task is to create descriptions of smells, immersing the reader in your sensations. Use olfactory markers of your choice for description: aroma, smell, stench, fragrance, feter, odor, stink, incense, etc.”*

*“Write a literary text in which smells reveal the inner state of the character. Use metaphors, comparisons, and unexpected images. Don’t limit yourself to the word ‘smell’, use words like ‘aroma’, ‘stench’, ‘fragrance’, ‘feter’, ‘odor’, ‘stink’, ‘incense-’.”*



*“Convey the atmosphere of the scene through smells: let them reflect the characters’ feelings, evoke associations, or heighten tension. Write figuratively and metaphorically.”*

The generated texts were saved in separate files for each temperature value. According to the results of manual analysis of the texts, the most meaningful were the sentences composed at a temperature of 0.4, which formed the basis of the dataset of generated texts with olfactory markers.

As a result, a dataset of 4323 synthetic or machine descriptions with contexts was obtained. In fact, the expert assessment method allowed us to identify repetitions in the structure, poor lexical compatibility, and stylistic errors.

For example:

(1) В дальнем углу комнаты, где свет почти не достигал, можно было уловить слабый запахок плесени. Он напоминал о том, что время не щадит ничего, даже самые изысканные ароматы могут быть омрачены неприятными запахами.

(In the far corner of the room, where the light barely reached, a faint smell of mold could be detected. It was a reminder that time spares nothing, even the most exquisite aromas can be overshadowed by unpleasant ones.)

(2) В воздухе витал аромат цветущих яблонь, смешиваясь с медовым запахом полевых цветов.

(The air was filled with the scent of apple blossoms, mingling with the honeyed scent of wild flowers.)

(3) В воздухе витает аромат свежескошенной травы, смешанный с благоуханием цветущих садов.

(The air is filled with the scent of freshly cut grass, mixed with the fragrance of blooming gardens.)

(4) Но не всё было так сладко. Вдали, на окраине деревни, можно было уловить зловоние гниющих отходов, которое резко контрастило с общей картиной утренней свежести. Этот смрад, казалось, проникал в каждую щель, напоминая о несовершенстве мира.

(But not everything was so sweet. In the distance, on the outskirts of the village, one could detect the stench of rotting garbage, which contrasted sharply with the general picture of morning freshness. This stench seemed to penetrate into every crack, a reminder of the imperfections of the world.)

Our tasks included developing statistical evaluation metrics that could identify regular parametric differences between “natural” and “synthetic” olfactory descriptions. An algorithm was created that implemented a complex analysis of lemmatized tokens, capable of extracting frequency characteristics from text data using `psql` and `pandas`. The program builds regular expressions to search for all forms of a word, calculates the frequency of tokens, the number of sentences in which they occur, and analyzes dependent parts of speech and sentence lengths, subsequently saving the results in tables.

Here we will present only the final results:

**Table 4.** Comparison of parameters of “natural” and “synthetic” olfactory descriptions

Indicator	Natural Tokens	Synthetic Tokens
Unique tokens	34	19
Average number of token occurrences	706.5	516.2
POS variety (on average per token)	9.68	8.95
VERB_HEAD	2809	1025
NOUN	2106	701
ADJ	1454	295
ADP	546	93
VERB	500	431
VERB_HEAD	2809	1025

The corpus with “natural” tokens has higher lexical diversity, average word length, and variety of grammatical roles. This may indicate greater stylistic or semantic richness. In all POS categories, the corpus of “natural” tokens demonstrates significantly higher absolute values. The difference is especially noticeable in adjectives (ADJ), nouns (NOUN), and adpositions (ADP), which indicates greater descriptiveness and syntactic ramification. It is worth mentioning the problem of back translation which arises from the fact that a decrease in lexical variability may be associated with the features of the model architecture. Most modern multilingual LLMs are trained on English-language data. Therefore, when working with other languages, a “back translation effect” occurs frequently, namely when the model first generates a response in English and then translates it into the query language (Zhang et al., 2020). As is known, English has one of the richest vocabularies among the languages of the world, while Russian is more complex in morphosyntactic terms. This may explain the great variability in lexical compatibility and the general lexical richness of the Russian language, especially in limited thematic domains (Mariko, 2025).

The most obvious general characteristic of LLMs is manifested in the peculiarities of the average sentence length. Our hypothesis was that the length of sentences with the selected tokens differs significantly in the generated and natural texts. To test the hypothesis, we used the classical Walsh t-test (Shaules, 2020), since it can be used on small samples to compare average values with different variances. For 10 of the 12 studied pairs of tokens, the differences in the average sentence length are statistically significant ( $p < 0.05$ ). The average sentence length in synthetic texts was 14–17 words



versus 21–37 words in natural texts. The variance of sentence length in synthetic texts was significantly lower, indicating a smaller variety of syntactic constructions.

It is evident that the language model produces sentences that are shorter and also syntactically more uniform than natural human texts. This reflects a fundamental feature of LLMs: they are optimized to reduce prediction uncertainty and enhance local coherence, which leads them to favour common, predictable syntactic structures. In contrast, human descriptions of embodied or sensory experiences often exhibit irregular, fragmented, or metaphor-rich syntax, reflecting the difficulty of putting pre-reflective, non-propositional states into words. The model, however, replaces this expressive variability with repetitive templates (e.g., “It smells like X” or “It has a X smell”), thereby smoothing out the linguistic traces of phenomenological effort. As a result, while the generated text appears fluent and coherent, it lacks the cognitive and affective complexity that characterizes authentic perceptual reports. We can conclude that, this syntactic simplification is therefore not merely a stylistic limitation, but a systematic bias that masks the richness and ambiguity of embodied experience behind a surface of grammatical regularity.

## CONCLUSION

Language judgments related to the perception of odors and the experience of intra-corporeal (interoceptive) states are an important research object. Semantic properties expressed in statistical parameters allow revealing the features of bodily conceptualization through the “prism” of a particular linguistic picture of the world. The problem of sensory experience verbalization is well covered in modern research (Nagornaya, 2014; Winter, 2019). Nevertheless, natural language processing (NLP) technologies often ignore bodily aspects, which creates a certain gap in the adequate interpretation of sensory metaphors and socio-cultural contexts. In this study we developed and applied analytical methods to odor-experience text collections that enable its systematic detection – revealing measurable parameters of lexical, syntactic, and stylistic divergence. Perhaps, further developments will help to reduce the detected parametric gap. We see such an applied interdisciplinary approach as promising for both philosophical generalizations and engineering knowledge.

In defending the body-oriented approach in discussions of the phenomenal content of consciousness, we have substantiated that olfactory experience in natural language is described through a wide range of lexical collocations, including objects, emotions, colors, and abstract images, which indicates the polymorphism of experience and its emotional richness. Judgments describing phenomenal experience represent access to a complex system of relationships between individual introspective reports and the socio-cultural component of language habits. These relationships and their context-dependencies remain inaccessible (or available only in a distorted form) to machine learning methods. Modern computer methods of natural language processing can help us implement the principles of strict parameterization of phenomenal judgments. This allows performing a contrastive analysis – of vocabulary, grammar, stylistics, and other language levels – of natural and synthetic perceptual descriptions, those found in the corpus and



those generated by a LLM after additional training. A comparative analysis of human- and machine-generated olfactory descriptions reveals tendencies by LLMs of statistical generalization of lexical composition along with syntactic simplification – strengthens the position of those who endorse philosophical anti-computationalism.

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