



SOFIA UNIVERSITY "ST. KLIMENT OHRIDSKI"

FACULTY OF PHILOSOPHY

REVIEW AND OPINION

on the Ph.D. thesis:

**„INFORMATION AND ENTROPY: KNOWLEDGE STRUCTURES IN THE AGE OF
ARTIFICIAL INTELLIGENCE”**

submitted in fulfillment of the degree of Doctor of Philosophy

Ph.D. candidate: Andreas Chetkowski

Supervisor: prof. Rossen Russev

Reviewer: assoc. Prof. Gerasim Petrinski, Ph.D.

Ph.D. candidate

Andreas Chetkowski holds a Master's degree in German Philology and Economics from the Technical University of Berlin. His specialization areas include 19th and 20th-century literature, the history of economic thought, and political economy. He was officially enrolled as a full-time doctoral student by Order No. RD 20-900/02.07.2020.

Chetkowski completed all activities outlined in his approved individual doctoral plan, submitting regular progress reports that were reviewed and accepted during departmental meetings of the "Logic, Ethics, and Aesthetics" department in the corresponding academic years. He met the requirement of earning at least 60 credits annually through educational, pedagogical, and research work. Throughout his doctoral studies, Chetkowski published three articles in peer-reviewed journals relevant to his dissertation (one currently awaiting publication) and met the minimum academic criteria stipulated by the Law on the Development of Academic Staff.

He has been cleared for public defense within the legally prescribed timeframe, having adhered to regulatory requirements and the rules of Sofia University "St. Kliment Ohridski." The academic jury for his defense was established by Order No. ПД 400/12.07.2024, following a decision by the Faculty Council of the Faculty of Philosophy on 02.07.2024 (Protocol 13). Thus, the appointed jury members are Prof. Alexander Lyubenov Gungov (SU), Assoc. Prof. Gerasim Ivanov Petrinski (SU), Prof. Pravda Dobrinova Spasova (National Academy of Arts), Prof. Daniela Vasileva Sotirova (Technical University), and Assoc. Prof. Marina Ivanova Bakalova (Institute for Philosophy and Sociology at the Bulgarian Academy of Sciences). At its first meeting, the jury elected Prof. Gungov as chair and scheduled the public defense for Thursday, October 31, 2024, at 16:00.

No instances of plagiarism were detected in the final version of the dissertation.

Ph.D. thesis

The topic of the dissertation fully aligns with its content. It is notable for its relevance, especially in light of the significant shifts in communication practices and theories due to the emergence of "strong Artificial Intelligence" (see p. 7). Unlike the "weak A.I." we've been using

for over a decade, strong A.I. seeks to replicate human cognitive processes closely. With its highly complex and engaging nature, this topic combines methodologies and subject matter from the exact sciences (such as informatics and physics) and philosophy.

From my perspective, this research is a pioneering and valuable interdisciplinary study, blending theoretical and practical aspects. It has the potential to not only spark interest but also inspire a deeper exploration of the communicative-rhetorical and philosophical-linguistic dimensions of modern technology within today's cultural zeitgeist (p. 8). It establishes a crucial link between information theory in the "Digital Age" (a term used with some caution) and various branches of philosophy, particularly epistemology and ethical concerns (see p. 22). We find ourselves in a postmodern world where form increasingly precedes content, and semantics is "switched off" (p. 30). Strangely and unexpectedly, it seems to fulfill Oswald Spengler's grim 1918 prediction that engineers would replace humanities scholars. In this context, Chetkowski's research is fundamental and valuable, as it emphasizes the philosophical and humanistic dimensions of information, in stark contrast to the "mechanization" of knowledge by ultra-wealthy, self-satisfied, and intellectually confused Silicon Valley gurus.

I must emphasize from the outset that this dissertation is an exemplary interdisciplinary study and a significant contribution to the field. It is highly refined and mature, showcasing the candidate's ability to synthesize knowledge from multiple disciplines.

The structure is clear and precise, aligning well with the content. The dissertation spans 176 pages, including an introduction, three chapters, a conclusion, key contributions, and a comprehensive bibliography, which lists an impressive number of sources, predominantly in English and German.

The text is well-organized, with chapters of a balanced length that maintain a steady pace and keep the reader engaged. This feature reflects both the candidate's strong academic guidance and his skill in structuring scholarly work.

In the introduction (pp. 5–13), Chetkowski provides a clear rationale for the chosen topic, outlining the key points of the study. On page 8, he identifies the central focus of the dissertation: "the epistemic nature of information and its historical shifts in status." The latter part of the introduction gives a brief overview of each chapter (pp. 5–7). Given the interdisciplinary nature of

the subject and its relevance across multiple fields (including the exact sciences, natural sciences, humanities, and social sciences), Chetkowski chooses to focus on the relationship between information and entropy, analyzed through the lens of semiotics, mainly drawing from thinkers like Peirce and Morris. He also presents an intriguing preliminary examination of the concept of "entropy," interpreting it as inherently subjective, much like the ideas of "order" and "disorder." The introduction suggests a clear tendency toward relativism and subjectivity in Chetkowski's approach, particularly regarding information (see especially p. 13). This inclination seems well-grounded, and it is not surprising that rhetoric—historically the first discipline to deal with the transmission of information—has long been linked to the development of relativism.

In the first chapter (pp. 14–78), Chetkowski presents a thorough and illustrative analysis of the definitions and historical evolution of the term information and the various meanings that different epochs have attributed to it. However, I believe the historical overview on pages 14-15 could benefit from a more comprehensive approach, as it lacks depth. Additionally, I was surprised to find a lack of discussion on First Sophistic in the section concerning the relationship between information and knowledge. It is important to note that the key to modern information theory may not lie solely in Plato's "Forms" or his transcendental conception of truth—both of which the candidate discusses extensively—but rather in the sophistic relativism and even subjectivism of Protagoras. Chetkowski's insightful observation about the subjective nature of entropy, especially in distinguishing truth from falsehood in the vast flow of information as a personal, even intimate, activity for each user, resonates deeply with the dialogue between Socrates and Protagoras in the *Theaetetus* (which is notably absent from the overview). This dialogue examines the essence of knowledge and its connection to individual perception and experience. Despite such oversights, the dissertation's overall quality is indisputably high.

In the first part of the chapter, Chetkowski also examines the theoretical connection between information and history, specifically focusing on historical memory. This approach effectively clarifies the 'Digital Age' concept within our societal consciousness. He compellingly argues, 'We are not in the information age, but in the age of big data and cheap computational power' (p. 19). His thorough, analytical examination of the historical development of the 'Digital Age' from the mid-19th century to the present is commendable and reassuring in terms of the quality of the analysis.

The second part of the chapter delves into the origin of the term 'information.' Here, the focus on etymology is prominent, well-justified, and insightful. I would have expected a more detailed explanation of the connection between the Latin *informatio* and the Greek *εἶδος* in Plato's philosophy - mainly because such an etymological connection doesn't exist (the Greek word for 'form' is *μορφή*). Additionally, it is essential to recognize that ancient Greek philosophy extends beyond Plato's theory of forms ('Eidos philosophy'), which does not encompass the full scope of ancient Greek thought.

The third section of the chapter addresses modern information theory, with particular attention given to Hartley, Shannon, and Weaver. Their model, which focuses on formal 'technical' criteria, appropriately ties information to uncertainty (a decision yet to be made) and thus to entropy (p. 32). Chetkowski's critique of Shannon's model, particularly its omission of the semantic dimension of information, is a critical issue not only for information science but also holds immense significance for the very structure of the methodologies we use in science. It influences how formal logic relates to the semantic level reflected in syllogisms and propositions.

The appeal of Shannon and Weaver's approach, despite its shortcomings—well-suited to engineering but less applicable in the humanities and social sciences due to its focus on technical criteria and its omission of the semantic dimension—naturally transitions into the chapter's fourth section, which explores the intersection of the relationship between linguistics and information. Chetkowski insightfully discusses the semiotic models of F. de Saussure, Ch. Peirce, U. Eco, and others, though he overlooks some key contributions, such as A. Richards' semantic triangle, the speech act models of Searle and Austin (locution, illocution, perlocution), and particularly Alex Bavelas's communication models from the late 1940s (Chain, Circle, Star, Hairpin, and multichannel networks).

In the following part of the chapter, the doctoral candidate explores the cybernetic approach to information and communication. This method is highly beneficial not only for mathematical and engineering sciences but also for understanding propaganda theory and even advertising. The transmission of information is undoubtedly a form of control, as we can all feel from the overwhelming and often toxic flood of commercial (and other) advertisements that pollute our infosphere.

In conclusion, I believe that Chetkowski has done an excellent job of processing a vast amount of theoretical material from both philosophy and communication theory. He has applied these theories effectively and creatively to the subject of his dissertation. I might have structured the content differently—perhaps by analyzing the cybernetic approach alongside the Shannon-Weaver model (since both are "technical") and by discussing von Foerster's constructivism (which centers on self-organization) in connection with Saussurean structuralism. However, I find the text well-executed in its current form.

Chapter Two (pp. 78–110) offers an in-depth exploration of "information entropy." As a dissertation should combine both compilative and original contributions, this section, in my view, presents the most significant innovations of the study. After discussing the models proposed by essential thinkers such as Shannon, Wiener, von Foerster, von Weizsäcker, and others, the candidate effectively describes and analyzes their concepts of entropy in a broader theoretical context.

The first part of the chapter (pp. 77–86) is a testament to the depth and breadth of the research, with a significant focus on entropy in thermodynamics. This section is an outstanding example of interdisciplinary research, broadening our understanding of entropy's applications in other fields, such as cultural and historical studies. The candidate's similar approach in the discussion of entropy in physics, primarily through the structural theory of Carnap, is truly commendable. The doctoral candidate's solid analytical abilities and deep understanding of the subject matter are evident in the practical analysis of the contradictions between Wiener's and Shannon's views on the relationship between entropy, or "negentropy," and information (p. 92 ff.). This analysis is particularly impressive and adds significant value to the study.

The third chapter (pp. 110–154) focuses on the information processing. The first part of the dissertation provides a concise historical overview, starting with the Gutenberg printing revolution and extending to the present day (pp. 110–131). Chetkowski goes beyond simply listing dates and events, offering a deep analysis of major philosophical schools and thinkers, such as Thomas Hobbes, Francis Bacon, René Descartes, Gottfried Leibniz, Martin Heidegger, and others, examining their views on information processing. I commend the doctoral candidate for applying a historical-philosophical approach in his narrative. However, I would suggest (if the text is published) including additional "information revolutions" in human history, such as the shift from

hieroglyphic and syllabic writing systems to alphabets around the Bronze-Iron Age transition, the invention of parchment and the change from scrolls to codices, the introduction of minuscule script, and the development of paper as a low-cost medium for mass information. This recommendation is not about adding unnecessary or redundant detail. It highlights that, while the invention of the printing press was a significant event before the modern era, human history can also be viewed as a continuous flow of information punctuated by various 'revolutions.'

The final two sections of the chapter focus on the hermeneutic structure of knowledge and the ideas of Wilhelm Dilthey, who defined the humanities as "the science of experience" (p. 155). Chetkowski presents key definitions of "artificial intelligence" and introduces his creative ideas on the subject, once again applying his "etymological" approach. I find this section comprehensive and imaginative, and I applaud him for both his mature scholarly method and his meticulous attention to terminological details. I rarely encounter such precision in handling terms from Latin and even Proto-Indo-European roots, and as a philologist, I found the text to be intellectually enriching.

The conclusion (pp.) is comprehensive and effectively complements and summarizes the content.

Bibliography and citations

The citations and bibliography meet the requirements for an academic text.

Language, style, and terminology

Chetkowski follows the conventions of academic language and style. The summaries that introduce each section help to enhance the overall clarity and make the material easier to understand and navigate.

Summary of the thesis

The summary of the thesis clearly and accurately presents all thematic parts of the dissertation. It is informative enough and meets the regulatory requirements.

Publications

During his academic studies, Chetkowski published three articles in peer-reviewed journals (two in German and one in English), reflecting a sustained interest in Wilhelm Dilthey's work, with two of the studies specifically dedicated to this scholar. One of these articles has been accepted for publication, with a confirmation note provided. These publications align with the research topic explored in his dissertation and demonstrate his focused research and academic commitment. Through this work, the doctoral candidate has successfully fulfilled the minimum publication requirements set by law and the regulations of Sofia University "St. Kliment Ohridski."

Contributions

Questions

I want to ask the doctoral candidate the following clarifying questions:

1. The modern world, particularly the Western one, is highly 'textual.' As scholars, we belong to a 'textual' community—building on texts, commenting on them, and expanding them in pursuit of new knowledge, both in terms of facts and methodology. Do you believe that this continuous flow of information, which has been surging since the Hellenistic era, is now becoming an overwhelming flood in the age of the Internet and artificial intelligence—not just in terms of quantity but also, I might say, conceptually?
2. If so, do you think breaking out of this 'textual cycle' is necessary to reach new forms of understanding and knowledge?
3. Finally, contrary to Weizsäcker's suggestions, do you think we should prioritize imagination over information—at least temporarily—if we wish to achieve new insights? Is there another way to do this?

Conclusion

The dissertation presented for public defense fully complies with such research's formal and procedural requirements. From a content perspective, I would like to reiterate that this is an exceptionally well-developed academic study marked by originality and high scholarly value. The candidate exhibits excellent skills in analyzing information and presenting arguments concisely and clearly. The text frequently impresses the reader with its innovative approach. The structure and style of the dissertation are well-organized, with clear and accessible language. Based on the strengths mentioned above, and despite a few minor shortcomings that do not significantly impact the quality of the work, I have no hesitation in recommending that the esteemed academic committee award Andreas Chetkowski the title of "Doctor of Philosophy." I will confidently vote in favor during the final public defense.

Sofia,

06.X.2024

/assoc. prof. Gerasim Petrinski/