

face-to-face English classes. Some of them find technical classes more suitable for learning online, while linguistic ones, like Ukrainian or English, in their words, are far better to be conducted in the traditional classroom, letting them have visual contact with the partners and easiness to ask the teacher any questions on the topic.

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### **Викладання англійської мови: ефективність дистанційного онлайн навчання Бойко Любов Михайлівна<sup>1</sup>**

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В теперішній період пандемії перед викладачами гостро постала проблема дистанційного навчання. В період локдауну наш університет був змушений замінити традиційне навчання в аудиторії на дистанційне. Особлива увага у статті приділяється перевагам і недолікам викладання англійської мови онлайн.

**Ключові слова:** дистанційне навчання, онлайн навчання, викладання англійської мови, пандемія Ковід-19.

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### **HEURISTICS AS A SEARCHING METHOD OF NEW APPLIED TO PROBLEM SOLVING UNDER UNCERTAINTY**

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**Abstract.** The work is devoted to the field of heuristics that is considered as a searching method of the new when it applied to problem solving under uncertainty. Heuristics is presented as a method as well as an approach that can be widely used as a problem solving mechanism especially under the circumstances of information explosion and limited time for any search. On the other hand, heuristics is described as a science that has its subject to study heuristic models of new original problem solving or to determine the correct solutions from the wide range of examples. A wide range of heuristic models as well as heuristic methods are mentioned in the work.

**Key words:** heuristics, heuristic models, heuristic methods, problem solving, decision-making, uncertainty, search.

Heuristics is applied to the field of philosophy of science with the aim to reflect and explain a constant feature of scientific knowledge to expand, namely to describe a situation when a theory crosses its borders and is to grow. Heuristic meaning of the process is connected with emergence of completely new meaningful spheres and niches. Heuristic characteristic is an ability of a theory to cross its prime borders, adapt and be potentially able to expand on new fields. In modern philosophy heuristics is described as a science connected with the emergence of new way of thinking, ideas in knowledge and human activity [6]. Heuristic methods have rather broad way of appliance in any science. As a science of creative thinking, heuristics is one of the youngest in the system of current scientific knowledge, namely it has been formed on the base of generalized results of different sciences that study a man, his activity and creativity. A major breakthrough of philosophy of science was awareness of heuristic opportunities as a universal tool which permits problem solving under uncertainty.

The main task of heuristics is to create the new appropriate models of problem solving. Being a complex scientific branch that contains elements of philosophy, psychology, linguistics, cybernetics, informational theory, knowledge sciences, labor organization, etc., it provides the tools for such search. The main part is devoted to psychology of creative thinking that studies the mechanisms of problem solving [2].

There are several heuristic assumptions:

- A group of inventive tasks is infinite, a group of inventive methods is finite.
- A method of problem solving always contains subjectivity, its effectiveness depends on excellence of an inventor.
- There is always an opposite method of problem solving as an alternative one.
- There is no inventive task that was solved without conscious or unconscious method, strategy or tactics of thinking.

The goal of heuristics is to develop models of any new task solution or problem solving. Heuristics as a science has its subject to study heuristic models of new original problem solving or to determine the correct solutions from the wide range of examples. The models of performed search have individual character and closely connected with psychological activity and general motivation of a subject of cognition. The following heuristic models can be named: an elementary model of "blind search", structural and semantic model of G. Bush, maze model, transformer model, gateway model, seed model, model of obstacle and springboard, etc. [3].

Heuristic moments can be visualized in a case when the presented circumstances don't have a ready solution and the past experience doesn't contain a ready scheme which can be applied in the situation. A new strategy of activity is needed to find a way out of a problem situation. Furthermore, heuristics includes studies of human abilities to intellectual activity, namely to heuristic study and methods of its organization [5]. The term "task" is used when an ultimate goal is clear and input data are precisely formulated. A problem relates to such situations where there is a high level of uncertainty, namely there is no clear goal, technology of decision-making is ambiguous, there is a lack of resources, etc. A problem is a task with a correct and obvious decision. It emerges when a man has a goal, nevertheless, he doesn't know how to achieve it. Or in a situation when a man can't overcome a present situation and meet desired requirements with a help of simple tools, therefore, in this case he needs to advance the process of thinking and decision-making. The task of such cognitive process is to invent some actions that can be a mediator between a present and desired situation. Problem solving is a search of a logical decision that can be used to achieve the desired things. Problem solving can be considered as a process of creation of subjective mental representations that impact on solution searching based on strategies [4].

The term "uncertainty" is one of the popular terms that are used in current philosophical studies as well as in social, natural sciences that consider it in various historical contexts and situations. Uncertainty is determined by a lack of integrity and information that can be a base for problem-solving [7].

There is urgent necessity of problem-solving strategies. Adequate strategies are applied when a problem can be determined and identified. The strategies and tasks can be differentiated based on their potential chances to find solutions or due to their inherent level of ambiguity under the circumstances of uncertainty. The heuristic strategies contain a search of possible solutions, for instance through trial and error, unlike the algorithms they lead to a desired result with some goal. The heuristic strategies are interesting for a behavioral study while problem-solving [4].

The heuristic methods based on managerial principles that permit to apply creative thinking, generate new ideas, usage of which enhance decision effectiveness, are widely used under uncertainty. A choice of tools for decision-making is variable: some researchers rely on methods of decision-making; others purposely activate the past experience of the similar tasks or intuitively make their choice [1].

The tools' selection for decision-making has only emerged, namely the process is complicated by a range of objective reasons [1]:

- A task can be solved by usage of some or, in a number of cases, a wide range of principles.
- Every principle of problem-solving can be found by some relative methods.
- On the other side, different methods of search can lead to the same principle of decision-making.
- The individual peculiarities of every person should be counted alongside with the presented patterns of creative process.
- There are stereotypical methods of problem-solving that lead to a solution in most cases. A decision taken based on the stereotypical methods is equally original as those taken based on completely new methods that were not used before.
- Any method of problem-solving is connected with limitations on the number of possible solutions. Making a choice means to find an optimal method with the highest originality.

The methods of problem-solving can be distributed into the following types according to the heuristic principle: methods of heuristic analogy, heuristic complex and heuristic combinations. The abovementioned groups can be divided into numerous methods that have their peculiarities and ways of application. The main practical meaning has a classification of tools due to the heuristic principle that facilitates the whole process of decision-making [1].

The current heuristic methods and models permits to expand a process of thinking towards new. The system of heuristic methods of problem-solving and knowledge in general, is an open system, therefore more and more heuristic methods will appear as a result of scientific and technological development.

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