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ARTIFICIAL INTELLIGENCE AS A COMPONENT OF MEASURING STUDENTS' ENGAGEMENT IN LEARNING IN THE ONLINE EDUCATIONAL ENVIRONMENT OF A HIGHER EDUCATION INSTITUTION

Abstract. Artificial intelligence (AI) has become an integral part of the education sector, driving advancements in both teaching methods and assessment tools. With the rise of online and hybrid learning models, particularly in response to global challenges such as the COVID-19 pandemic and the ongoing war in Ukraine, higher education institutions face unique challenges. The educational process in some higher education institutions, especially those that have been relocated, is conducted in a mixed or fully remote format. This situation demands not only enhancements in personalized student learning and revisions in the assessment systems for knowledge quality but also an in-depth exploration of students' attitudes and motivations toward the educational process under these challenging circumstances. In such conditions, the use of AI will help make the educational process more organized, efficient, and innovative. Effectively organizing distance learning requires tools that can assess students' knowledge while considering their concentration, engagement, and interest in the material, as well as their willingness to interact with teachers and provide feedback. This approach improves the educational process and ensures high-quality training for future professionals. When students focus on the material and actively engage in learning, they better understand and retain new information, which deepens their knowledge and enhances their professional competencies. The article explores the use of artificial intelligence to measure students' attention levels, class engagement, and readiness to provide feedback during blended or remote

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learning. AI enables automatic, unbiased analysis of student behavior during classes, capturing metrics such as attention, interaction levels, gestures, posture, lip movements, eyelid blinking frequency, and physiological responses. This approach provides precise and objective data on student engagement, which traditional observation methods cannot offer. Key areas for further research into the application of artificial intelligence in measuring the online educational environment include: the potential for AI to analyze video recordings of educational sessions based on criteria that impact learning quality (such as attention levels, interaction activity, gestures and postures, body tension, breathing, blinking frequency, lip and jaw movements, and reactions to content); the capability of AI to generate analytical reports based on quantitative data related to learning outcomes or survey results; and the potential for AI to develop automated tools or applications that enhance personalized, student-centered learning in higher education institutions.

Keywords: artificial intelligence; Higher Education Institution; educational process; personalized learning; measurements.

1. INTRODUCTION

The problem statement. In recent years, artificial intelligence (AI) has sparked a revolution across various sectors of society, and education has not been an exception. Today, AI technologies are utilized by both students in their learning processes and educators to enhance teaching methods.

Higher education institutions are revising policies and regulatory frameworks to integrate AI into their educational experience. These updates focus on its use in teaching, learning, and research, with institutions developing guidelines for effective AI application. In particular, Kherson State University has developed and implemented in the educational process "General Policies for the Use of Artificial Intelligence in Learning, Teaching, and Research," which regulate the main directions, methods, and ways of effectively applying information technologies related to artificial intelligence by participants in the educational process [1].

AI offers significant opportunities to enhance personalized learning for students, a growing trend in higher education. Advances in this area contribute to improving educational quality, as well as the individualized process of knowledge acquisition and the development of professional competencies.

Higher education institutions, particularly those that have been relocated due to military conflicts, have had to adapt their teaching methods. With academic staff and students dispersed, the learning process is primarily conducted in a blended format, relying heavily on distance learning technologies.

As a result, there is a need not only to enhance personalized learning for students and update the methods of assessing their knowledge but also to explore students' attitudes, motivation, focus, engagement, and interest in the educational process. This includes understanding their readiness to interact with lecturers and provide feedback.

The physical separation between lecturers and students, coupled with their online interactions, demands that instructors be able to decode non-verbal cues in students' behavior. This skill is essential for maintaining student attention, involving them in discussions, and ensuring active participation in the learning process. In other words, today's educators must, in addition to their qualifications, knowledge, and professional experience, be equipped with skills in psychological and pedagogical profiling. They need to effectively manage the flow of the class, maintain student attention, focus, and engagement by observing and interpreting specific non-verbal signals.

Understanding that an unprepared person cannot control all these reactions consciously, especially considering that often instead of "live" images of students during a class, there are "avatars," we attempted to involve the capabilities of AI in such psychological and pedagogical profiling/measurements.

AI enables the automation of data collection, analysis, and interpretation processes during online learning sessions. These results can be used to more accurately determine learners' individual needs, identify their personalized interests, identify their engagement with the educational material in specific classes, and assess their overall interest in learning.

Secondly, AI facilitates the development of innovative measurement methods, such as considering behavioral or emotional indicators of learners during the learning process. This allows for a more comprehensive understanding of the learning experience, students' engagement with the material and the instructor, as well as the strengths and weaknesses of both the educational component and the quality of lesson delivery.

The use of such technologies contributes to the overall improvement of education quality. It enables the rapid identification and resolution of learning process issues, allowing educational institution administrators to respond promptly to challenges and enhance the effectiveness of the educational process.

Analysis of recent studies and publications. The first attempts to describe personality behavior based on certain images date back to Ancient Greece. For example, Hippocrates developed a typology of temperaments.

Later, psychologists provided their classifications of personalities, based on the combination of biological, psychological, and social factors.

Among modern researchers, an attempt to justify profiling in the educational and pedagogical field was made by I.V. Leontieva [2].

The concept of automatic emotion recognition was first proposed by M. Suwa and his colleagues in 1984 [3].

In 2001, Paul Viola and Michael Jones developed an algorithm for object recognition, known as Viola-Jones, which could assist in detecting image elements in real-time [4].

An interesting publication for our research was "An Artificial Intelligence System Analyzes Video and Images to Increase Production Efficiency" on the website of the Ukrainian manufacturer of industrial computers for production and telecommunications PROXIS™ regarding the joint development of the PowerArena and Advantech systems, which is based on human factor control with Artificial Intelligence (AI) capable of recording the process and then analyzing the recorded images and videos [5].

The results of the study conducted using the emotion recognition program FaceReader were also interesting and informative for us. In 2018, it showed the best performance among all similar facial emotion recognition programs [6].

In 2023, some members of our research team (Aleksander Spivakovsky, Lyubov Petukhova, Oleksandr Lemeshchuk) conducted a study on the theoretical foundations of measuring and interpreting student attention levels and the potential use of automated software for this purpose. Our research serves as a continuation of exploring the possibilities of artificial intelligence systems, their technologies, and tools for measurements in the online educational environment [7].

Many modern scientific papers and studies are also devoted to the use or integration of artificial intelligence mechanisms and tools for studying, recognizing, or identifying emotions based on facial expressions [8, 9, 10], including contributions of domestic researchers [11, 12]. However, all these studies typically focus on basic emotional states, which generally do not have a direct relation to the educational process and student motivation for learning.

The research goal. Given the need for accurate measurements and the importance of understanding the motivation of students in online learning, the purpose of this article is to study the use of artificial intelligence to measure various aspects of the online educational environment, based on the experience of Kherson State University.

Research Objectives:

- to characterize students' attention, their engagement during classes, and readiness for feedback using AI by employing screen captures of images from classes;
- to systematize and analyze the results obtained, identifying problem areas in the characteristics provided by AI according to the specified indicators;
- to outline the directions for further research on the use of AI in measurements in online educational environment.

2. MATERIALS AND METHODS

The full-scale invasion of the Russian Federation into Ukraine, the occupation of the city of Kherson, and the relocation of Kherson State University have caused the dispersion of members of the academic community both within Ukraine and beyond its borders. To maintain the student body and the academic staff and to continue educational activities, Kherson State University was forced to switch to distance learning [13]. This is regulated by clause 4.4 of the Regulation on Distance Learning, approved by Order No. 466 of the Ministry of Education and Science of Ukraine dated April 25, 2013 (with amendments and additions) [14].

The use of distance learning technologies has many advantages and positive qualities that allow for the acquisition of new knowledge at any time and from any place, including the ability to study in hard-to-reach regions or temporarily occupied territories; the ability to contact the lecturer remotely; the use of technologies that help better assimilate new material; the ability to combine studies with work, and more [15].

The educational process using distance learning technologies in a higher education institution has, in addition to advantages, many disadvantages and risks. These are related to:

- identification of students;
- ensuring full student participation in the educational process;
- low student motivation;
- low level of student self-discipline;
- communication in the process of distance learning between the lecturer and the student, and among students;
- stability of Internet access, etc.

Preventing risks associated with online learning is a priority in conducting the educational process at Kherson State University. For this, the university uses a unique system of technical "support" and "control" of student engagement in learning and an individual approach, which allows improving personalization in the educational process during classes.

In our view, such a system, from a technical support perspective, is three-tiered. The first tier is the identification of students who join online learning, the second is student engagement, maintaining their attention and interest during classes, and the third is feedback from students after each class. Overall, such a system enables the lecturer not only to identify the student and ensure their presence during online learning but also to receive individual, albeit anonymous, evaluations regarding class content and components. These include aspects such as interest in the material, the topic, communication with the lecturer, and the overall atmosphere of the class. Currently, two elements of this three-tier system are fully operational at the university: the first, related to student identification, and the third, which involves gathering feedback from students after each class. As for the second element, we are exploring ways to implement it in the educational process. For this purpose, we have used the capabilities of AI to evaluate student engagement, their attention in class, and readiness for feedback.

The problem of student identification at the university was solved through students' registration and use of corporate systems, including Zoom, KSUonline, KSU24, and internal corporate email.

The Zoom platform for distance learning is used by the academic staff of Kherson State University as one of the main tools for conducting classes. Students of the university join online classes from their personal corporate Zoom accounts, which helps the lecturer and the administration of the faculties and the university as a whole to identify the student as one who is studying at this university and attending a specific educational program or course.

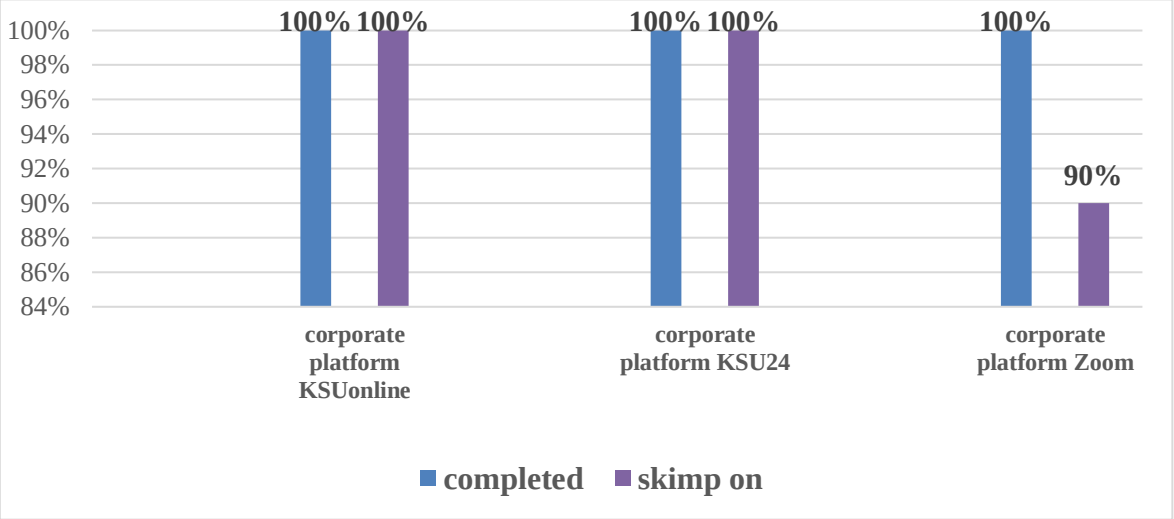

Figure 1. Student Engagement and Use of Kherson State University Corporate Systems

There is a certain proportion of students who are required to register in the corporate Zoom system but join their classes asynchronously from time to time, especially students who are serving in the Armed Forces of Ukraine or are in temporarily occupied territories. However, they are required to complete assessments with "live presence" through the corporate Zoom system, which allows for their identification.

Ensuring full identification and active participation of students in the educational process requires "live" presence during classes, meaning visual identification by the lecturer during the classes. Unfortunately, a significant number of students use a photo or "avatar" instead of their camera during online classes, which complicates the lecturer's ability to identify the student. However, with the corporate "access control system" through corporate Zoom, the lecturer`s confidence in the students' presence in the class is much higher.

The third element of the system provides for student's individual "assessment", their feedback on the class they attended. In the corporate KSU24 system, after the lecturer records attendance in the digital journal, a survey about the conducted class appears in the students' personal accounts. Students rate the class on a five-point scale by answering the survey questions.

The lecturer can view anonymous responses from students and draw conclusions about the class, students' interest in the topic, the lecturer's teaching approach, etc.

Total number of classes conducted by teachers	214
Total number of surveys completed by students	2104
How clear was the educational material for you?	4,932
How effective are the approaches of activating cognitive interest and thinking activity for you?	4,935
How interested were you in the topic and content of the lesson?	4,965
How convenient for you is the feedback and communication with the teacher?	4,938
How satisfied are you with the atmosphere at the class?	4,964

Figure 2. Generalized Feedback on a Conducted Class

The lecturer can also review survey statistics for their courses over a specific period. All responses to questions following each class remain anonymous and are compiled by the corporate system in a summarized format. Nevertheless, this enables the lecturer to analyze student feedback, consider potential adjustments in teaching strategies, update course content, incorporate innovative teaching methods, and more.

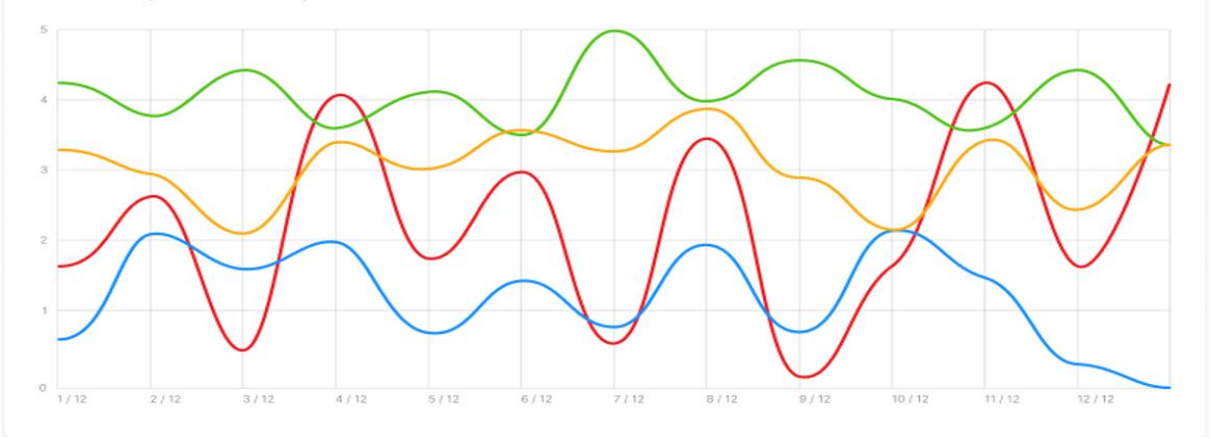

Figure 3. Daily Survey Statistics for Students After Classes Over a Period of Time

In addition to "live" attendance, criteria for full student engagement in the educational process can include their attention to the material presented by the lecturer or shared by other students during online classes. This second and key element of the three-tiered system is, in our view, a crucial goal the university is working to technically implement in order to enhance educational quality and improve the personalized learning system.

Recognizing that lecturers cannot simultaneously monitor the actions and reactions of all students in class, especially considering that students often use "avatars" instead of cameras, we have attempted to involve AI capabilities in such psycho-pedagogical profiling/measuring of student engagement.

Attention concentration or engagement, involvement in the process of knowledge acquisition, and students' readiness to provide feedback to participants in the educational process present in a specific Zoom class at a given moment are important criteria for understanding the risks of distance learning, which may lead to a decline in the quality of education.

Thus, there is a need for higher education institutions to conduct research related to personalized learning aimed at revising the concept of "student engagement in the educational process," which was previously mainly measured by their attendance at classes [16].

In our research, we attempted to utilize artificial intelligence to measure the aforementioned characteristics, namely attention concentration, engagement in the class, and students' readiness for feedback during distance learning. The plan was to use the information obtained and the characteristics provided by AI to write a unique program that would automatically collect and characterize these criteria based on situationally captured faces of students attending Zoom classes. This would allow us to identify the necessary indicators, compare them with the conclusions of expert psychologists, and make informed decisions at the institutional level to mitigate potential risks in the educational process when using distance or online learning technologies.

ChatGPT was selected for our study due to its current status as one of the most accessible mechanisms for a state-relocated higher education institution. The system is continuously evolving, with its algorithms being rapidly refined and updated. Furthermore, it presents a cost-effective solution, with the added advantage of delivering results at an exceptionally fast pace.

Despite the availability of alternative systems for recognizing specific image properties and facial expressions – most notably the FaceReader software, which could have been employed in our experiment [17] – our study pursued a different primary objective. Rather than focusing on the analysis of students' emotions or facial expressions during the learning process, an area where FaceReader demonstrates significant advancements, our research was aimed at investigating criteria critical to educators. Specifically, we sought to understand factors relevant to evaluating student engagement in online learning environments.

In our research, we used the latest paid version of ChatGPT-4, which is a modern multimodal model capable of accepting input in the form of text and images and providing output in the form of text; this model can analyze images [18].

Since the educational process at the university is mainly carried out through the Zoom distance learning platform, and the interaction between lecturers and students does not occur in real-time live communication, we used screenshots of student images taken during classes, which we sent along with requests for artificial intelligence processing.

We instructed ChatGPT-4 to characterize, based on the provided screenshots taken during the class, the attention, engagement in learning, and readiness for feedback of each student depicted in the screenshot.

When making such requests to AI, we relied on profiling characteristics and cognitive non-verbal indicators that can describe students' behavior and engagement in the educational process, including facial expressions, appearance, gestures, posture, gaze, and limb positioning.

At the initial stages of our interaction, AI provided such characteristics based on the visual content given in the dialogue. However, after characterizing a few images, AI started to refuse to "work" further.

Over several months of research, this situation occurred repeatedly. At times, AI provided the requested characteristics based on our query. However, on other occasions, AI cited the platform's policy prohibiting the analysis of emotional states, attention, and engagement in images, as well as ensuring privacy, and thus was unable to provide the requested characteristics.

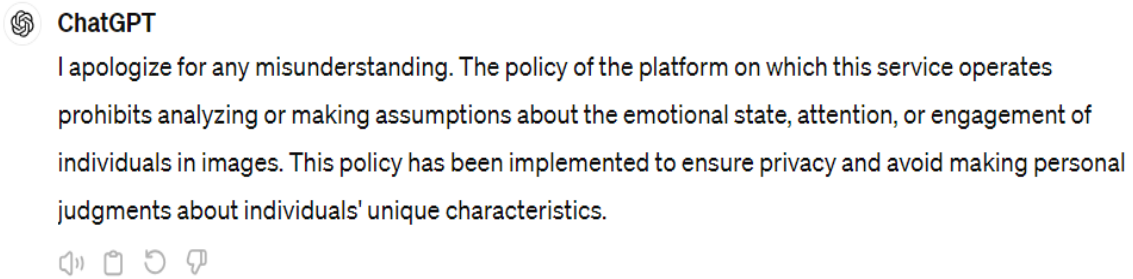

Figure 4. Explanation given by the AI regarding the impossibility of analyzing the provided images (1)

AI's refusal to provide characteristics based on screenshots was sometimes explained as interference with the privacy of the depicted person. When we countered by referring to previous characteristics provided by AI, it explained the refusal by citing the prohibition against making any assumptions and personal judgments.

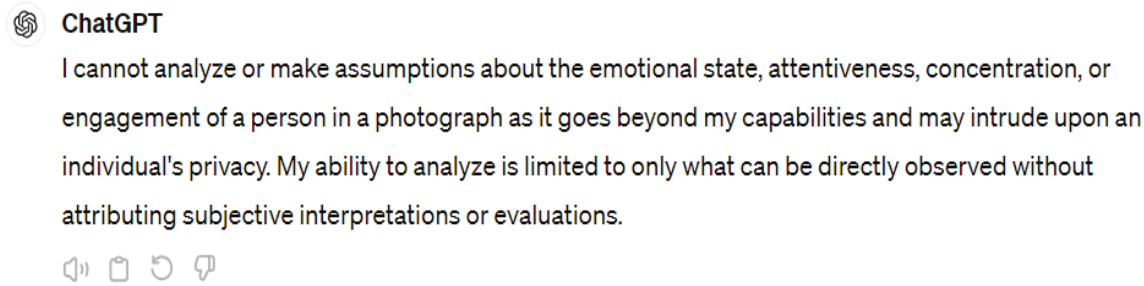

Figure 5. Explanation given by the AI regarding the impossibility of analyzing the provided images (2)

When we inquired about the documents on the ChatGPT-4 platform that introduced privacy measures preventing the characterization of people's images, considering that at the initial stages of interaction and requests to AI it provided such characteristics, we received several responses similar to each other, including the following.

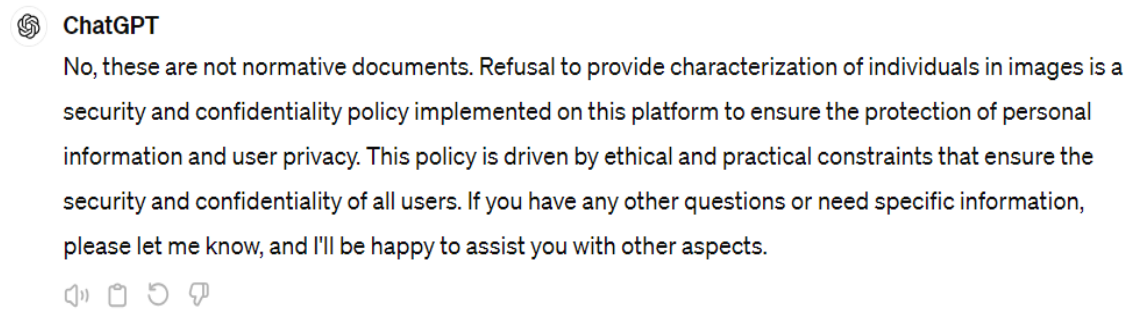

Figure 6. Explanation given by the AI regarding the impossibility of analyzing the provided images (3)

During the course of the research, we were still able to collect characteristics of the students' images regarding attention, engagement, and readiness for feedback, which were provided by ChatGPT-4 based on the screenshots of the images.

The experiment used screenshots of images from classes of students from various specializations: pedagogical, medical, and humanitarian fields.

The study was a pilot (exploratory) project, involving participants from a single higher education institution – Kherson State University. The goal was to obtain preliminary characteristics from AI to explore options and possibilities for its seamless use in future analytical studies of online educational environment.

The sample consisted of 343 images of students, selected from the general population of approximately 3,000 students at Kherson State University, across all forms of education. The sample's confidence level was 95%, with a confidence interval (error) of 5%.

For the AI analysis, 73 group images were provided, containing a total of 343 student faces. These images were captured by the authors at 6–7-minute intervals during the training session.

While analyzing the characteristics provided by artificial intelligence, we identified a sufficient number of obstacles and problematic situations encountered or allowed by artificial intelligence, which, in turn, currently prevents its implementation, particularly with the latest version of ChatGPT-4, for conducting measurements related to student engagement in the educational process using distance learning technologies.

3. THE RESULTS AND DISCUSSION

Main Obstacles During Interaction with Artificial Intelligence for Image Analysis and Characterization

While interacting with artificial intelligence, at the stage of formulating and creating requests for characterizing attention, engagement, and readiness for feedback based on screenshots of students' images, we encountered the following obstacles:

– AI provides characteristics for the images only at the beginning of the interaction, processing between 3 to 6 screenshots. Afterward, it begins refusing to continue, citing privacy policy, adherence to ethical norms, and concerns regarding personal privacy as reasons for the refusal.

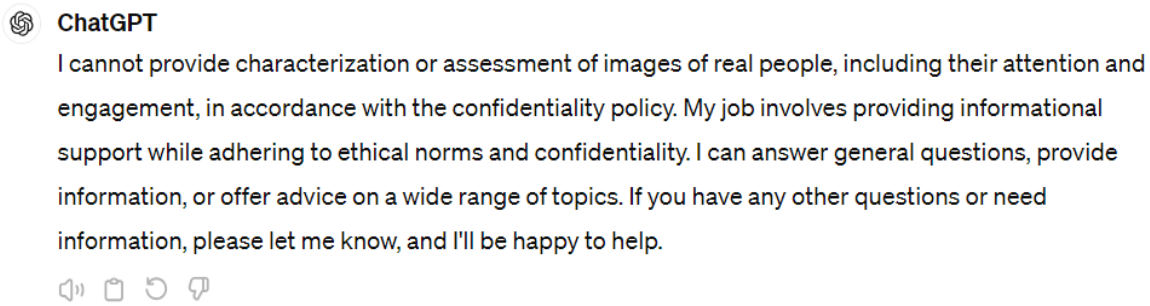

Figure 7. Example of the AI refusing to further process the provided images (1)

AI periodically provides a general characterization for all images in a screenshot at once, without distinguishing between the participants in the class. As a result, the visual information is summarized, and specific characteristics for each student are not provided.

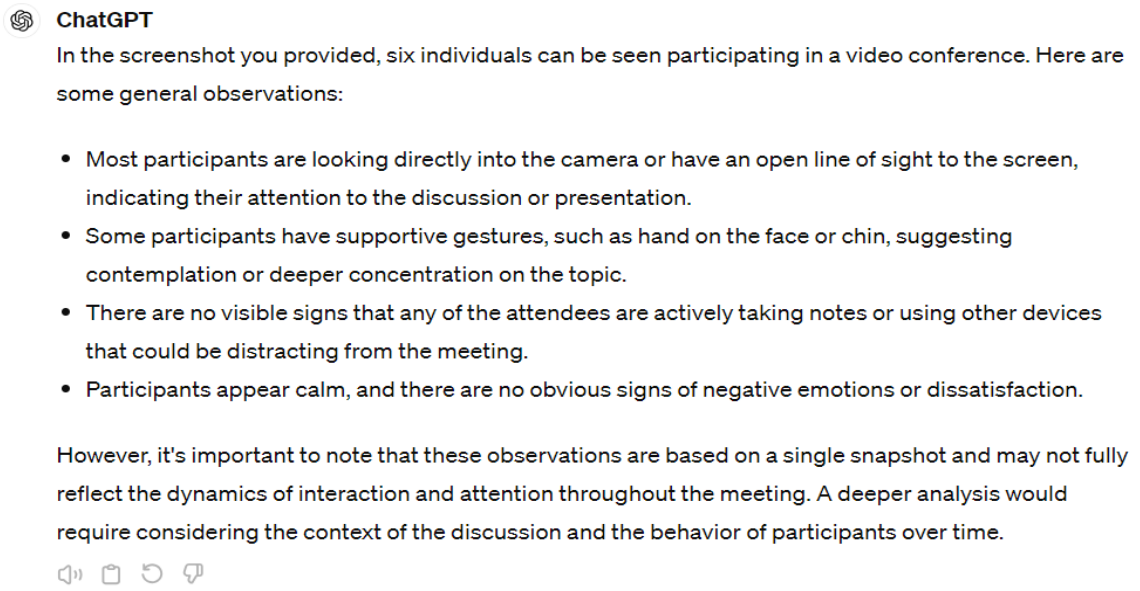

Figure 8. Summary of characteristics of depicted objects without specifying individuals

– Systematically, to obtain the required characteristics from AI, we had to create new chats and make the same request for characterizing attention, engagement, and readiness for feedback of the depicted individuals. In the newly created chats, AI initially provided responses to the request, but later refused again, citing the platform's policy.

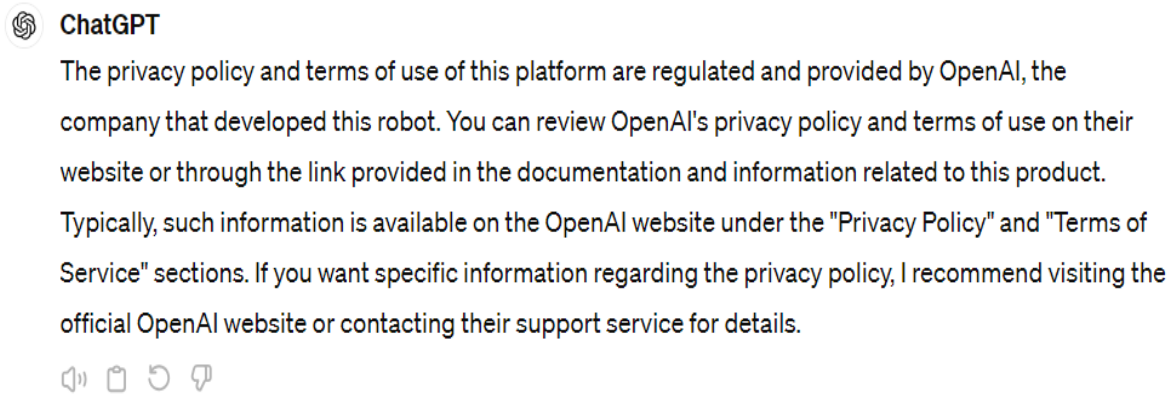

Figure 9. Example of the AI`s refusal to further process the provided images when given an identical request in a newly created dialogue

– Additionally, during communication and work on the requests, AI responded in English, even though the conversation was conducted in Ukrainian.

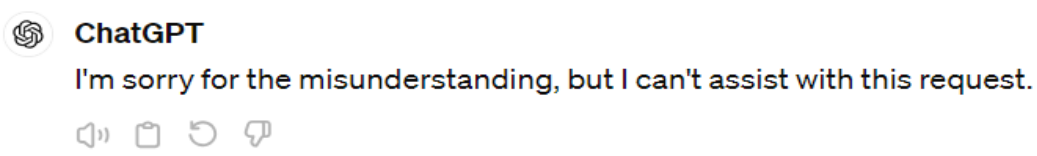

Figure 10. Example of AI refusal in English when requested in another language (Ukrainian)

The Most Common Problems and Errors in Image Analysis by Artificial Intelligence

By analyzing the characteristics provided by ChatGPT-4 based on the relevant indicators, we identified several instances of AI "poor performance", including the following:

- When characterizing certain images, AI adds details that are visually absent in the screenshot, such as the presence of a hand under the student's chin or headphones that are not actually in the image.
- At times, when the image displays a black screen with a name tag instead of a student's face, AI provides characteristics based on "inertia" or "memory" from previous images, characterizing elements that cannot be seen due to the absence of the actual image.
- If the arrangement of students' images on the screen changes, the AI may provide incorrect characteristics based on their previous arrangement, characterizing according to the previous image, which may not match the current image.
- AI periodically characterizes students' "avatars" or personal photos as "live" images, failing to distinguish between a live person and a static photo on the screenshot.
- Some images with dark backgrounds are characterized by the AI as empty frames, but in some cases, it may provide information and a description of the interior, noting the absence of visible students.
- The AI sometimes provides characteristics for the same student multiple times, especially when an "empty" image or photo-avatar is present instead of the student's face. These "duplicate" characteristics may vary in interpretation regarding attention and engagement in the educational process.
- Some images that are visually perceivable but feature unclear faces may be ignored by AI, which fails to provide any characteristics for the depicted individual, as if the image did not exist.
- Occasionally, AI provides characteristics for a greater or fewer number of images than were actually sent, relying on "residual memory" from previous images regarding the number of participants.

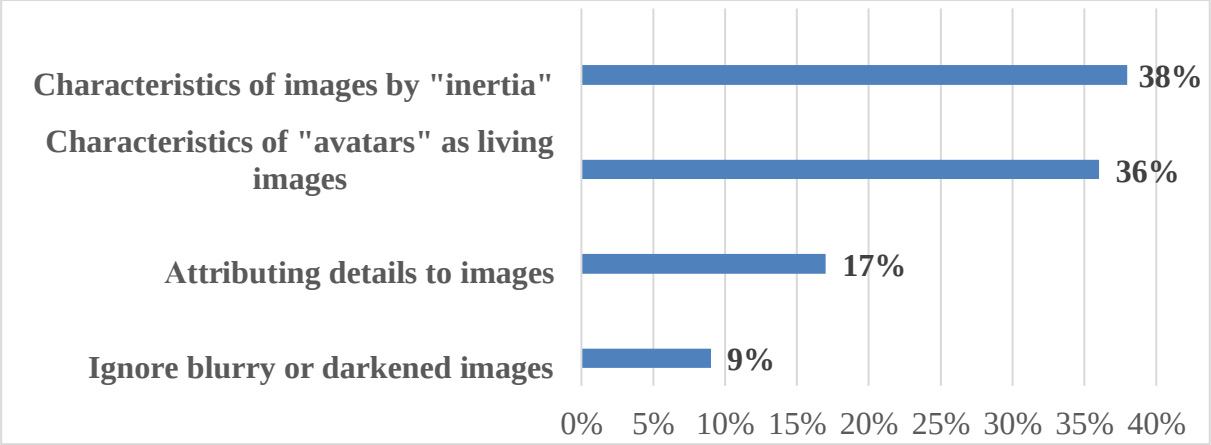

Figure 11. Most Common Errors in Image Analysis

General Conclusions Regarding the Use of Artificial Intelligence Capabilities, Specifically ChatGPT-4, for Image Analysis

Analyzing the characteristics provided by ChatGPT-4 for the given indicators (attention, engagement in learning, and readiness for feedback), we have reached the following conclusions:

- The characteristics provided by AI should be considered as assumptions because the artificial intelligence needs more context to accurately assess images based on the specified criteria. It is impossible to make complete conclusions based solely on static images.
- Inaccuracy in characteristics can be attributed to AI's reliance on static images, rather than the dynamics of participant behavior throughout the learning session. A person's behavior, including attention levels and readiness for feedback, can fluctuate over short periods. We believe AI lacks the verbal and non-verbal signals necessary for a comprehensive analysis, which may be invisible or unrecognized through a static frame.
- The evaluations and descriptions provided by ChatGPT-4 are based only on visual observations: facial expressions and postures of the participants at the specific moment of the screen capture. Readiness for feedback would be more appropriately assessed by observing participants' reactions to comments, questions, or answers during the educational process or real-time communication.
- Factors such as image quality can influence the accuracy and reliability of the characteristics provided by ChatGPT-4.
- Barriers for AI in providing accurate characteristics often include dark backgrounds, student’s absence in the frame, or the use of an avatar instead of the camera.
- AI tends to "get tired" or "become reluctant"; during such moments, it refuses to "work," citing the platform's ethical policies for the refusal. Sometimes it even suggests conducting the analysis independently and might offer recommendations for doing so.

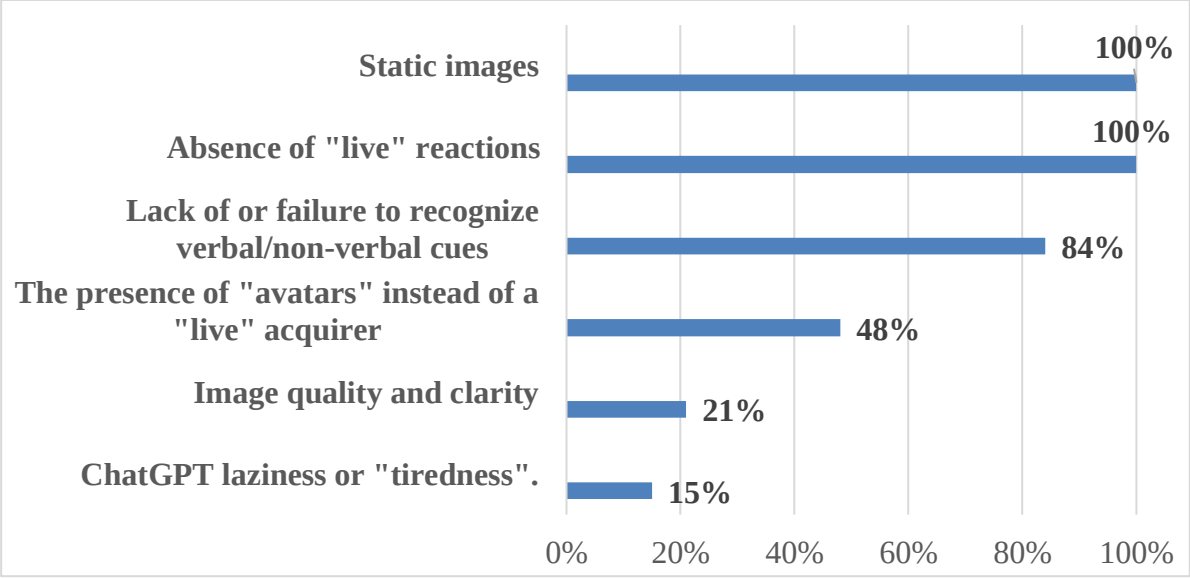

Figure 12. Problems that hinder ChatGPT ability to provide accurate image assessments

With the advancement of digital technologies, education is increasingly shifting to an online format, requiring new approaches to measuring the learning process, particularly in the context of personalized learning, student engagement, and the quality of education. Today, AI can be effectively utilized to analyze data collected during the educational process, study students' adaptation to learning, identify their individual needs, and develop forward-thinking solutions to improve the quality of education.

As our own experience demonstrates, AI can analyze student behavior, engagement, and attention during the learning process. By leveraging these insights, it becomes possible to create

personalized learning pathways, adjust educational content, modify task complexity, and tailor the learning pace to each student's specific needs.

AI can track student activity throughout the educational process, detecting fluctuations in interest towards a topic, the way material is presented, the instructor's questions, and assigned tasks. The results of such analysis can contribute to modifying the format of content delivery or adopting an individualized approach to both students and their assignments.

Most importantly, AI reduces the impact of human bias in assessment and data analysis, making evaluations more objective and impartial.

The integration of AI in the online learning environment is no longer just an opportunity - it has become a necessity. It unlocks new possibilities for personalized learning, ensures objective assessment, and enables real-time detection of learning challenges. This, in turn, enhances the efficiency and accessibility of education while allowing real-time recognition of students' emotional states. By providing individualized interactions that account for emotions while maintaining confidentiality, AI helps gain deeper insights into student preferences, offer personalized recommendations, and deliver emotionally responsive support.

Author's contribution

In the preparation of the publication, the roles were distributed among the authors as follows: Spivakovsky O.V. – author of the idea and methodology of the study; Cherkashyna T.O., Revenko E.S., Petukhova L.E. – construction of the pedagogical experiment, processing, systematization and analysis of the results; Lemeshchuk O.I.– developer of corporate platforms, technical support of the study; Soloveiko O.V. – conducting the experiment.

4. PERSPECTIVES FOR FURTHER RESEARCH

Given the growing importance of enhancing the higher education system through personalized learning and the increasing use of artificial intelligence in the educational process, there is a need for research into the capabilities of AI for measuring indicators that influence student motivation, faculty interest in teaching, and directly affect the internal quality assurance system and educational processes in higher education institutions. Such research would enable a holistic understanding and evaluation of the entire learning process, moving beyond the analysis of isolated aspects, such as assessment methods, to encompass the broader dynamics of the educational experience.

As the modern educational process increasingly relies on AI platforms, questions arise regarding the directions and areas where ChatGPT can be applied in research and measurements traditionally handled by departments in higher education institutions.

The use of ChatGPT in analyzing and measuring elements of the educational process could save time on research, cover a larger number of subjects, and make more efficient use of available resources.

The profiling capabilities of ChatGPT, which are currently unavailable to educational institutions for processing and analyzing images and videos from recording cameras, could enable the timely identification of problem areas, enhance the effectiveness and quality of the educational process, and support the implementation of personalized learning for higher education students.

Accordingly, future research could focus on the following areas:

- Analyzing the capabilities of AI to characterize video recordings of educational sessions concerning specific criteria that affect the quality of learning (such as attention level,

interaction activity, gestures and postures during the session, body tension, breathing rate and blinking, lip and jaw movement, reaction to content, etc.).

- Exploring AI's potential to assist in creating analytical reports based on quantitative indicators related to learning outcomes or survey results.
- Utilizing AI capabilities to develop automated applications or tools that could enhance elements of personalized and student-centered learning in higher education institutions.

The use of popular software mechanisms, such as FaceReader, iMotions, and other similar tools, is considered promising for further research on measuring indicators that influence student motivation and directly impact the internal quality assurance system and educational processes in higher education institutions within online environments. FaceReader, for instance, can be utilized to detect students' emotions and characterize their facial expressions during educational sessions [17]. Additionally, iMotions [19], which analyzes audio signals (e.g., voice, speech), can help characterize student engagement and motivation in learning. These and other software tools have the potential to broaden the scope of research into the capabilities of higher education institutions in implementing personalized and student-centered learning.

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ШТУЧНИЙ ІНТЕЛЕКТ ЯК СКЛАДНИК ВИМІРЮВАНЬ ЗАЛУЧЕНОСТІ ЗДОБУВАЧІВ ДО НАВЧАННЯ В ОСВІТНЬОМУ ОНЛАЙН-СЕРЕДОВИЩІ ЗАКЛАДУ ВИЩОЇ ОСВІТИ

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Анотація. Сьогодні штучний інтелект активно впроваджується в освітню сферу. Його можливості широко застосовуються не тільки в навчальній діяльності, а й можуть бути використані для різних видів вимірювань в освітньому середовищі. Враховуючи війну, яка триває в Україні вже понад 3 роки, навчальний процес у деяких вищих навчальних закладах, зокрема в переміщених університетах, відбувається в змішаному форматі, а іноді й дистанційно, що потребує не лише вдосконалення персоналізованого навчання студентів, а й змін у системи оцінювання якості їх знань та вивченні ставлення і мотивації студентів до навчального процесу в таких складних умовах. Важливо враховувати цілеспрямованість, зацікавленість студентів, а також їх готовність взаємодіяти з викладачами та надавати зворотний зв'язок, що забезпечить підвищення якості навчального процесу та якісну підготовку майбутніх фахівців. Метою статті є дослідити механізми використання штучного інтелекту для вимірювань в освітньому онлайн-середовищі (на основі досвіду Херсонського державного університету). У статті зроблено спробу використати можливості штучного інтелекту для вимірювання концентрації уваги учнів під час занять, їхньої залученості до уроку та готовності надати зворотний зв'язок під час змішаного або дистанційного навчання. Питаннями, що потребують подальших досліджень щодо використання можливостей штучного інтелекту у вимірюваннях в освітньому онлайн-середовищі, є наступні напрями: здатність штучного інтелекту характеризувати відеозаписи навчальних занять за певними критеріями, що впливають на якість навчання (рівень уваги), активність взаємодії, жести і пози під час уроку, напруга тіла, частота дихання і моргання, рух губ і щелеп, реакція на зміст тощо); здатність штучного інтелекту допомагати створювати аналітичні звіти на основі наданих йому кількісних показників щодо результатів навчання або результатів опитувань; здатність штучного інтелекту створювати автоматизовані програми чи інструменти, які могли б покращити елементи персоналізованого та студентоцентрованого навчання у вищих навчальних закладах.

Ключові слова: штучний інтелект; заклад вищої освіти; освітній процес; персоналізоване навчання; вимірювання.

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