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### **RESULTS OF MEASURING CRITICAL THINKING SKILLS OF FIRST YEAR STUDENT PILOTS**

*The purpose of this study is to disclose the notion of critical thinking and define the level of critical thinking skills of first year student pilots of Flight Academy of the National Aviation University (Kropyvnytskyi, Ukraine). In the article critical thinking skills are understood as the ability to process the information, to analyze and evaluate it; the abilities of reasoning, synthesizing, observation and reflection. The issue of developing critical thinking skills is of special importance for future pilots as they are responsible for making decisions during the flight. This paper proposes that critical thinking can and should be developed from the first year of higher education in order for students to cope with their future studies and to be of most use to future employers. To evaluate the critical thinking skills the group of 72 first year student pilots was formed. They were given the critical thinking questionnaire which defines such critical thinking skills as analysis, inference, evaluation, inductive reasoning, and deductive reasoning. Our findings have proved the necessity to develop these critical thinking skills of first year student pilots.*

**Key words:** critical thinking, student pilots, first year pedagogy, professional education.

**Introduction.** Critical thinking is a topic which provokes a lot of debates and discussion among researchers, teachers, education experts and psychologists. Most of them agree that the model when a teacher explains the material and the learners just take this information goes back to the education of the last century.

We are living in the era of rapid development of technologies. The piece of information which was of current importance yesterday is of no value today.

Taking into account the said above, the educators understand that the main focus of education today should be the development of critical thinking skills. Under critical thinking skills we understand the ability to process the information, to analyze and evaluate it; the abilities of reasoning, synthesizing, observation and reflection. Possessing these skills the learners will be able to solve different problems, come up with innovative ideas and, as a result, comply with the requirements of the modern world and stay competitive.

The issue of developing critical thinking skills is of special importance for future pilots as they must be on alert all the time. The pilots are responsible for making decisions during the flight. The process of flying is automatic, but different situations may occur during the flight including emergency situations. The life of a pilot, his crew and the passengers depends on a pilot's decision and its rationality, the time of a pilot's reaction to the circumstances. That's why, developing future pilots' critical thinking skills must be the primary concern of their training.

**Review of recent sources of research and publications.** Critical thinking has been a focus of research of many educators and scientists (B. Moore & R. Parker, J. Steel, K. Kabilan, K. Meredith, G. Nosich, W. Paul, P. Stapleton, Ch. Temple, S. Walter, B. Bloom, R. Ennis,

J. Alvino, etc.). In their papers researchers tried to give a definition to critical thinking, define its characteristics and ways of developing critical thinking skills.

**Setting an objective.** The objective of the article is to disclose the notion of critical thinking and define the level of critical thinking skills of first year student pilots of Flight Academy of the National Aviation University (Kropyvnytsky, Ukraine).

**Presentation of basic material.** Over the past twenty years critical thinking has moved from a small corner of the stage in philosophy and the social sciences to the front and center. Higher education writers agree that critical thinking should be included in the undergraduate curriculum. However, there seems to be little agreement on exactly what critical thinking is [1].

A person who thinks critically employs the scientific method for understanding the ordinary world. This is true because critical thinking mimics the well-known method of scientific investigation: a question is identified, a hypothesis is formulated, relevant data are gathered, the hypothesis is logically tested and evaluated, and reliable conclusions are drawn from the result [2; 10].

S. Bailin, R. Case, J. Coombs, and L. Daniels [3] mention that frequently critical thinking is conceptualized in the case of skills, processes, procedures and practice. L. Daniels continues that great amount of educational literature refers to cognitive or thinking skills or equates critical thinking with certain mental processes or procedural moves that can be improved through practice. They further say that courses and conferences concentrate on the development of thinking skills and references to skills appear in much of the literature. They state that "even leading theorists in the area of critical thinking conceptualize critical thinking largely in terms of skill" [3, p. 270].

According to H. Zainuddin and A. Moore [11], there are different definitions of critical thinking, ranging from ones which envisage critical thinking as a broad construct which centers primarily on reasonable and reflective thinking and is focused on what to do or believe, while others view it narrowly, specific to a certain content area.

Based on the definition of K. Kabilan [7], creative and critical language learners are those who have cognitive abilities to carry out tasks effectively. They must be able to carefully and deliberately determine to accept, reject or suspend judgment about a claim. In the mean time, critical language learners must be able to cite and identify good reasons for their answers and opinions; they should correct themselves and others' methods and procedures, and cope with regularities, uniformities, irregular circumstances, special limitations, constraints and over-generalizations.

R. Carroll [4] asserts that the ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing critical thinking skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society [12].

At each educational level, thinking must be practiced in each content field. This means hard work for the teacher. It's much easier to teach students to memorize facts and then assess them with multiple-choice tests. In a course that emphasizes thinking, objectives must include application and analysis, divergent thinking, and opportunities to organize ideas and support value judgments. When more teachers recognize that the facts they teach today will be replaced by the discoveries of tomorrow, the content-versus-process controversy may be resolved [9].

G. Nosich [8] holds that most scholars believe that skills needed to begin to think about issues and problems do not suddenly appear in our students. Teachers who have attempted to incorporate higher level questioning in their discussions or have administered test items demanding some thought rather than just recall from their students are usually dismayed at the preliminary results. Unless the students have been prepared for the change in expectations, both the students and the teacher are likely to experience frustration.

The Collegiate Learning Assessment (CLA) Project of the Council for Aid to Education has come up with a list of critical thinking skills. It comprises the following skills: determining what information is or is not pertinent; distinguishing between rational claims and emotional ones; separating fact from opinion; recognizing the ways in which evidence might be limited or compromised; spotting deception and holes in the arguments of others; presenting his /her own analysis of the data or information; recognizing logical flaws in arguments; drawing connections between discrete sources of data and information; attending to contradictory, inadequate, or ambiguous information; constructing cogent arguments rooted in data rather than opinion; selecting the strongest set of supporting data; avoiding overstated conclusions; identifying holes in the evidence and suggest additional information to collect; recognizing that a problem may have no clear answer or single solution; proposing other options and weigh them in the decision; considering all stakeholders or affected parties in suggesting a course of action; articulating the argument and the context for that argument; correctly and precisely using evidence to defend the argument; logically and cohesively organizing the argument; avoiding extraneous elements in an argument's development; presenting evidence in an order that contributes to a persuasive argument?

Thus, we may conclude that critical thinking is a complicated phenomenon. The role of a teacher in developing critical thinking skills especially in a language classroom where the students must get an opportunity to express themselves, to evaluate the arguments of their group mates and present their point of view is crucial.

Teaching Aviation English to first year student pilots of the Flight Academy of the National Aviation University (Kropyvnytskyi, Ukraine) we came across a few problems:

- 1) the students got used to learning the information by heart without proper understanding and consideration;
- 2) there are some problems with thinking operations, such as analysis and synthesis;
- 3) the students experience difficulties with expressing their point of view;
- 4) the students are unable to find the arguments for proving their point of view;
- 5) using the Internet instead of considering the problem which prevents the students from completing creative tasks.

The findings highlighted that it is important to develop students' critical thinking skills at the first year of their study. Students need to grasp that it is essential for them to develop a critical approach in order to be skilled employees who are able to adapt to new situations in the workplace [5]. It is especially important that students develop their meta-cognitive skills in their application of critical thinking in order to be successful at university [6]. By starting in first year, we offer the students more opportunities to practice the skills they need to be critical thinkers so that they can embed them in their learning in later years.

To evaluate the future pilots' critical thinking skills the homogenized group of 72 students was formed. The students under investigation were future pilots, 1<sup>st</sup> year of study. They were given a critical thinking questionnaire developed by P. Honey and adopted to Ukrainian students. It includes items which define such critical thinking skills as analysis, inference, evaluation, inductive reasoning, and deductive reasoning. The questionnaire has Likert type items, and every item is followed by five alternatives including *never*, *rarely*, *sometimes*, *often*, and *always*.

The questionnaire highlighted the low level of developing the skill of *making notes on the important elements of people's arguments or propositions* for 36% of the students (10% of the students never make notes, 26% do it rarely). However, copying information and taking notes are professional skills as pilots can not rely only on their memory.

The investigation showed the low level of the skill of *putting material into one's own words* for 24% of the future pilots who answered that they do it never or rarely. It suggests that students learn the material by heart and do not use the skill of paraphrasing, which is of primary importance in Aviation English acquisition.

The gaps in the development of such skill as *double-checking facts for accuracy* raise concerns. Aviation is the sphere where human factor is undoubtedly the reason of incidents and accidents. 10% of the future pilots answered they never double-check facts. 25% of the students do it

rarely. The contributing factor to the problem of misunderstanding is also lack of such skill as *checking other people's understanding of issues*. The future pilots of the Flight Academy demonstrated the following results: 3% – never, 17% – rarely, 39% – sometimes, 36% – often, 5% – always.

The students under the experiment showed the development of such skill as analyses, comparison and syntheses when they evaluated *searching for parallels and similarities between different issues, summarizing the ideas and breaking down material*. The results for the first skill are: 7% – never, 14% – rarely, 38% – sometimes, 36% – often, 5% – always. The students summarize what they have heard or read to ensure they have understood properly: 0% – never, 12% – rarely, 17% – sometimes, 36% – often, 35% – always. They break down material so that they can see how ideas are ordered and raised: 0% – never, 10% – rarely, 38% – sometimes, 33% – often, 21% – always.

An important skill in aviation is using a set of criteria against which to evaluate the strength of the argument or proposition as pilots should assess the situation using special indicators. The students of the Flight Academy demonstrated such results: 12% – never, 10% – rarely, 10% – sometimes, 38% – often, 2% – always.

**Conclusion.** The findings in this study have suggested some implications which might be considered for future research, and which are of significance to educators. The results of the current study revealed future pilots of the first year do not have a sufficient level of critical thinking skills and it should be improved. The further study will comprise the development of analysis, inference, evaluation, inductive reasoning, and deductive reasoning. The results could imply the need for creating critical thinking techniques which foster such skills as making notes on the important elements of people's arguments or propositions, putting material into one's own words, double-checking facts for accuracy, checking other people's understanding of issues, searching for parallels and similarities between different issues, summarizing the ideas, breaking down material.

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## **РЕЗУЛЬТАТИ ВИМІРЮВАННЯ РІВНЯ СФОРМОВАНOSTІ ВМІНЬ КРИТИЧНОГО МИСЛЕННЯ СТУДЕНТІВ-ПІЛОТІВ ПЕРШОГО КУРСУ**

**Анотація.** Метою даної статті є розкриття поняття «критичне мислення» та визначення рівня сформованості вмінь критичного мислення студентів-пілотів першого курсу Льотної академії Національного авіаційного університету (Кропивницький, Україна). У статті під терміном «критичне мислення» ми розуміємо здібність обробляти інформацію, аналізувати та оцінювати її; здібності аргументації, синтезу, спостереження та міркування. Проблема розвитку критичного мислення є особливо актуальною для майбутніх пілотів, оскільки вони несуть відповідальність за прийняття рішень протягом польоту. У цій статті наголошується, що уміння критичного мислення можна та треба розвивати з першого курсу навчання у ЗВО для того, щоб студенти легко справлялися у подальшому зі своїм навчанням та приносили максимум користі майбутнім роботодавцям. Для того, щоб оцінити рівень сформованості навичок критичного мислення було сформовано групу із 72 студентів-пілотів першого курсу. Їм було запропоновано взяти участь в опитуванні, метою якого було визначити рівень сформованості таких умінь критичного мислення, як аналіз, формулювання висновків, оцінка, індуктивна аргументація, дедуктивна аргументація. Наші висновки підтвердили необхідність розвивати навички критичного мислення серед студентів-пілотів першого курсу.

**Ключові слова:** критичне мислення, студенти-пілоти, педагогіка для першого курсу, професійна освіта.

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