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MNEMONIC TECHNIQUES FOR TEACHING AND LEARNING ARTIFICIAL INTELLIGENCE TERMINOLOGY

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Abstract
Introduction: the article explores the methodological potential of mnemonic techniques for teaching and learning English-language artificial intelligence (AI) terminology. The relevance of the research is due to the rapid development of the AI field and the need for quick, easy and effective forms of learning of its fast developing terms. The linguistic analysis is based on 1,500 artificial intelligence terms. The research reveals that the share of pure neologisms in the AI terminology system is only 3%, while 34% are formed through the terminologization (semantic reinterpretation) of common vocabulary. This feature makes it possible to apply mnemonics in teaching and learning English-language artificial intelligence terminology. **Materials and methods:** the methodology is based on classical mnemonic approaches adapted for working with AI terms. The experimental test of effectiveness is conducted during the 2024/2025 academic year. The study involves 69 second-year students majoring in "Applied Mathematics and Computer Science" divided into an experimental group (34 students) and a control group (35 students). The former applies mnemonic techniques for terminology training (keyword method, physical response, mind mapping, rhymes, visualization, etc.), while the latter uses traditional methods (memorizing word lists, translation, drills). **Results:** the outcomes of the experimental test on training 224 AI terms confirm that mnemonic techniques demonstrate significant superiority and high effectiveness over traditional vocabulary teaching methods, with 83% compared to 70% in the control group. **Conclusion:** the research makes it possible to conclude that mnemonic techniques are a powerful and scientifically grounded tool for teaching and learning English-language AI terminology.
Keywords: artificial intelligence terminology, term formation, terminologisation, semantic reinterpretation, mnemonic techniques, teaching and learning methodology.

МНЕМОТЕХНИЧЕСКИЕ ПРИЕМЫ ДЛЯ ОБУЧЕНИЯ ТЕРМИНОЛОГИИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

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Аннотация
Введение: в статье исследуется методический потенциал мнемотехнических приемов для обучения англоязычной терминологии искусственного интеллекта (ИИ). Актуальность исследования обусловлена стремительным развитием сферы ИИ и необходимостью эффективного усвоения ее быстрорастущего терминологического фонда. Лингвистический анализ 1500 терминов ИИ показал, что лишь 3% являются чистыми неологизмами, а 34% образованы путем терминологизации (семантического переосмысления) общеупотребительной лексики. Эта особенность создает естественные предпосылки для применения мнемотехник, основанных на ассоциативных связях. **Материалы и методы:** в основу методики легли классические мнемотехнические подходы, адаптированные для работы с терминами ИИ. Экспериментальная проверка эффективности проводилась в 2024/2025 учебном году. В исследовании участвовали 69 студентов-второкурсников направления «Прикладная математика и информатика», разделенных на экспериментальную (34 чел.) и контрольную (35 чел.) группы. В первой группе обучение терминологии ИИ строилось на комплексе мнемотехник (метод ключевых слов, физической реакции, ментальные карты, рифмовки, визуализация и др.), во второй использовалась традиционная методика (заучивание списков, перевод, упражнения). **Результаты:** результаты экспериментального тестирования на усвоение 224 терминов ИИ показали статистически значимое превосходство и высокую эффективность мнемотехнических приемов в экспериментальной группе, где средний показатель усвоения составил 83%, в то время как в контрольной группе – 70%. Эффективность обусловлена когнитивными механизмами усвоения языка и внутренней лингвистической спецификой терминосистемы ИИ, формирующейся преимущественно через переосмысление общеупотребительных слов. **Заключение:** проведенное исследование позволяет заключить, что мнемотехники являются мощным и научно обоснованным инструментом для обучения англоязычной терминологии ИИ. Результаты работы открывают перспективы для внедрения подобных методик в обучение другим техническим дисциплинам со сложной терминологией.
Ключевые слова: терминология искусственного интеллекта, терминообразование, терминологизация, семантическое переосмысление, мнемотехнические приемы, методика преподавания.

Introduction

In the 21st century, artificial intelligence (hereinafter AI) has become one of the priority areas of scientific and technological development. AI is radically changing

the modern world. Financial indicators serve as proof: in 2024, the volume of the global AI market reached a record $184 billion, which is $50 billion higher than the result of the previous year. According to forecasts, this impressive growth trend will continue [1; 6; 11].

There is a steady increase in the number of scientific papers devoted to artificial intelligence [8]. Naturally, the language of this field is continuously enriched with new concepts. Such rapid evolution of the language is a direct consequence of the swift development of the industry itself. When science progresses so quickly, language often does not have time to create new words for each concept, so it flexibly restructures its existing resources.

To confirm this hypothesis, the authors investigated the processes of term formation in the field of AI based on a corpus of 1,500 terminological units from an AI dictionary [4]. As a result of the analysis, it was revealed that only 3% of AI terms are pure neologisms. It was also established that 34% of the analysed terms were formed through the semantic reinterpretation of common vocabulary, namely through broadening of meaning (2.4%), narrowing of meaning (20%), homonymisation (3.4%), as well as metaphorical and metonymic transfer (16%) [2]. Thus, based on the obtained results, it can be stated that the English terminological fund in the field of AI grows and updates predominantly through the phenomenon of terminologisation of common vocabulary. This clearly demonstrates that the AI terminology system is not created “from scratch” but actively utilizes and adapts existing vocabulary.

This characteristic of English-language AI terminology suggests that mnemonic techniques could serve as an effective tool for its teaching and learning. The reason behind this statement is that such techniques directly apply to the primary mechanism of AI term formation – the semantic reinterpretation of common vocabulary.

The potential of mnemonic techniques for teaching and learning AI terminology is revealed in several aspects:

1. Since the vast majority of AI terms (97%) are not pure neologisms, and a third of them (34%) are created through the terminologisation of common vocabulary, mnemonics make it possible to create strong associative links between the general and the specialized meaning of a word.

2. The fact that 16% of terms in the field of AI are formed through metaphoric and metonymic transfer (e.g., *data mining*) means that mnemonics can use these ready-made images, making memorisation more natural and effective.

Thus, the authors conclude that mnemonic techniques not only facilitate memorization but also go with the nature of the AI terminology system itself, turning the process of study from rote memorisation of new words into the process of conscious reinterpretation of the meanings of already existing and known vocabulary.

Methods and materials

The research materials include works by leading specialists in the field of mnemonics and cognitive linguistics, namely R. Atkinson, I. Thompson, and T. Buzan.

R. Atkinson and his colleagues proposed the keyword method. It involves linking a foreign word to a similar-sounding Russian word or phrase, followed by the creation of a vivid mental image [1].

The classification of mnemonic methods proposed by I. Thompson systematizes memory techniques, with different perceptual channels and thinking types taken into account [13]. I. Thompson identified five classes of mnemonic methods:

1. Linguistic methods are based on language – its structure, sound, and meaning, for example, creating a word from the first letters of the information to be memorized (acronyms).

2. Spatial methods engage spatial memory and associative thinking. For instance, according to the method of loci (or memory palace), objects to be remembered are mentally placed along a familiar route (they are placed in familiar physical locations (loci)). To recall them, one needs to mentally walk that route.

3. Visual methods work directly with visual images. They are based on creating vivid, unusual, sometimes absurd mental pictures. For example, the peg-word system allows connecting several images into one vivid scene.

4. In Thompson's verbal mnemonic methods, the emphasis is not on the structure of language but on sound, rhythm, narrative, and semantic associations. These techniques exploit the natural tendency of the human brain to remember stories (the story method), rhythms, and sound patterns (rhymes and rhyme schemes, songs).

5. According to I. Thompson, the final class of mnemonic techniques is the physical response method, which involves learners imagining a term and physically acting out its meaning. Movement helps place and fix terms in memory [14].

A special place in the system of mnemonic techniques is occupied by the mind mapping method developed by T. Buzan [10]. This approach, also known as the method of concept maps or semantic maps, offers an alternative to the mechanical memorisation of vocabulary through its visual organisation. It implies the construction of an ordered structure with a key concept at the center, which generates related ideas and terms. Such techniques make it possible to create semantic associations and visualise lexical-semantic fields [7; 12; 13].

The works of these authors are based on the system of principles that transform mnemonics into a powerful tool that utilises the fundamental properties of memory to make associations and refer to prior experience.

Mnemonics are particularly suitable for mastering AI terminology since AI terms are already related in learners' minds to common vocabulary units, as they are formed through its reinterpretation. In other words, by using mnemonic techniques to master AI terms, learners can associate new terminology with those common words already stored in their long-term memory [3; 5].

Outcomes and discussion

We tried to make an attempt to combine various mnemonic techniques and experimentally test the impact of their application in teaching and learning the AI terminology in a non-linguistic university. The scientific novelty of the research lies

in the empirical experience of using mnemonic techniques for teaching and learning AI terminology.

The experimental work was conducted during the 2024/2025 academic year with two groups of second-year students studying the discipline “Foreign Language”. The representative sample consisted of 69 students majoring in “Applied Mathematics and Computer Science”. The student groups were comparable in key socio-demographic parameters: age (18-20 years old), gender (predominantly male), average level of language proficiency, which ensured the representativeness of the experimental data.

The experimental group (hereinafter EG) consisted of 34 students, who were taught AI terms using mnemonic techniques. The control group (hereinafter CG) consisted of 35 individuals, who were taught according to the traditional model being provided with ready-made word lists for memorisation, tasks and questions for reading, translation and further discussion, exercises for drilling the lexical and grammatical materials, reproduction of the learned content, and transfer into new cognitive and language situations. To minimise the influence of external factors, the same instructor presented the subjects with identical educational content and learning materials; the only difference was the use of mnemonic techniques for teaching AI vocabulary in the experimental group.

At the stage of providing the students with the lexical material, they were introduced to mnemonic techniques that allowed them to memorise it effectively. For example, to memorise the word *source*, it was suggested to associate it with a “*keyword*” – the Russian word *соус* (sauce). These words sound similar to Russian speakers. Next, the learners visualised a vivid mental image connecting the meaning of the English word with this “*keyword*”. One could imagine a bottle of sauce, from which not tomato paste but pure source code is pouring out, where “zeros” and “ones” are mixed with “tomatoes”. This approach creates such a strong association that afterwards, learners are unlikely to forget that *source* means just the same as “*sauce*” is the “*base*” of a dish in cooking.

The method of physical reaction also proved useful. For example, the students needed to memorise the term *clustering*. It was suggested that the learners should scatter various objects on the table (coins, pens, keys), then group them. All metal ones to one side, all plastic ones to another. The tactile experience of the quick sorting of objects into “clusters” makes a strong connection with the term itself.

In cases where it was possible to form an acronym, the students were encouraged to use this mnemonic tool. A clear example is the word *ARC* for memorising the term *automatic reference counting*.

The initial memorisation of AI terms implied spatial and visual methods of learning. Below is a visual image for the term *computer vision* (Fig. 1). It is based on associating the algorithm with human vision. A computer does not possess “human vision”, but it “sees” images and “recognizes” objects. Such images can be drawn either mentally or with the help of neural networks.

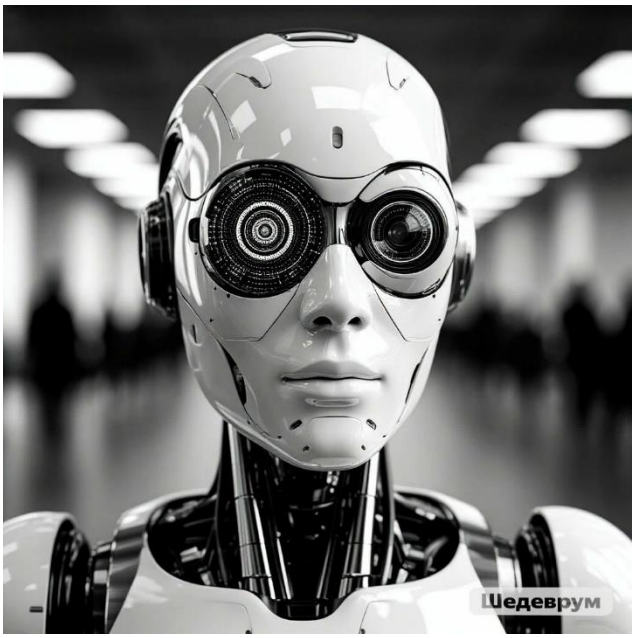

Fig. 1 An example of creating a visual image for the term *computer vision*

Rhymes and the “storytelling” method have proven effective for mastering AI terminology. As a representative example, one can cite a mnemonic rhyme that regulates the choice of the optimal data structure:

Use a list for your linear queue,

Use a stack for what's last to go through.

Use a map for a key and a value to pair,

Use the right tool and show that you care.

The “storytelling” method was implemented using the context-building technique known as the “snowball effect”. This method expects learners to sequentially make up a meaningful story in English, using the lexical units from a given list in each new sentence. The key point is that one should make sure to reproduce the entire previous part of the story, starting from the first sentence, before adding their own new statement. This technique ensures repeated productive repetition of the studied terminology, which contributes to its effective memorisation and transfer to long-term memory.

As part of arranging students’ independent work on memorizing AI terms, they were encouraged to create mental maps instead of memorizing word lists mechanically. Mind mapping helped establish semantic connections between concepts, integrating new terms into the semantic field. Such online services for mind mapping as MindMeister, Xmind, Coggle, Miro, and Lucidchart, are available today. Figure 2 presents a semantic map for the term *artificial intelligence* (AI); it visually explains the architecture of AI and connects the central concept of *artificial intelligence* with other related terms.

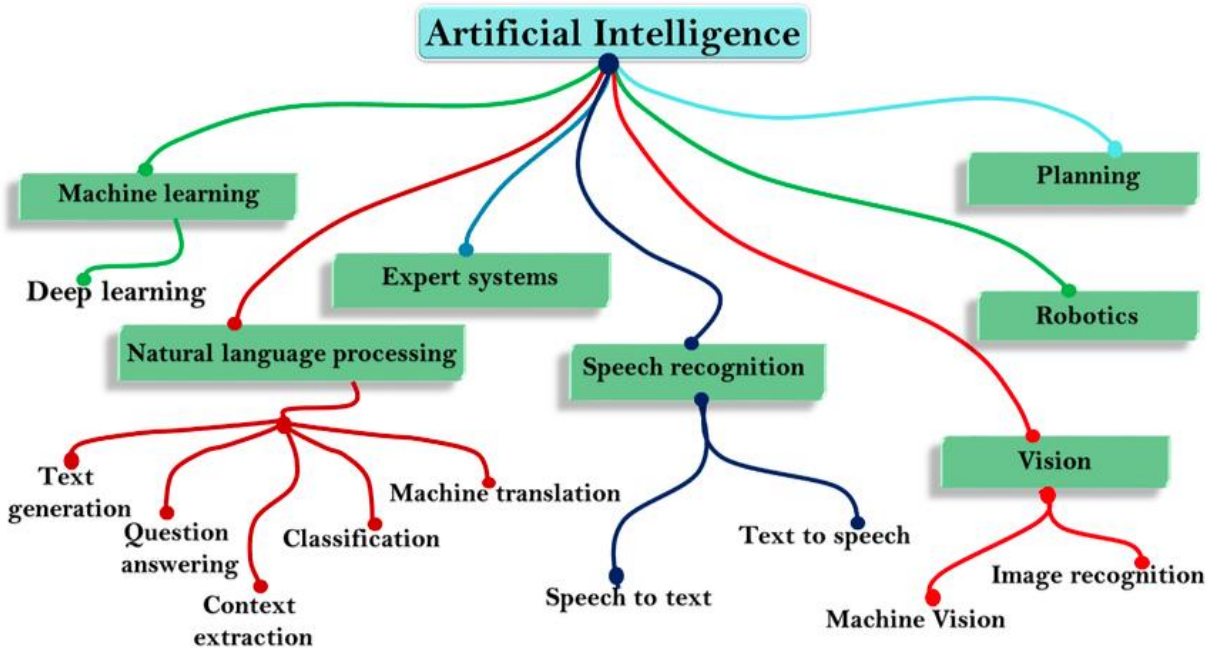

Fig. 2 A semantic map for the term *artificial intellegence*

At the end of the semester, a written test on AI terminology knowledge was provided. The test included 224 terms in the field of AI. The students were given three types of tasks: to provide the translation of a term from English into Russian and from Russian into English, and a task on the ability to use AI terminology in the appropriate context by filling in blanks in sentences with English terms. The mastering of terms was checked in both the experimental and control groups, with the average rate of correct answers calculated and provided both in number and percentage. The results of the experiment are presented in the Table.

Table

The mastering of terms in students' groups

	The average rate of mastering (in numbers)	The average rate of mastering (in percentage)
Experimental Group	186	83
Control Group	157	70

The Table presents a summary of the experimental results, reflecting the average group indicators for AI term mastering. The data collected during the experiment allow for the following conclusions:

Firstly, in practice it has become evident that classical mnemonic techniques, pioneered by R. Atkinson, I. Thompson, and T. Buzan, can be successfully integrated into the teaching and learning of AI-related English terminology. Their use transforms routine work with terminology and frees up more classroom time for organizing communicative activities. The experimental outcomes make it possible to implement mnemonic techniques in teaching and learning of other technical disciplines that require the mastering of professional terminology.

Secondly, the high effectiveness of mnemonic techniques for mastering professional terminology in the field of artificial intelligence has been empirically confirmed. The indicators of the experimental group have proved to be significantly higher rather than those of the control group (83% vs. 70%). This result is logical, considering the linguistic features of the AI terminological base, which is formed primarily through the terminologisation of common words. This intrinsic connection between terms and common vocabulary creates a cognitive basis for the natural integration of mnemonic techniques into the process of teaching and learning of AI terminology.

Conclusion

The current research allows to make a conclusion that a significant portion of the English terminological base in the field of artificial intelligence develops through the terminologisation of common words. This specific characteristic has proved the substantial methodological potential mnemonic techniques being used in teaching and learning of AI terminology. The higher indicators of the experimental students' group over the control one serve as evidence of this.

The effectiveness of mnemonic techniques is determined by the nature of AI term formation and the fact that these techniques perfectly match the cognitive mechanisms of language learning. Therefore, mnemonic techniques for mastering AI terminology can be considered a powerful and scientifically grounded tool of an English language teacher.

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