

IDENTIFYING PROBLEMS AND SOLUTIONS IN THE TEXT

Jabborova Dildora Zokirjanovna

Department of English language theoretical aspects senior teacher PhD
Uzbekistan State World Languages University
e-mail: dilyacity89@gmail.com

Dusanova Dilafruz Abduraufovna

Uzbekistan State World Languages university
First English faculty
Foreign language and literature
e-mail: dilafruzdusanova167@gmail.com

Annotatsiya. Ushbu tadqiqot matnlarda uchraydigan muammo–yechim tuzilmasini o'quvchilar hamda avtomatlashtirilgan tizimlar qanday aniqlashini o'rganadi. Mazkur tuzilma keng tarqalgan bo'lsa-da, ko'pincha murakkab xarakterga ega bo'lib, unda muammolar va ularning yechimlari ba'zan yashirin, tartibi o'zgargan yoki o'zaro chatishib ketgan holda ifodalanadi. Ushbu tuzilmani anglash o'qish jarayoni, ta'lim, professional muloqot hamda sun'iy intellekt uchun muhim ahamiyat kasb etadi, biroq ayniqsa aniq bog'lovchi vositalar mavjud bo'lmagan matnlarda u yetarlicha o'rganilmagan. Tadqiqot uchta asosiy savolni ko'rib chiqadi: qaysi lingvistik ko'rsatkichlar (masalan, bog'lovchilar, baholovchi sifatlari, modal fe'llar) muammo va yechimlarni ifodalaydi; abzats chegaralari va sarlavhalar kabi matn xususiyatlari ularni aniqlashga qanday ta'sir ko'rsatadi; hamda aniq tashkiliy belgilar mavjud bo'lmagan narrativ yoki argumentativ matnlarda qanday qiyinchiliklar yuzaga keladi. Tadqiqotning maqsadi o'qish metodikasi, texnik yozuv hamda tabiiy tilni qayta ishlash uchun amaliy ahamiyatga ega bo'lgan konseptual asos ishlab chiqishdan iborat. Umuman olganda, tadqiqot muammo va yechimlarni aniqlash jarayoni matn ichidagi belgilar hamda o'quvchining oldingi bilimlari o'zaro ta'siri natijasida shakllanuvchi dinamik talqin jarayoni ekanligini ta'kidlaydi.

Kalit so'zlar: muammo–yechim tuzilmasi, diskurs tahlili, o'qishni tushunish, lingvistik markerlar, tabiiy tilni qayta ishlash

Аннотация. Данное исследование посвящено тому, как читатели и автоматизированные системы распознают структуру «проблема–решение» в текстах — распространённый, но зачастую сложный тип организации, при котором проблемы и их решения могут быть выражены имплицитно, переставлены или переплетены. Распознавание этой структуры имеет ключевое значение для понимания текста, образования, профессиональной коммуникации и искусственного интеллекта, однако остаётся недостаточно изученным, особенно в случаях, когда тексты не содержат явных переходных маркеров.

Исследование рассматривает три основных вопроса: какие лингвистические маркеры (например, союзы, оценочные прилагательные, модальные глаголы) сигнализируют о проблемах и решениях; каким образом текстовые характеристики, такие как границы абзацев и заголовки, влияют на их идентификацию; а также какие трудности возникают в нарративных или аргументативных текстах без чётких организационных указателей. Целью исследования является разработка практической концептуальной рамки,

применимой в обучении чтению, техническом письме и обработке естественного языка.

В целом исследование утверждает, что выявление проблем и решений представляет собой динамический интерпретационный процесс, формируемый как текстовыми признаками, так и предшествующими знаниями читателя.

Ключевые слова: структура «проблема–решение», дискурс-анализ, понимание прочитанного, лингвистические маркеры, обработка естественного языка

Annotation. This research examines how readers and automated systems identify problem–solution structures in texts—a common but often complex pattern where difficulties and their remedies may be implied, rearranged, or interwoven. Recognizing this structure is essential for reading comprehension, education, professional communication, and artificial intelligence, yet it remains underexplored, especially when texts lack explicit transitional phrases. The study investigates three key questions: which linguistic markers (e.g., conjunctions, evaluative adjectives, modal verbs) signal problems and solutions, how textual features like paragraph boundaries and headings influence identification, and what challenges arise in narratives or arguments without clear organizational cues. The goal is to develop a practical framework for reading instruction, technical writing, and natural language processing. Ultimately, the research argues that identifying problems and solutions is a dynamic interpretive process shaped by both textual cues and the reader's prior knowledge.

Keywords: problem–solution structure, discourse analysis, reading comprehension, linguistic markers, natural language processing

Introduction

Every day, readers encounter a diverse and heterogeneous corpus of written materials—ranging from scholarly monographs and peer-reviewed journal articles to journalistic accounts, technical manuals, legal documents, and rhetorical speeches. Beneath the explicit content of many such texts lies a recurrent rhetorical schema that cuts across disciplinary and cultural boundaries: initially, a difficulty, deficiency, or adverse condition is revealed; subsequently, one or more remedies, responses, or corrective measures are proposed. This problem–solution configuration ranks among the most foundational organizational principles in expository and persuasive discourse. The ability to identify this structure is not a mere academic convenience but rather an essential competency for effective reading, critical analysis, and coherent writing. In its absence, readers may conflate illustrative details with central claims, fail to detect unarticulated presuppositions, or struggle to determine whether a suggested remedy genuinely resolves the identified difficulty.

Notwithstanding its ubiquity, the recognition of such structures is rarely straightforward or automatic. A problem may remain implicit, signaled only through negative evaluations, unfulfilled expectations, or comparative deficiencies, thereby obliging the reader to infer its presence. Conversely, a solution may appear before the corresponding problem has been explicitly named, requiring the reader to temporarily suspend judgment on a candidate response while awaiting clarification of the issue it is intended to address. Furthermore, multiple problems and their respective solutions can be interwoven across a passage—sometimes embedded hierarchically, other times arranged sequentially, and occasionally left deliberately open-ended. Such complexity

generates fundamental questions at the nexus of linguistics, cognitive psychology, and rhetorical theory: by what means do readers decipher these frequently subtle rhetorical designs, and how might writers render them more perceptible to the reader's cognitive faculties without compromising sophistication or subtlety? The importance of detecting problem–solution patterns in texts extends well beyond academic contexts; it holds significant implications for education, professional communication, and artificial intelligence development. For instance, learners who acquire proficiency in recognizing problem–solution frameworks are better equipped to distill extended arguments into their essential logical components, evaluate the validity and practicality of proposed solutions, and transfer inferential reasoning skills from reading activities to real-world decision-making—such as assessing consumer product evaluations or interpreting public policy debates. Concurrently, automated systems—including text summarization tools that condense lengthy documents, question-answering architectures that extract relevant information from extensive corpora, and dialogue models that process discourse flow in real time—depend on reliable detection of these structural patterns to function accurately. A system that misidentifies a proposed solution as background exposition or overlooks an implicit problem will produce erroneous outputs, thereby eroding user confidence and practical effectiveness. Nevertheless, despite this recognized significance, the process of isolating problems and their corresponding solutions remains underinvestigated in the scholarly literature, particularly for texts in which the architecture is not explicitly marked by conventional linguistic signals such as “the challenge consists of,” “one potential answer is,” or “to remedy this situation.” Implicit configurations—wherein causal or evaluative cues substitute for overt labeling—pose particular difficulties for inexperienced readers and rule-based computational models alike.

The current investigation aims to address this research gap by examining the linguistic and cognitive mechanisms that enable both human readers and automated systems to reliably identify problem–solution configurations across a range of textual genres, registers, and rhetorical traditions. More specifically, the study focuses on three central research questions, each targeting a distinct dimension of the identification process. First, which linguistic markers — for example, adversative conjunctions (e.g., but, however, nevertheless), evaluative adjectives (e.g., insufficient, problematic, optimal, effective), modal auxiliaries (e.g., must, should, can, may), or causal connectors (e.g., because, therefore, as a result) — most reliably signal the presence of a problem or a solution within a clause? Second, how do structural features such as paragraph boundaries, section headings, typographic emphasis, and lexical repetition across sentences influence a reader's ability to identify these configurations accurately? Third, what distinctive challenges arise when problems and solutions are embedded within narrative passages or argumentative texts that lack explicit organizational cues, such as bulleted lists, subheadings, or transitional phrases? Through systematic investigation of these questions, the research seeks to develop a practical framework for recognizing problem–solution architectures—a framework applicable to reading instruction, technical and persuasive writing, and natural language processing, including low-resource environments where manually annotated training data are limited.

In the subsequent chapters, the study will first review the existing literature on discourse analysis (with particular emphasis on Rhetorical Structure Theory), the

psychology of reading comprehension (including schema theory and mental models), and computational approaches to argument mining. It will then describe the methodological approach used to analyze a corpus comprising a broad spectrum of texts—from opinion pieces and instructional guides to case studies and policy documents—annotated by both expert human judges and algorithmic systems. Following that, the results of this analysis will be presented, accompanied by a detailed discussion of their theoretical and practical implications, including potential pedagogical strategies and design recommendations for intelligent text-processing technologies. In its concluding section, the work aims to demonstrate that the identification of problems and solutions is not a purely mechanical pattern-recognition task; rather, it constitutes a dynamic, interpretive process—influenced as much by the subtle textual cues crafted by the author as by the store of prior knowledge, expectations, and inferential heuristics that each reader brings to the text. Acknowledging this interpretive complexity does not undermine the proposed framework but instead paradoxically enhances its adaptability across diverse contexts and applications.

References

1. Bohaty, J. J. (2015). The effects of expository text structure instruction on the reading outcomes of 4th and 5th graders experiencing reading difficulties [Doctoral dissertation, University of Nebraska-Lincoln]. UNL Digital Commons.
Relevance: This dissertation provides empirical evidence on teaching problem–solution text structure to struggling readers, directly supporting claims about the practical implications of structure recognition in education.
2. Graesser, A. C., McNamara, D. S., & Louwerse, M. M. (2003). What do readers need to learn in order to process coherence relations in narrative and expository text. In A. P. Sweet & C. E. Snow (Eds.), *Rethinking reading comprehension* (pp. 82–98). Guilford Press.
Relevance: This foundational chapter explains how readers process coherence relations—including problem–solution patterns—and identifies the cognitive skills required for comprehension, supporting the theoretical framework of your research.
3. Heine, L. (2010). *Problem solving in a foreign language*. De Gruyter Mouton.
Relevance: This book examines problem-solving processes through linguistic markers and think-aloud protocols, offering methodological insights for analyzing how readers identify problems and solutions in text.
4. Hoey, M. (2001). *Textual interaction: An introduction to written discourse analysis*. Routledge.
Relevance: Hoey is a seminal figure in problem–solution pattern research. This book provides the foundational framework for identifying problem–solution structures in written discourse, including detailed analytical techniques.
5. McNamara, D. S., Cai, Z., & Louwerse, M. M. (2007). Optimizing LSA measures of cohesion. In T. K. Landauer, D. S. McNamara, S. Dennis, & W. Kintsch (Eds.), *Handbook of latent semantic analysis* (pp. 379–400). Lawrence Erlbaum Associates.
Relevance: This chapter discusses automated cohesion measurement in texts, directly relevant to your research's focus on how automated systems can identify structural patterns like problem–solution.

6. Shih, Y.-C. (2009). The demonstration of discourse analysis on reading teaching: The problem-solution pattern. *Journal of National Taipei College of Business*, (15), 137–152.

Relevance: This article provides a practical demonstration of applying problem-solution pattern analysis to reading instruction, with clear examples of linguistic signals and classroom implications.