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THE ROLE OF ERROR AND ERROR CORRECTION IN EFL TEACHING.

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Abstract
As everyone learn anything they make mistakes and errors by doing that they improve their skills. Making errors is considered as an essential part of learning in EFL classes. However not each student comprehends the teachers feedback positively , so how teachers should correct students errors in the case when students do not understand their mistakes and often students repeat one error several times, which irritates teaches most. Teachers' and students' beliefs in this sphere is controversial. This review of articles tries to answer those questions and encourage teachers and students to use their errors in English language learning in a
Keywords: English language learning, error, error correction, feedback, teachers' beliefs, students' beliefs.

Introduction

English language has become one of the most used language so that many students learn this language nowadays. However while learning process, they face a great deal of mistakes and this irritates them from studying. Teachers also have the problems of how to give positive feedback and correct students' error as students psychology differs they find challenging to approach them in positive ways.

Providing feedback and correcting students errors has been always a challenging issue for teachers. If students make errors it means that they are learning and this can be an useful clue for teachers to find out the missing knowledge of students to correct them. Inappropriate feedback or correction of students' mistakes can be negative and harmful in some cases.

According to Gumbaridze (2012) following factors are the reason why students make errors in learning process:

1. Transferring grammatical, phonetical and lexical features from L1 to L2 or to English as foreign language.
2. In difficultness of the learning language especially, in the use of polysemantic words, omonyms, phrasal verbs and use of idioms.
3. Overgeneralization can be next factor for example misuse of comparative and superlative forms of adjectives and adverbs.
4. Fossilization , as students faulty effects to their psychology and if they repeatedly make mistakes they feel that they cannot correct their errors.
5. Lack of speaking or communicative process.
6. Fatigue and carelessness
7. Feeling inferiority and low self- esteem.
8. Inhibition
9. The shortage of empathy between teachers and students.

To correct students' error and encourage their study mostly teachers utilize next techniques:

1. Echoing
2. Repetition up the correct answer
3. Prompting
4. Making notes of common mistakes
5. Nonverbal way
6. Reformulation
7. Recording on tape.

Many teachers believe that error correction gives positive results and Zhu to find out their opinion about error correction did a survey and according to that survey teacher correction(63.3) is mostly preferred technique and peer correction(16,7) were leading techniques.

Theoretical framework

Everyone learns from the errors they make in their life. Making mistakes is crucial as if a student is doing error is means that he is learning the language. The significance of error in language learning was firstly explored by Corder in1 967 and Selinker continued Corder's theories in this field (Amara, 2015).error is the misuse and incorrectly utilization of grammatical structures, language competences, pronunciation errors, phonetic errors and so on. According to Amara (2015) native speakers can correct their mistakes faster than EFL speakers as they know their mother languages grammmatical and linguistic, pragmatic and phonologic competences better that EFL speakers. So we can conclude that students may commit an error if they do not know or do not understand the language competences.

It is difficult to correct the errors by students as they have several in misunderstanding of each language has its own structures and they often mix foreign language grammar with their L1.

First error, is called as language transfer and interlingual interference.(Amara,2015) this errors are the results of the mixture of two or more languages. The same error shows Gumbaridze (2012)a nd his list of errors are the following;

1. Transferring grammatical, phonetical and lexical features from L1 to L2 or to English as foreign language.
2. In difficultness of the learning language especially, in the use of polysemantic words, omonyms, phrasal verbs and use of idioms.
3. Overgeneralization can be next factor for example misuse of comparative and superlative forms of adjectives and adverbs.
4. Fossilization , as students faulty effects to their psychology and if they repeatedly make mistakes they feel that they cannot correct their errors.
5. Lack of speaking or communicative process.
6. Fatigue and carelessness
7. Feeling inferiority and low self- esteem.
8. Inhibition
9. The shortage of empathy between teachers and students.

Teachers ' attitude to errors; it is said that teachers are afraid of the students' error and always try to do not mistakes during the clas they hink that if a teacher makes mistake each

student repeats it and they cannot correct that error and teachers believe that comitting errors are very harmful however errors mistakes are the part of each one's life.

To treat error teachers should answer several questions and and use mostly used techniques and be active in learning and exploring students' errors and theories that are recommended by scientists. Next questions firstly should be answered and then I provide some techniques to utilize during the process;

Henrickson (1987 cited in Amara 2015) provides five fundamental questions for teachers;

1) Should I correct error
2) When to correct the error
3) Whose error to correct
4) How should I correct the error individually or in class
5) Should I correct or give chance for the student to find and correct his /her error.

To correct students' error and encourage their study mostly teachers utilize next techniques:

1. Echoing
2. Repetition up the correct answer
3. Prompting
4. Making notes of common mistakes
5. Nonverbal way
6. Reformulation
7. Recording on tape.

Zhu (2010) recommends some techniques to eliminate error problems;

1. Consider students preferences; as soon as teacher know how to approach students it becomes easier to correct the students without misunderstandings.
2. When and how to correct; teacher must differentiate error and mistake. Mistakes can be self corrected and errors should be corrected by teachers guide.
3. Promoting and teaching students self-correction techniques ; giving students chance to correct their own error gives amazing result as students and find out where and how they make a mistake and they understand how the structures or other competences work.
4. Encourage peer correction; students work better in groups and students understand each other better as their intuitions are the same so they may help each other not to repeat the error.
5. Feedback; using a wide range of feedbacks can help students as they understand their error and try to correct them there are several types of feedback mostly preferred are usually, explicit correction, recast, clarification, elicitation and repetition.

Amara studied the error that are made by undergraduates of Algeria and most influences factor in making errors was the effects of the mother tongue(2015). Zhu studied the preference on correction methods and according to the study 63.3 % students preferred teacher correction, 16.7% students prefer peer correction and 20 5 of students try to correct themselves (2010). Furthermore other studies done by Gumbaridze, 2012; Diab, 2005; 2006; Hamouda, 2011; Abedi, Latifi et. Al., 2010; Geiller ,2014; Swain, 1988 and et.al also prove that error correction is an essential part in English language learning.

Conclusion

All in all, error and mistake are different conceptions and error should be corrected by the help of teachers. Teachers also have difficulties in correction methods of errors and to effectively use and encourage their students not to make error that should keep an eye with

theories in this field. By utilizing teacher correction, peer correction and self correction methodologies students can learn the language while committing errors. However errors are considered to be pertinent part of learning English language.

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ADVANTAGES OF USING VIDEOS IN ENGLISH LESSONS

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Abstract. The given article discusses the Using Videos in Education. A lot of time and resources are currently being invested into technologies and applications that have yet to be proven to be effective or efficient when compared to more traditional classroom learning contexts. Teachers and schools need to think carefully about when, why and how to use technologies as well as evaluating their efficiency and effectiveness.

Key words: real-world video, news reports, documentaries, scenes from TV shows, music videos, instructional videos, interviews, digital technology

In the modern world of language teaching, many teachers heavily rely on using real-world videos as a teaching resource. A real-world video is a video which was not made or intended to be used specifically for language lessons—for example, news reports, documentaries, scenes from TV shows, trailers, music videos, instructional videos, interviews, performances, etc. Using a real-world video can lead to student growth and progress, and increase students' confidence in using their language skills in real life. Let's dive into some of the advantages of using real-world videos as a tool for teaching a language.

1. Exposure to unfamiliar accents, tones, pronunciation, & terminology

Video gives learners a truly authentic learning experience. It can take the learner away from the teacher's voice for a period of time and allows the learners to hear multiple speakers using the language in natural contexts. Why does this help with their learning? Well, it's quite common for students to understand their teacher probably better than many other English speakers for two reasons – the first reason being that students are often used to the teacher's voice. And the second is that teachers often grade their language down a bit when speaking with their students, and tend to speak a bit more clearly, simply, and slowly, in order for students to understand them. Language teachers are often aware that they speak differently to their friends at home compared with their students in their classes.

Therefore, when students watch a video with someone else using the target language, they get a break from the teacher's voice and must train their ear to different voices, accents, tones, pronunciation, and terminology. Consequently, it becomes an incredibly beneficial experience for learners to train their listening comprehension skills.

2. Activates two channels for learning

Language learners benefit immensely from watching videos because they must simultaneously activate two sensory channels – listening and viewing. Simply put, when you watch a video, you hear the sound and see the motion picture at the same time. This helps learners 'fill in the gaps' – if there are unknown words, terminology, or expressions to students while watching a video, they have the visual element, as well as contextual dialogue

or speech, to help them supplement those missing gaps and help them contextualize the new language.

Vocabulary is learned much more effectively when matched with visuals/video rather than definitions/explanations. Language learners tend to remember the imagery, visuals, sounds, objects, faces, and voices in the context of the video, and therefore build a stronger mental association to the vocabulary words that were used in the video.

3. Topical and cultural value

We're bombarded with videos all day online and on social media – it has become such a normalized medium for communication, information, entertainment, advertising, and art. There are videos used in a variety of contexts in just about any industry, and no matter what the learners' interests are, there are most likely videos somewhere on the web that are relevant to and suit their interests.

The types of video mentioned above can also be valuable in terms of cultural education. When learners are exposed to real-world videos, it can help them learn about the culture and get to know the people, customs, beliefs, sports, foods, lifestyles, and values of those who speak the target language. This is useful because the more someone is educated in culture, the more they develop open-mindedness and, in turn, the likelihood of developing intercultural empathy – an important trait in today's globalized world.

Take for example, a class watching a video about the sport of Irish hurling. Since hurling is quite specific to Ireland only, the students are learning something new about Irish culture. And lastly, back to the point about exposure mentioned earlier—if they're watching a video about Irish hurling, they're likely listening to someone talk about hurling with an Irish accent.

4. Trains understanding and encourages speaking skills

Although watching videos would be considered a passive activity, videos are often full of content that can then be turned active. Basically, they provoke a reaction from students and can inspire students to speak their mind about the topics or themes presented in the video, and they help plant the seed for great classroom discussion. In other words, watching videos helps your students train their listening comprehension, and then in turn also encourages them to share their opinion about the topic, speak about their own experiences, and relate to the topic personally. These are skills that are important to develop for any language learner. Video is also used as a medium for artistic and creative expression it often tells a story which can allow the viewer to make a special emotional connection with the content. Emotion often leads to motivation, inspiration, and creative expression. Contribution from students in response to watching a video is often higher in comparison with reading a text, and it's a tool for providing a balanced learning experience of both passive and active student engagement.

5. Linguistic value and the level of student engagement

Perhaps the most significant value of using videos in your lessons is how they can be used to help your students grow and make progress linguistically. Videos are inherently packed with natural linguistic material – there is so much you can extract from a video and turn into an educational activity to help students build their vocabulary, grammar, pronunciation, listening, speaking, and more. It can be very effective to take a short, engaging video and then transform its contents into a lesson plan with different kinds of activities, designed to help learners improve their core skills.

Even though the aim of the lesson should be linguistic development, videos can also provide value in terms of student engagement as well. When students are interested or engaged in the lesson topics, they tend to be more motivated to learn. Many teachers agree that playing videos for students creates a lively classroom atmosphere. You might even spontaneously come up with some new questions or activities for your students while the video is playing, which you can then use to generate additional discussion with them after viewing. All in all, using video is a great tool to step up student engagement.

Remember that real-world videos can be a great tool to help your students develop their language skills. Both students and teachers typically enjoy working with videos and I encourage all language teachers to incorporate them somehow into lessons. Connecting with students and their own opinions, experiences, and stories related to the lesson topics can help teachers build great relationships with their students!

In the current pandemic, where all students and educators are confined to their homes, the use of videos in terms of education has become even more important.

In the field of education, there is a growing desire to move away from traditional textbooks to more holistic audio-visual learning. The latter is useful for both students and teachers in today's technologically advanced world. As a supplement to traditional textbooks, videos improve the quality of traditional and non-traditional teaching.

6. Pupils focus on visual stimuli

Thanks to the technology that controls our lives, we are used to staring at screens for long periods of time.

Today's learners can be easily stimulated visually because of their connection to technology. With visual stimulation, the student is more engaged with the concept being taught to them. It also leaves a clearer mark on students' memories, making them ideal for keeping video information between readings.

7. Video is a comprehensive method of teaching

The combined use of speech, text and visuals allows the teacher to get to the heart of the matter more quickly than traditional teaching allows. This allows for more content and communication in a shorter amount of time that successfully holds students' attention.

These videos don't have to be complicated. At its most basic, an instructional video can consist of audio and on-screen text, almost similar to lyric videos. This type of video footage allows for more visualization. If audio and text are combined in a lesson, it is easier for students' brains to absorb and remember the message or lesson.

8. Digital Literacy

Today's students should not think of institutional education and digital literacy as two separate things. These should be considered integral aspects of the educational process. Digital literacy is an essential skill for almost every job in the 21st century.

If students are educated in these two aspects, they will be more confident and skilled than in the traditional schooling process. Students shoot videos, edit them with an online video editor, and present their videos, gaining practical skills they will need later in life.

Teaching using classroom films is also becoming popular, provided the appropriate equipment is provided. However, the effect of the video may be impaired due to the nature of the technological gadget used or poor connection.

This encourages teachers to play the aforementioned movies on different platforms, depending on the quality of the video and the type of equipment they, as well as the students, own.

9.It has incredible comfort

YouTube, one of the most popular video platforms in the world, is not only a source of entertainment. If you want to learn a new skill, the material for this is available on the platform, and you can find thousands of resources and courses in minutes by entering the necessary keywords in the search field.

The best thing about video-based learning is that you can learn at your own pace and in the comfort of your own home.

10. Distance learning opportunities are growing rapidly

The market for online courses is exploding. Many institutions are taking advantage of this trend by using Internet videos for teaching. Not only does this show that the school can reach more students, but it also increases the organization's ability to generate revenue.

Using videos in online courses eliminates the need for universities to pay full-time instructors to teach the course. It is important to be aware of the etiquette of respecting the intellectual property of others, and it is essential for educational institutions to ensure that videos used in online courses have the appropriate permissions.

Conclusion

Video training is a great idea. When students have trouble with a particular aspect of the activity, the teacher should pause the video.

If students are using the videos independently, they have the opportunity to review them again and again until they fully understand the point. This gives students more opportunities to use newly learned information and skills.

Importantly, videos can be used to review and reinforce student concepts that require further explanation.

As a teacher, the goal is to increase students' interest in reading and actively involve them in the learning process.

To this end, videos are an engaging learning tool that provides more interest and enjoyment than traditional printed materials. They are a great tool for children who are auditory or visual learners because it combines sight and sound, which ensures that the child does not miss out at the same time.

Video excites and engages students, creates and sustains interest, and provides teachers with an innovative and effective way to address and deliver key curriculum topics.

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EFFECTIVENESS OF PROBLEM TEACHING METHODS IN TEACHING CHEMISTRY

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Abstract: The article describes the problem-based learning used in the teaching of all subjects today and the effectiveness of applying problem-solving situations from chemistry to the teaching process.

Key words: problem-based learning, problem-based learning technologies, problem, problem-based situation, muscular (alken).

Problem learning technologies are based on the activation and acceleration of the student's activities. The basis of problem learning technology is that a person's thinking begins with solving a problem situation, as well as the fact that he has the ability to identify, research and solve problems. Problematic education is of serious importance in the cultivation of creative thinking and creative abilities of students.

In the problematic teaching of chemistry, the teacher remains the leader of the educational process, but it is necessary that he get out of the role of a person who informs knowledge, as in a traditional group, and be an observer, developing the mental actions of students. Corrects errors, explains the places of suspicion of tasks. The process of carrying out problematic teaching, which is organized in chemistry, itself was a problem " " what training should a teacher undergo in order for them to successfully master the problematic teaching of chemistry?"raises a very important issue.

The teacher who teaches chemistry must explain the content of the teaching, while also having a good mastery of the research techniques. Going out in the role of an organizer in teaching on the basis of a problem situation, the teacher is intended to be more a leader and partner for students, and not a ready-made source of knowledge, its carrier and directive. During the preparation for problematic lessons in chemistry, the teacher:

• the fact that students intelligently perceive the situations they encounter as problematic and know how to put real learning issues on a special subject in front of the group, which students understand;

• coordinator of the entire process (solving tasks, putting the problem, solving, checking the result, etc.) carried out by students in chemistry and performing partner tasks for students;

• to try to involve students in the process of problem and its in-depth research, to motivate creative thinking readers with the help of masterfully posed questions;

• the teacher must acquire experiences such as being patient and tolerant by offering his help to the mistakes that students make in their efforts to find personal solutions, or in times when students are unsure in their search for a solution, sending them to the necessary sources of information.

We will give a few examples of problem situations in chemistry below:

The first problematic situation: let's take the fly familiar to all of us. The male of this insect secretes the substance muscalur (alkene) from himself in order to focus his female on himself. When the same substance is exposed to bromine water C23H46Br2 forms a compound. If the substance is ozonized C8H7COH and C13H27COH to divide. Solve the situation: how do you represent the structure formula of the alkene that the house fly separates from itself. Situation solution: CH3-(CH2)-CH=CH-(CH2)12-CH3

The second problematic situation: Have you ever heard of the destruction of the Scott expedition in history. Scott and members of his expedition jumped to the pole for the purpose of the expedition. The expedition took out fuels in special containers made of metal. In a long-standing expedition, at a low temperature, the vessel broke and its fuel spilled. As a result, members of the expedition were killed. How could this have happened? Situation solution: yes. Scott expedition crash is known to us from history. The members of this expedition were made up of 40 people. Expedition fuels that jumped to the pole were stored in a jar, which was quarried with the help of tin. At a low temperature, the container broke and the fuel spilled. As a result, members of the expedition were killed.

The third problematic situation: the pheromone (causative agent) of leaf-cutting ants is the citral substance (geranial, neral). The smell of this substance is reminiscent of the smell of lemon. The fighting of the ants that smell it increases, scraping away all living things in the place where the smell comes out. 2.3.6.7-tetrabrome combined with citral bromine water-3-7-dimethyl forms octanal. Task: determine the name of the same article by international nomenclature. Situation solution: 3,7- dimethylactadiene -2,6-al. Citral C10H16O composed of a mixture of CIS and trans forms, it is used in obtaining flavorings and vitamin A.

Fourth problematic situation: German Alchemist discoverer and physician Iogan Ioaxim Bexer H2SO4 while experimenting with, boiling sulfuric acid is mistakenly released by ethyl alcohol over it. The Arashma was whipped and a more active combustible gas substance began to be released from methane gas. Assignment: How did Johann Ioachim Bexer name this gas, what reaction was carried out as a result of the experiment?

The fifth problematic situation: one day after a long conversation with his friends, Mendeleev said that he could collect tobacco smoke in the air in an empty jar without any difficulty in order to have some fun. Then, when his friend Repin papiros smokes and releases tobacco smoke into the air, he covers the mouth of an empty jar on the table with a glass plate. With a little time, a miracle happened, and an empty closed jar was filled with white “tobacco smoke”. Then Mendeleev offers his friend Repin to smell. As soon as Repin, without believing, sniffs the smoke in the container, he quickly takes himself out of the container and begins to cough strongly.

Assignment: comment on what experience Mendeleev carried out?

Hence, these and similar life problem situations are formulated by the teacher based on the topic and develop the competence of students in the course of the lesson.

Problem-based teaching arms students with the methods of knowing the existence that surrounds them, develops skills and abilities to observe them purposefully, educates the skills of generalizing and summarizing the basic laws by substantiating them, instilling in them an interest in a possible research work.

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DEVELOPMENT OF MEASURES TO ENSURE THE STABILITY OF A ROCK MASSIF WITH THE USE OF MODERN SURVEYING INSTRUMENTS

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Annotation: in the development of a mineral deposit by an underground method with the collapse of the overlying strata of the rock mass, failures and collapse zones form on the earth's surface. Dips and collapse zones on the earth's surface are used as a disturbing factor that cause a redistribution of stresses in the rock mass. The resulting cavities filled with collapsed rocks can be approximated on the earth's surface by a circle or an ellipse. A technique and schemes are proposed for calculating stresses when a collapse zone reaches the earth's surface in the form of a circle, using the results of observations of the displacement of benchmarks on the earth's surface along profile lines.

Keywords: collapse zone, rock mass, stress state, geodetic instruments, profile lines, benchmark, dip.

Currently, the development of measures for the protection of buildings, structures and natural objects in the development of powerful iron ore deposits by an underground method remains an urgent problem. In the work of N.P. Vloha , A.D. Sashurina and A.V. Zubkov [1] substantiated the need to determine the integral stress field at large bases in order to ensure the safety of mining operations in areas of mine fields from hundreds of meters or more, as well as to calculate the parameters of safety pillars and develop measures to protect buildings and structures on the earth's surface from their mining jobs.

Modern methods [2–4] make it possible to assess the safe state of buildings, structures, and natural objects during the displacement of rocks and the earth's surface, in which the gradients of the natural stress field acting in the rock mass are used as boundary conditions for calculation.

As a disturbing factor in the natural stress field, a dip formed in the rock mass and a collapse zone above the goaf, the shape of which on the earth's surface can be approximated by a circle or an ellipse [5–8], are used.

To determine the stresses, it is necessary to lay an observation station on the earth's surface according to a specially developed "Project", observing the requirements of the "Instructions for Observing the Movement of Rocks and the Earth's Surface during the Development of Ore Deposits" [9] and GOST 24846-

2012. Soils. Methods for measuring deformations of the foundations of buildings and structures [10].

Reference ground benchmarks are laid outside the zone of possible deformations, at least two points, both on the side of the hanging and lying sides of the ore body. The distance between the reference benchmarks must be at least 70 meters. As reference benchmarks, it is recommended to use the axial points of shafts and mine buildings, triangulation and polygonometry points, if they are located outside the zone of possible displacements.

Working benchmarks are laid at distances of not more than 5 radii (R) of the calculated (design) collapse zone. The layout of profile lines and benchmarks can be different:

- profile lines across the strike

ore body ;

- profile lines at an angle of 45˚ to the strike of the ore body (Fig. 2); • arrangement of working benchmarks in a checkerboard pattern;
- combined schemes.

Currently, in the production of mine surveying, modern high-precision electronic devices (electronic total stations, scanning systems, GPS and GLONAS navigation systems) are used, which allow changing the methods of geodetic and mine surveying to address industrial safety issues in the development of mineral deposits. The use of high-precision geodetic electronic devices makes it possible to increase the accuracy of determining the coordinates of working benchmarks, which are separated from the reference benchmarks at distances from one hundred meters to kilometers, with an accuracy of 2 mm. Significantly reduce the time for the production of geodetic measurements.

Consider a method for determining the stress state of a rock mass for the collapse zone represented on the plan as a circle. Reference ground benchmarks are laid at a distance of more than 5 radii from the center of the calculated collapse zone. Under this condition, the redistribution of stresses around the formed collapse zone in the rock mass and on the earth's surface will not affect the displacement of the reference benchmarks. After laying the observation station before the exit of the collapse zone, the planned coordinates of the ground reference and working benchmarks (xi; yi) are determined from two series of observations.

After the collapse zone reaches the earth's surface, a tacheometric survey is performed, based on the results of which a plan is made on a scale of 1:500 with the contours of the collapse zone and the crack zone drawn.

Using well-known analytical methods, the area of the collapse zone is determined, the planned coordinates (x 0; y 0) of the center of gravity are found [11]. The radius (R) of the collapse zone is calculated by the formula:

$R = \sqrt{S / \pi}$, where R and S are the radius and area of the collapse zone, respectively.

We introduce a new coordinate system (x`o`y` ) , the beginning of which is combined with the center of gravity of the formed zone of collapse on the earth's surface. In the new coordinate system ( x`o`y `) the y ` axis is combined with the x-axis, and the x` -axis with the y-axis for further convenience of transferring the coordinates of the reference and working reference points to the new coordinate system.

When the collapse zone reaches the earth's surface, the working benchmarks move, which leads to a change in their planned coordinates. With the help of high-precision electronic devices, we determine the new planned coordinates and increments of the coordinates of the working benchmarks located in the displacement zone on the earth's surface in the new coordinate system. The value of the total horizontal displacement of the i- th benchmark in the plan after the collapse zone reaches the earth's surface is determined by the formula:

Δy`2 i where $Ɛ\, i$ is the absolute horizontal displacement of the i- th benchmark; $\Delta\, x\, `\, i$, $\Delta\, y\, `\, i$ are the increments of coordinates of the i- th reference along the x` and y` axes in the new coordinate system after the exit of the collapse zone. Scheme of displacement of the working i - th benchmark after the exit of the collapse zone to the earth's surface. The direction of the total horizontal displacement (shift) of the i- th reference is characterized by the angle φi relative to the y-axis ` φ i = arctg $\Delta\, x\, `\, i\, .\, \Delta\, y\, `\, i$

From the scheme presented, we determine the radius - the vector of the i- th frame in the new system $\upsilon\theta i = Ɛ\, i\, sin\delta i$; δi =90°-βi– φi , (7) where υri , $\upsilon\theta i$ are respectively the radial and tangential displacements of the i- th reference; $Ɛ\, i$ is the total horizontal displacement of the i- th benchmark; δi is the angle between the vector of the total horizontal displacement of the i- th frame and the radius - the vector of the i- th frame.

Radial and tangential displacements of benchmarks in the zone of influence of the dip and the zone of collapse on the earth's surface are determined using the following formulas [12, 13]: coordinates before the exit of the zone of collapse on the earth's surface according to the formula:

$ri = \sqrt{y\, `2\, i + x\, `2\, i}$, where $x\, `\, i$ , $y\, `\, i$ are the planned coordinates of the i- th frame in the new coordinate system (x`o`y `) before the collapse zone exits to the earth's surface. The direction of the radius-vector of the i- th frame before

the exit of the collapse zone in the new coordinate system is determined by the formula: βi= arctg $y'i$ $x'i$ Radial and tangential displacements of the i-th benchmark are calculated by the formulas:

{ vri = Σi $cos\delta i$ { $v\theta$ = −where vr , $v\theta$ are radial and tangential displacements; σ1, σ2 are principal normal stresses; R is the dip radius; r is the radius vector of the frame; G= E − shear modulus; E is the modulus of deformation-2(1+ μ) tion ; μ is Poisson's ratio; χ = 3− μ 1+ μ officer Kolosova G.V .; θ is the angular coordinate of the frame counted from σ1 to the radius vector of the frame counterclockwise.

To determine the stresses σ1, σ 2 , the angle θ and the shear modulus G, four equations must be drawn up. To compile four equations , it is enough to know the magnitude and direction of the total horizontal displacement vectors of two working reference points. The solution of the resulting system of equations will allow to determine the main normal stresses σ1, σ2, , the shear modulus G and the angle θ1 between σ1 and the radius vector of the reference 1. The direction of action of σ1 relative to the x' axis is determined using the following formula: α=β1-θ, where α is the angle between the x-axis` and the direction of action σ1; β1 is the angle between the x-axis` and the radius - the reference vector 1.

To determine the integral stress field after the collapse zone reaches the earth's surface, all possible options are sorted out and the accuracy of determining the components of the natural stress field acting in the horizontal plane and the rock shear modulus for a territory equal to the area of a circle with a radius equal to five collapse zone radii is performed. Observations of the development of the collapse zone in the process of mining and long-term geodetic observations of the displacement of benchmarks make it possible to monitor the stressed state of the rock mass, taking into account the size of the area undermined by mining.

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INGREDIENT OF PORTLAND CEMENT

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Keywords: Portland cement, mortar, stucco, grout, hydraulic lime, clinker, limestone, clay, kiln

Abstract: Portland cement is the most common type of cement in general use around the world as a basic ingredient of concrete, mortar, stucco, and non-specialty grout. It was developed from other types of hydraulic lime in England in the early 19th century by Joseph Aspdin, and is usually made from limestone. It is a fine powder, produced by heating limestone and clay minerals in a kiln to form clinker, grinding the clinker, and adding 2 to 3 percent of gypsum. Several types of portland cement are available. The most common, called ordinary portland cement (OPC), is grey, but white Portland cement is also available. Its name is derived from its resemblance to Portland stone which was quarried on the Isle of Portland in Dorset, England. It was named by Joseph Aspdin who obtained a patent for it in 1824. However, his son William Aspdin is regarded as the inventor of "modern" portland cement due to his developments in the 1840s.

Portland cement (English: Portland - from the name of a peninsula in the United Kingdom), a water-resistant binder; building material. The composition consists mainly of calcium silicates. It is the most common type of cement. The mixture of clinker and gypsum (3-7%) is very soft. A certain amount (10-15%) of active mineral substance can be mixed into the mixture. According to the composition, properties and fields of application, Portland cement is divided into simple, quick-hardening, hydrophobic, sulfate-resistant, white, used in the production of asbestos-cement products, and others. The composition and quality of Portland cement mainly depends on the composition of clinker and how soft it feels. Its most important property is the ability to harden when exposed to water. This feature is determined by the brand, the brand of Portland cement produced in Uzbekistan ranges from 300 to 600 (the higher the brand, the higher the quality of the material).

The low cost and widespread availability of the limestone, shales, and other naturally-occurring materials used in portland cement make it one of the lowest-cost materials widely used over the last century. The most common use for portland cement is in the production of concrete. Concrete is a composite material consisting of aggregate (gravel and sand), cement, and water. Concrete produced from Portland cement is one of the world's most versatile construction materials, and has changed the world in almost every observable aspect. It is one of the most widely used substances on Earth, and as such, portland cement manufacturing is currently vital to the world's economy. It is one of the construction industry's largest cause of climate changing carbon dioxide emissions.

Portland cement clinker is made by heating, in a cement kiln, a mixture of raw materials to a calcining temperature of above 600 °C (1,112 °F) and then a fusion temperature, which is about 1,450 °C (2,640 °F) for modern cements, to sinter the materials into clinker.

The materials in cement clinker are alite, belite, tricalcium aluminate, and tetracalcium alumino ferrite. The aluminium, iron, and magnesium oxides are present as a flux allowing the calcium silicates to form at a lower temperature,[15] and contribute little to the strength. For special cements, such as low heat (LH) and sulfate resistant (SR) types, it is necessary to limit the amount of tricalcium aluminate ($3\ CaO{\cdot}Al_2O_3$) formed.

The major raw material for the clinker-making is usually limestone ($CaCO_3$) mixed with a second material containing clay as source of alumino-silicate. Normally, an impure limestone which contains clay or SiO_2 is used. The $CaCO_3$ content of these limestones can be as low as 80%. Secondary raw materials (materials in the raw mix other than limestone) depend on the purity of the limestone. Some of the materials used are clay, shale, sand, iron ore, bauxite, fly ash, and slag. When a cement kiln is fired by coal, the ash of the coal acts as a secondary raw material.

Typical constituents of portland clinker plus gypsum showing cement chemist notation (CCN)

Clinker	CCN	Mass
Tricalcium silicate $(CaO)_3 \cdot SiO_2$	C_3S	25–50%
Dicalcium silicate $(CaO)_2 \cdot SiO_2$	C_2S	20–45%
Tricalcium aluminate $(CaO)_3 \cdot Al_2O_3$	C_3A	5–12%
Tetracalcium aluminoferrite $(CaO)_4 \cdot Al_2O_3 \cdot Fe_2O_3$	C_4AF	6–12%
Gypsum $CaSO_4 \cdot 2\ H_2O$	$C\bar{S}H_2$	2–10%

Portland cement production includes two processes:

- Clinker production;
- Filling clinker with additives.
- First of all, the process is very complicated, and its implementation is associated with large funds and implementation costs. Because most of the total cost of Portland cement production (70-80%) is the cost of clinker.
- The following main technological operations are performed in the production of Portland cement clinker.
- limestone and clay are mined
- raw materials are prepared and ground
- fuel is prepared
- raw materials are burned

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TECHNOLOGICAL METHODS OF PREVENTING SLOPE ANGLE VIOLATIONS IN THE MINE. MEASURING SLOPE ANGLES.

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Abstract: Slope failures are an inevitable aspect of economic pit slope designs in the mining industry. Large open pit guidelines and industry standards accept up to 30% of benches in open pits to collapse provided that they are controlled and that no personnel are at risk. Rigorous ground control measures including real time monitoring systems at TARP (trigger-action-response-plan) protocols are widely utilized to prevent personnel from being exposed to slope failure risks. Technology and computing capability are rapidly evolving. Aerial photogrammetry techniques using UAV (unmanned aerial vehicle) enable geotechnical engineers and engineering geologists to work faster and more safely by removing themselves from potential line-of-fire near unstable slopes. Slope stability modelling software using limit equilibrium (LE) and finite element (FE) methods in three dimensions (3D) is also becoming more accessible, user-friendly and faster to operate. These key components enable geotechnical engineers to undertake site investigations, develop geotechnical models and assess slope stability faster and in more detail with less exposure to fall of ground hazards in the field. This paper describes the rapid and robust process utilized at BHP Limited for appraising a slope failure at an iron ore mine site in the Pilbara region of Western Australia using a combination of UAV photogrammetry and 3D slope stability models in less than a shift (i.e. less than 12 h).

Keywords: Slope stability,3D limit equilibrium analysis,Aerial imagery, Photogrammetry,Open pit mining.

Introduction

In both civil engineering and mining projects, practical limitations significantly affect the ability to assess the stability of rock slope cuttings and benches in real-time, using analytical approaches such as kinematics, LE, FE or distinct element modelling. Excavation is usually too fast for this. Two key limitations currently preventing this are:

1. Time required for local site investigations. In the case where slope failures occur, safety concerns and residual risks in close proximity to unstable slopes such as failure reactivation or localized rock falls may prevent site investigations altogether;
2. Time required to translate the site investigation data into a geotechnical model to facilitate detailed stability analysis using a variety of numerical codes.

Traditional rock slope mapping techniques would typically require from 30 to 180 min of field time to assess a 10 m length of slope using window and traverse approaches, respectively.

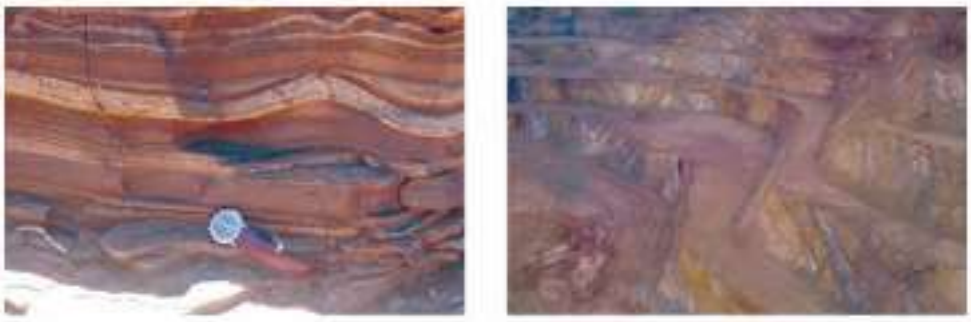
Development or refinement of a geotechnical model and subsequent stability analyses can easily take several hours thereafter. In contrast, empirical methods such as slope mass rating (SMR), Q-slope and slope stability assessment methodology (SSAM) can be applied in real-time to assess stability as slopes are exposed in the field. Typically, these empirical methods require between 5 and 15 min in the field to assess slope stability for a 10 m long section. Slope stability modelling techniques have significantly improved over the years from basic kinematic analysis in the 1990s through to two-dimensional (2D) LE analysis and simple FE modelling using PC in the 2000s. However, in Australian iron ore and coal deposits, open pit mines are typically designed using relatively limited data density and the routine use of more advanced numerical modelling techniques such as FLAC and UDEC is generally not practicable, nor is it always warranted. indicated that over 80% and 90% of coal mines are designed using kinematics and 2D LE analysis, respectively, and that less than 15% of designs include 3D numerical analyses. The recent development and improvement of simple-to-use 3D LE and FE analysis software has provided an additional method for identifying potential issues in slope designs [11,12]. The use of 3D analysis has also been shown to provide more detailed analysis results that allow geotechnical engineers to optimize pit slope designs and unlock resource value.

Technological quality of iron ore deposits

The central and eastern Pilbara region of Western Australia is renowned for its abundance of economically extractable, bedded iron ore deposits between the townships of Newman and Port Hedland. BHP Limited currently operates over 50 individual open cut mines across six mining hubs: Whaleback, Eastern Ridge, Jimblebar, Yandi, Mining Area C and South Flank (Fig. 1). Due to the broad regional expanse of the operations, a very high extraction rate is achieved despite vertical development rates remaining relatively low (typically 1–3 benches or 10 to 30 m per year in an individual iron ore pit). Final pit depths generally range from less than 100 to 450 m. Iron ore deposits in the Pilbara region occur within banded iron formations of the Hamersley Group which comprises Archaean to Proterozoic marine sedimentary and volcanic rocks. Geological structures play a key role in the location, geometry and preservation of high grade iron ore bodies. The structural evolution of the Hamersley Province is considered to be well understood and is documented by Dalstra. In general terms, it comprises normal faulting and thick-skinned tectonics in the west and more intense folding, minor thrust faulting and possible thin-skinned tectonics on the east. Some deposits such as Whaleback are very complex with several phases of deformation, resulting in an overturned stratigraphic sequence. The stratigraphic units of economic interest consist of banded iron formation (BIF) with interbedded carbonates and shales. BIF can vary in thickness due to differing amounts of carbonate dissolution and silica replacement during iron ore enrichment formation and typically contain thick interbedded shale bands, some of which make excellent stratigraphic marker horizons in the mining areas as they are remarkably persistent across hundreds of kilometers throughout the Hamersley Province. The bedded iron ore deposits are hosted in highly anisotropic rock masses. Anisotropy, as defined in engineering geology, refers to a rock whose engineering properties (such as strength and permeability) vary with direction. Anisotropy is very common and present everywhere. Isotropy is rare. Anisotropy is produced as a consequence of the geological history of the rock or rock mass, and generally has its origins in the varying mineralogical composition of different layers and/or a preferred orientation of mineral grains. Distinctive bedding planes are produced in sedimentary rocks

due to depositional cycles as is the case in iron ore. Two distinct scales of anisotropy are prevalent (Fig. 2): (1) bedding scale–between individual bedding planes (e.g. BIF-BIF or shaleshale bedding planes), and (2) banding scale–between known specific bands within stratigraphic layers (e.g. shale band NS2 and the bands of BIF either side in the Newman Member). Planar sliding along adversely oriented and low strength shale bands is the most common mode of slope instability from bench to overall slope scale in mining operations and also within natural slopes of the Pilbara region. The slope failure from the BHP mine discussed in this paper is a classic example of multi-bench planar sliding in the Hamersley Group (Fig. 3). The failure itself was ‘‘controlled” by means of a catchment bund such that no personnel or equipment were exposed to the hazard as shown in Figs. 4 and 6–8. Rock mass and bedding shear strengths are typically well understood in the Pilbara region as relatively limited variation exists across individual deposits that are situated within the same stratigraphic unit. Intact rock and rock mass shear strength, particularly in BIF-dominated stratigraphic units, may vary quite significantly with weathering, and to a lesser extent, alteration.

There is no significant difference between the shear strength of bedding planes of shale and BIF units across the Pilbara. The shear strength of shale bedding planes is also generally independent of weathering grade. Failure back-analyses, site



(a) Bedding scale

(b) Banding scale in an iron ore pit with 12 m high benches

Fig. 2. Scales of anisotropy in Western Australian iron ore deposits

Fig. 3. Aerial reconnaissance of planar sliding failure mechanism at BHP mine.

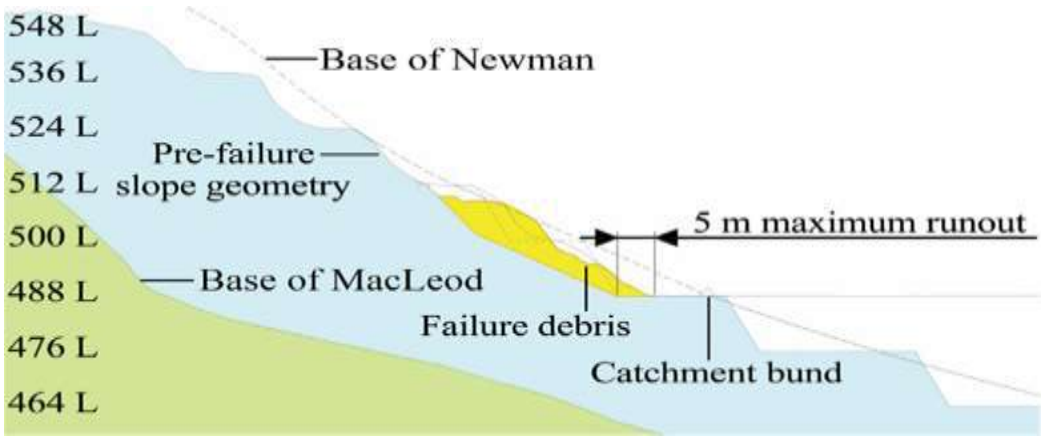


Fig. 4. Geological cross-section through failure.

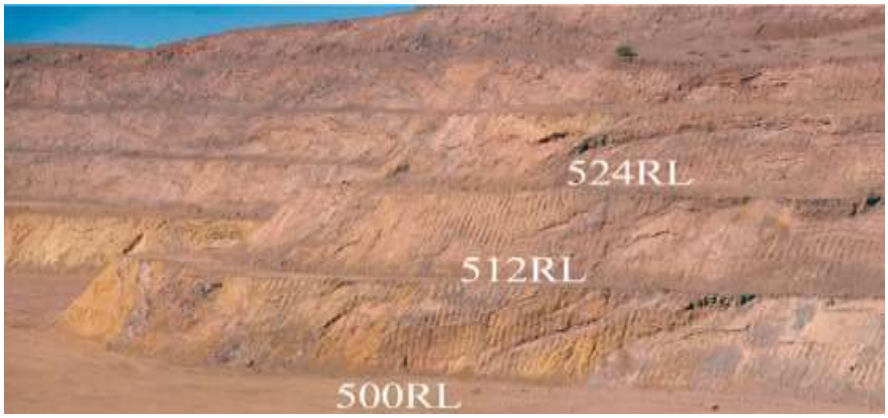


Fig. 5. Pit slope with undercut bedding planes near convex slope profile in July 2019–pit floor 500 RL

Fig. 6. Pit slope with initial 8 m high failure contained within a rock fall catchment bund on 26 October 2019–pit floor 492 RL

Fig. 7. Pit slope failure propagation to 15 m high contained within a larger failure catchment bund on 26 November 2019–pit floor 488 RL.

Fig. 8. South wall failure propagation to 24 m high on 27 November 2019–pit floor 488 RL

specific drilling and laboratory testing provide a means of assessing variation in shear strengths and material density. Slope stability analyses are undertaken considering the effects of anisotropy: (1) bedding scale anisotropy can and should be modelled using directional shear strength models in 2D or 3D; and (2) banding scale anisotropy is best modelled using discrete weak bands in both 2D and 3D models rather than with directional shear strength models. The use of directional shear strength models for banding scale anisotropy allows the weakness plane to appear ubiquitously in this slope, rather than at its actual discrete location. This may result in over-conservatism. Seery conceptually compared using ubiquitous directional shear strength models against discretely located shale bands within the Dales Gorge Member of the Brockman Iron Formation. Seery concluded that the directional shear strength model does not necessarily honor the geology, particularly due to the widely spaced shale bands in the Dales Gorge Member. In order to achieve an optimal slope design, it is necessary to understand the geology, and have the ability to discretely model banding scale anisotropy (i.e. discretely model shale bands) coincidentally with bedding scale anisotropy. Notwithstanding this, it remains appropriate to use a ubiquitous shale band strength model however where the position of discrete shale bands is not known. As slopes become exposed with mining progression, a detailed reconciliation process is used to validate the location of shale bands and enable a transition from a ubiquitous shale band strength model to discretely modelling banding scale anisotropy.

Aerial reconnaissance and photographic records

Aerial reconnaissance using UAV is routinely used to inspect unstable or failed slopes in both civil and mining engineering applications. High resolution imagery and video are captured while ensuring the geotechnical engineer or surveyor remains at a safe distance, away from the line-of-fire of potential rock falls or further instability. Fig. 3 provides examples of aerial reconnaissance imagery from the planar sliding failure at the BHP iron ore mine. Failure geometry and geological conditions are illustrated in Fig. 4, and ultimately comprised: (1) failure height of 24 m, (2) failure width of 40 m, (3) maximum horizontal runout of 5 m on pit floor (contained within catchment bund), and (4) estimated failure size of 15000 tons. The planar failure mechanism was progressive, initiating as a local bench failure that propagated further with the progression of mining excavations and increased loading of the undercut shale band. Fig. 5 shows the pit slope prior to the failure with the pit floor 500 RL in July 2019. Bedding planes near the convex slope profile are undercut and some shale bands exposed.

Also visible are several areas of local bench crest losses. Excavations progressed vertically downward 8 m (pit floor 492RL), undercutting a pervasive shale band and initiating a bench failure as shown in Fig. 6. Further excavation, vertically downward 4 m (pit floor 488 RL) was successful in extracting ore and achieving the planned pit design; however, further deterioration of the initial bench failure was observed. Failure propagation was evident on 26 November 2019 as shown in Fig. 7. The rate of failure may have been exacerbated by 0.8 mm of rainfall that occurred on 27 November 2019, resulting in the 24 m high failure shown in Fig. 8.

UAV photogrammetry and geotechnical model update

Photogrammetry enables the generation of 3D models from a series of overlapping photographs. The introduction of the ‘‘structure from motion” concept as well the broad availability of drones or UAV brought a renaissance of this technology. Structure from motion includes a series of processing steps that allows computing a comprehensive set of 3D surface points that are combined to a surface description (i.e. a mesh) in photo-realistic style. Due to the availability of redundant information, geometric deviations present in camera used (i.e. lens distortion) are compensated while generating the 3D model. This auto-calibration ability makes modern photogrammetry algorithms capable of producing accurate 3D models even from low-grade cameras, so even low cost, off-theshelf drones can be used to generate 3D models at sufficient high accuracy. Several commercial software packages are available for modern photogrammetry (e.g. Agisoft, Pix4D, ShapeMetriX). All work in a similar way and provide comparable results. In this case study, ShapeMetriX software has been used since it also includes tools for geological and geotechnical mapping. Figs. 9 and 10 show the resultant 3D model generated from 284 photographs captured using a 9 mm digital camera mounted on a DJI Phantom 4 drone. The model computed in less than one hour on a mobile workstation (2017 Alienware 17 R4). It consists of over 7 million surface points and has a ground sample distance (GSD) of 2 cm per pixel. Note the lighter material on the right hand side of the model in Fig. 10; this is where bench failures and crest losses had previously occurred on daylighting shale bands. Model accuracy in that context needs to be looked at in at least two ways: (1) positional accuracy, i.e. the correct location of the 3D model and given coordinate grid or the correct orientation and scale of the model if working in local co-ordinates, and (2) shape accuracy that reflects mainly if all the details of the rough surface are rendered by the 3D model. It is linked with the GSD and spacing of the 3D surface points. Positional accuracy is best if there are some reference points (ground control points or GCP) in the captured area. The GCPs are locations with surveyed coordinates. The referencing mechanism transforms the model to the location of the GCPs with remaining residuals in the sub-centimeter range. In some cases, the installation and surveying of GCPs is timeconsuming and costly especially in regions that are difficult to access such as alpine rock fall areas. Similarly, in an active mining area where personnel can be exposed to interaction with haul trucks and other mining equipment, GCPs may not be practicable from a safety perspective. In such case, the 3D model may be referenced (scaled and oriented) based only on GPS information recorded while taking the images. Such models show larger deviations from the ground truth–depending on the quality of GPS (the absolute localization might be some meters off). However, when comparing an accurately geo-localized 3D model using GCP and a roughly localized model using GPS, the scale and orientation of the 3D models align within 1% (i.e. shape accuracy is unaffected). Such pure GPS referencing can be even improved by using real time kinematic

(RTK) or post processed kinematic (PPK). Both lead to better absolute geo-localization of the 3D model without GCPs. 3D models developed from pure GPS referencing showed to be sufficiently scaled and oriented for performing geological mapping. In particular, data such as discontinuity orientations or spacing are practically unaffected since variations or errors in the 3D model (from UAV photogrammetry) are more than an order of magnitude less than errors obtained when using conventional measuring techniques such as mapping using a geological compass, tape measure or orienting and logging discontinuity orientations in drill core. ShapeMetriX software allows direct analysis of geometric entities such as volumes, areas, distances, sections, and the measurement of point coordinates. In addition, geologically relevant features can be examined. By way of example, Fig. 11 illustrates orientations of traces and surfaces that can be interpreted. Recent developments provide automatic analyses which lead to reproducible and statistically admissible assessments due to the high number of individual measurements.

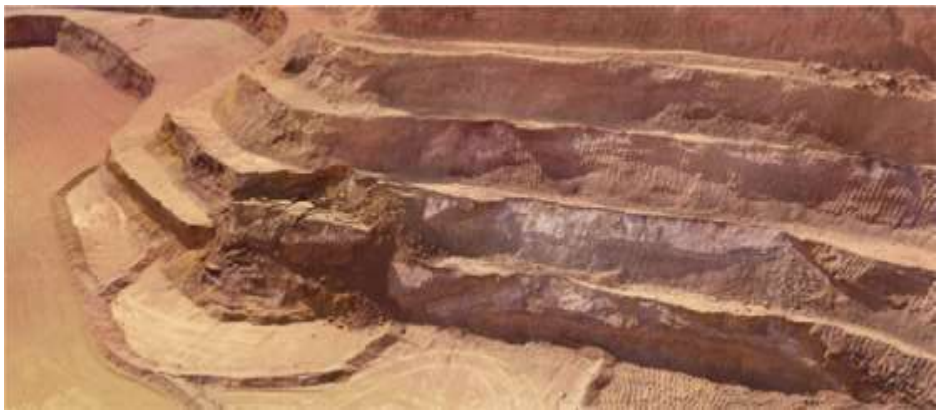
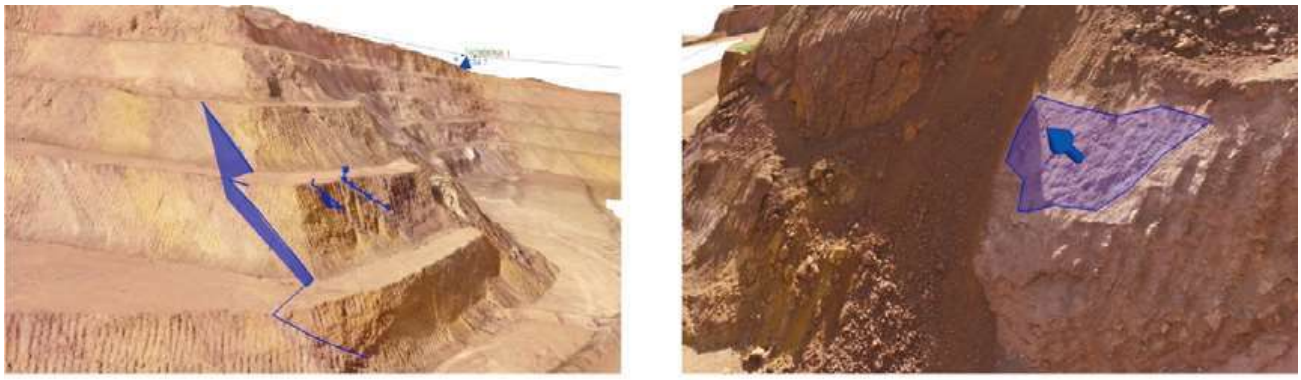


Fig. 10. 3D model developed from UAV photogrammetry with the planar failure on the left hand side near the convex slope profile. Lighter colored material on the right hand side where repetitive bench crest losses have occurred shows near-planar shale bedding planes. Shape accuracy is <5 cm without GCP.



(a) Orientation of significant shale bedding plane traces

(b) Shale bedding surface trace

Fig. 11. Orientation measurement of significant shale bedding plane traces across multiple benches and shale bedding surface trace upon which planar sliding has already occurred.

A total of 198 geological structures including bedding planes and joints were mapped using ShapeMetriX (Fig. 12) and imported into a 3D CAD package (GEM4D) where the failure plane was modelled as a 3D surface. The failure plane was a distinct shale band that was located near the MacLeod-Newman geological contact. The orientation, or rather, the dip of this shale

band was approximately 3———————————-5——————————— shallower than predicted in the pre-mining geological model, resulting in undercutting near the base of the slope (i.e. the pre-mining geological model was highly reliable).

Slope stability analysis

2D and 3D limit equilibrium modelling

Slope stability analyses can be undertaken in 2D or 3D. Traditionally, 2D models were generally most commonly constructed due to the relative ease of model construction and rapid computation time compared to 3D models. 2D models will generally yield a conservative result where: (1) the shear resistance of the end surfaces of failures is not included in the modelling process, and (2) cross-sections selected for FoS (factor of safety) calculation are typically a worst-case scenario which will generally not be representative of all slope conditions. However, this is not always the case, where 3D analysis can also produce lower FoS than 2D analysis. Wines stated that the main reason for the differences in results between 2D and 3D analysis is the ability of 3D analysis to provide an accurate

Fig. 9. 3D model developed from UAV photogrammetry covering surface area of approximately 186000 m^2.

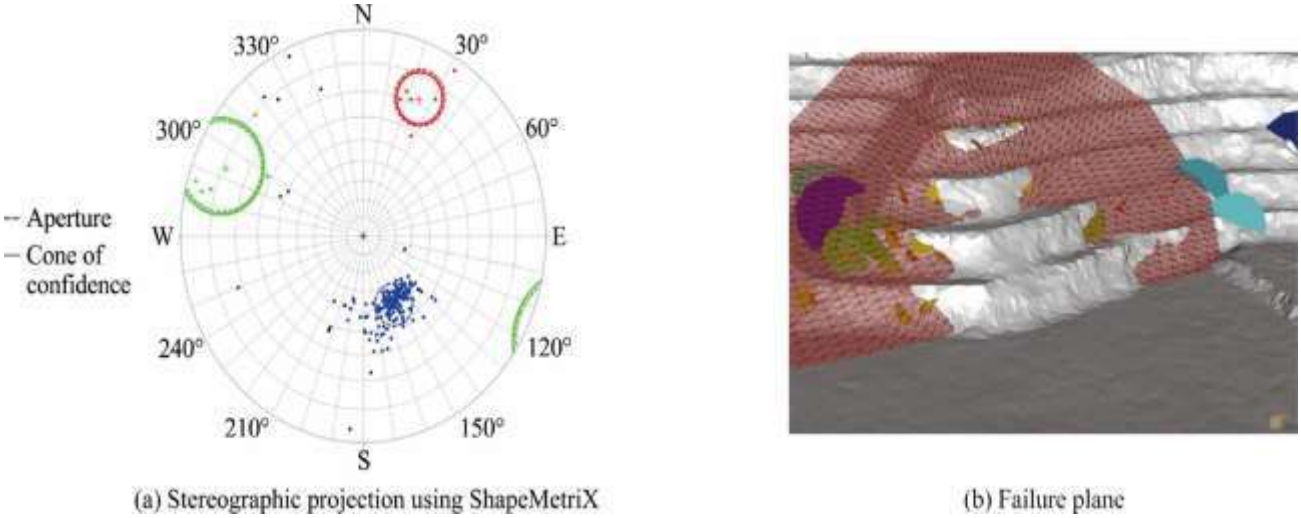
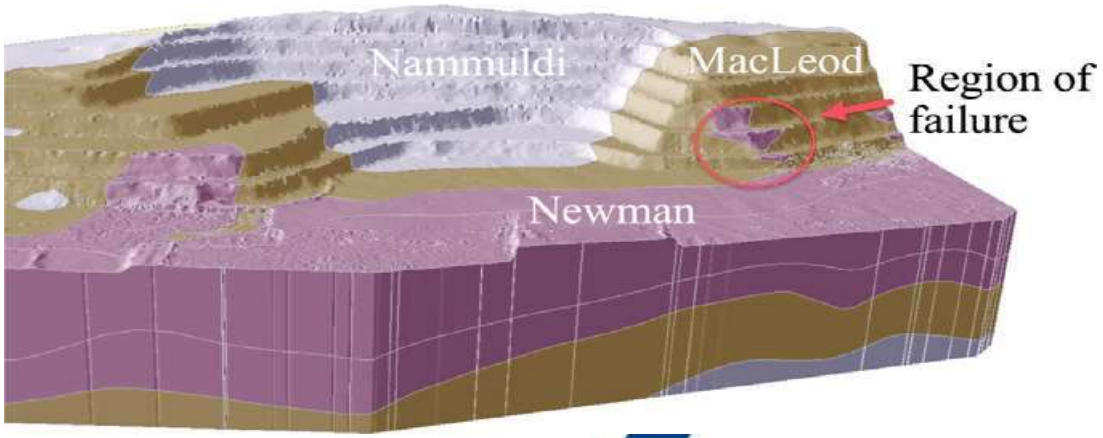


Fig. 12. Stereographic projection showing bedding planes: 40———————————/333 (blue) and joints: 72———————————/205——————————— (red) and 79———————————/113——————————— (lime) in ShapeMetriX and planar sliding failure plane (shale band) re-evaluated in GEM4D to create a wireframe mesh from utilizing the imported geological structures which are represented as colored disks. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.) representation of the problem such as geometry, spatial

distribution of geotechnical domains, discontinuity orientations and distribution of pore pressures, all which will always are threedimensional in reality. Wines and Sjoberg stated that for relatively long open pits with basic geological conditions a 2D model can generally be justified, except at the pit corners and at the lateral bounds of slope failures. Lorig & Varona recommend 3D assessments of slope stability should be made where the strike of discontinuities is less than 20———————————— to 30———————————— from the strike of the excavated face. Bar & Weekes demonstrated that anisotropy (or true dip) of any structure can only be correctly modelled in 3D as 2D sections of a slope inherently result in an apparent dip which is not completely perpendicular to the anisotropy. Bar & McQuillan presented several case studies from open pit iron ore and coal mines that highlight the limitation of 2D LE models in highly anisotropic geological settings. The case studies presented show 2D LE analysis can lead to either the over-estimation or under-estimation of FoS where 2D analysis did not adequately model the anisotropic conditions under which failure occurred. Stated that to reliably predict the performance (e.g. propensity for failure) and critical failure mechanism (including spatial location) of slope failure, geotechnical engineers must select appropriate tools to complete slope stability assessments. Modelling techniques which can adequately account for the failure mechanisms typically observed in highly anisotropic geological settings, such as WAIO iron ore deposits, include empirical, 3D LE and 3D numerical (e.g. FE) modelling. Of these three methods, LE has become a preferred method for routine slope stability analysis since its introduction in the early 20th century. Its popularity stems from its ease of use, relatively fast calculation speed and calibration from years of application and observation. A FoS using LE methods can be calculated using the method of slices (2D analysis) or method of columns (3D analysis). Both methods are based on the principle of statics, where the summation of forces acting on a failure surface (i.e. mobilized stress) are compared with the sum of the forces available to resist failure (i.e. available shear resistance). The ratio between these two sums is defined as the FoS. If the FoS is greater than 1, the slope is assumed to be stable. Geotechnical engineers frequently set design acceptance criteria (DAC) at values much higher than FoS = 1 when determining a stable slope design. That is, FoS of 1.2, 1.3, 1.5, etc., are required for varying slope configurations with varying required serviceability and strategic risk. complex surface, is discretized into vertical columns as shown in Fig. 13. Forces are analogous to the vertical slice method used in 2D. In 3D, each column has a share cross-section and forces and moments are solved in two orthogonal directions. Vertical forces determine the normal and shear force acting on the base of each column.

Pre-mining geotechnical design



Updated geotechnical model for south wall represented in 3D for LE analysis using Slide3.

Member, which also appears locally within the slope in areas where both slope and stratigraphical geometries permit, including the region of failure. The current pit is significantly above the groundwater table, so dry conditions are appropriate for the slopes. presents the original geotechnical design shear strength parameters derived from diamond core drilling and laboratory testing using Hoek-Brown failure criterion for rock mass, 2D LE analysis was used to design the pit slopes to meet the DAC whereby the FoS 1.2 for inter-ramp and overall slopes. The original (pre-mining) geotechnical design for the pit identified single to multiple bench scale hazards on the south wall using a combination of 2D LE and kinematic analyses from which the probability of undercutting bedding planes was expected to be in the order of 50%. As such, the area was routinely inspected and included as part of the slope validation process whereby actual ground conditions are reconciled against original geotechnical design predictions. During the course of mining five benches (i.e. vertically downward 60 m), several local single bench failures ——————————— 12 m in height had occurred, either during blasting, or excavation. These were safely remediated with standard mining procedures. Using the 3D model developed from UAV photogrammetry, Fig. 15 reconciles the actual percentage of slope face area that had been involved with failure events. The failure areas represent 32% of the total slope area (i.e. slope performance was better than expected since this is significantly less than the predicted 50% from probability of undercutting assessments).

3D limit equilibrium back-analysis of failure

The 24 m high planar failure in Fig. 3 was back-analyzed to refine the original geotechnical design shear strength parameters to enable add rigor to the geotechnical model and enable better prediction of future ground behavior as mining continues. The 3D LE model was developed such that it is spatially large enough to enable subsequent re-evaluation of future pit slope stability and alternative designs, if required. The updated geotechnical model including the location and orientation of the failure plane (shale bedding) and updated stratigraphic wireframes derived from UAV photogrammetry were utilized in the 3D LE back-analysis.

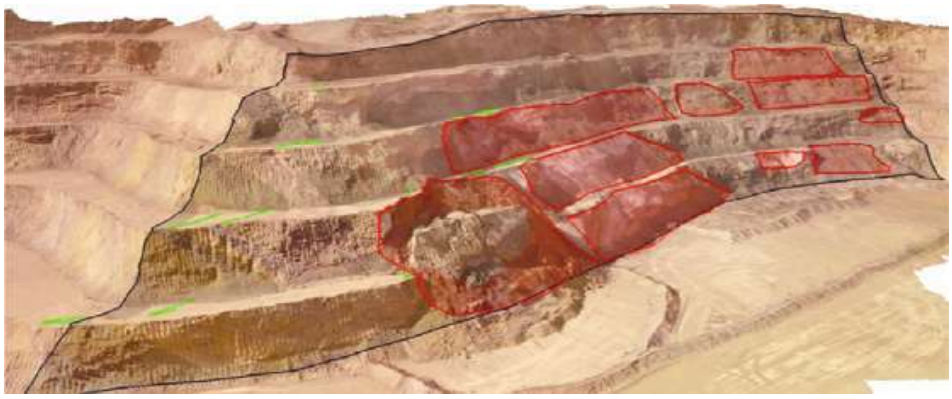


Fig. 15. UAV photogrammetry 3D model illustrating failure event areas in red, total failure area in black, and visible tension crack traces in lime green using ShapeMetriX. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

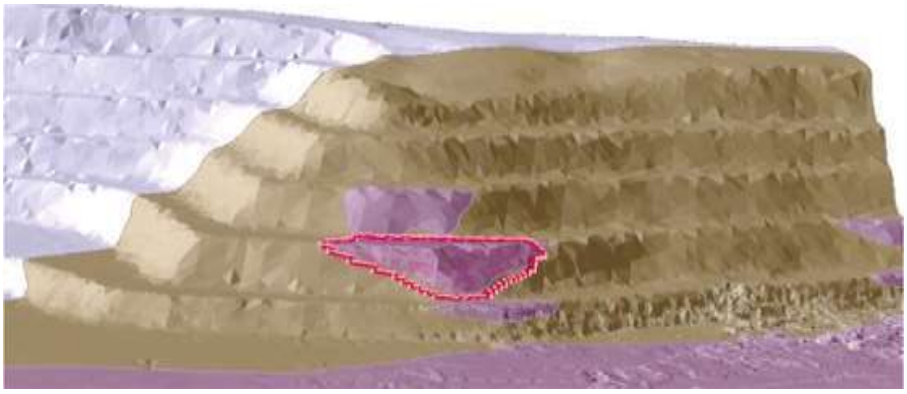


Fig. 16. Planar sliding failure back-analysis using bedding shear strength parameters, c'=0 kPa and /'=29———————————, identifying initial single bench instability.

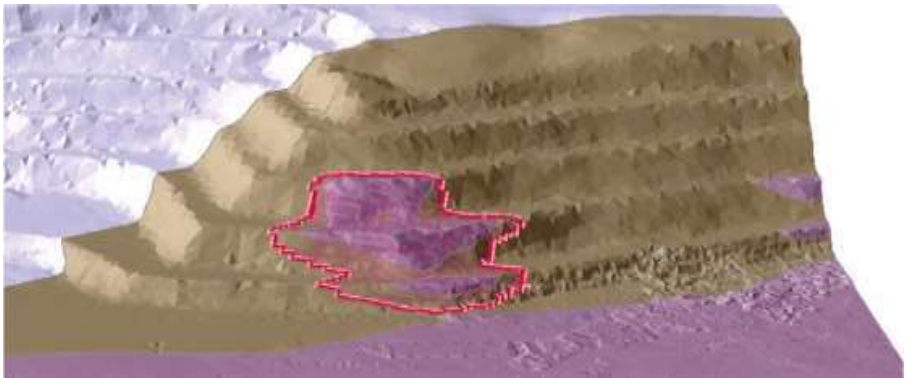
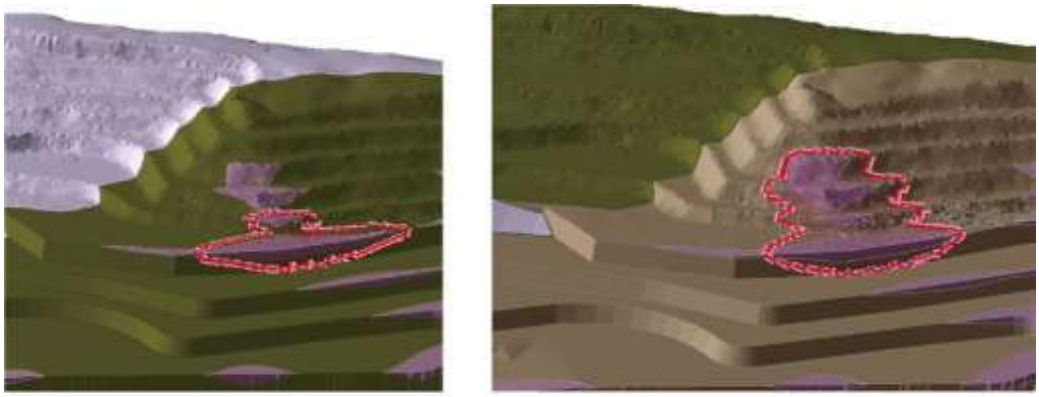


Fig. 17. Planar sliding failure back-analysis using bedding shear strength parameters, c'=5 kPa and /'=26———————————, identifying larger mechanism.

The 3D LE back-analyses results indicated bedding shear strengths likely contained 0 to 5 kPa of cohesion with friction angles ranging from 26——————————— to 29———————. Vibration and gas pressures from blasting along the already weaker shale bedding planes likely resulted in a loss of, or at least, significant degradation of cohesion, that initiated the planar failure. The future pit slope design was re-evaluated based on the bedding shear strengths obtained from the back-analysis as well as updated stratigraphical wireframes derived from the UAV photogrammetry.



(a) FoS=1.09 for single 12 m high bench

(b) FoS=1.20 for 48 m high multiple bench slope

Fig. 18 illustrates key findings of the 3D LE analysis results of the future pit slope:

(1) FoS = 1.09 for a single bench failure mechanism was identified (Fig. 18a). Although not complying with the design acceptance criteria, associated risks of a potential failure can be managed through the wide catchment berm as well as slope deformation monitoring.

(2) FoS = 1.20 for a 48 m high multiple bench slope was identified and complied with the DAC (Fig. 18b). Notwithstanding this, slope validation will routinely continue with mine progression to ensure that if any significant deviations to the geotechnical model are observed, they can be acted upon.

No evidence of larger slope failure risks using the updated geotechnical model.

Discussion

Aerial reconnaissance, photogrammetry, and 3D LE modeling were used to rapidly appraise ground conditions and stability conditions for the current and future planned slopes at the BHP iron ore mine. Demonstrates that through the use of the latest tools and technology, the process can be successfully completed in less than 12 h. The ability to respond quickly to geotechnical events enables the geotechnical team to provide quality advice to mine operation to continue operating safely and economically.

The ease and speed of undertaking UAV photogrammetry make it a powerful tool for identifying the location, orientation and length of geological structures. However, it should be noted that photogrammetry application on its own remains limited in its capability of undertaking complete ground characterization. By way of example, joint properties such as infilling and intact rock parameters such as strength cannot be evaluated or estimated using this method and required physical time spent in the field where safely accessible. The BHP WAIO survey team uses UAV photogrammetry for routine end-of-month surveying. With the addition of minor extra flights to capture additional angles and higher resolution digital SLR camera photographs, the geotechnical engineering and geology teams are also enabled to routinely update geotechnical and structural geological models across operating pits. Future improvements to the process include the use of high-precision UAV that remove the need for ground control points while maintaining or improving aerial reconnaissance and photogrammetry accuracy.

Conclusion

Since mid-2019, the BHP WAIO geotechnical engineering team has routinely been analyzing pit slope stability using 3D LE software Slide3. The shift to 3D modelling from 2D cross-sections has facilitated better integration with mine planning and is increasing the speed (and quality) at which we can review proposed pit slope designs. Quite simply, new mine and pit slope designs are inserted into a 3D model, replacing their predecessor. This approach also has the ability to automatically generate and analyze 2D cross-sections that are directly comparable with historic analyses. The 3D models themselves provide significant insight into possible lateral extents of failure mechanisms such that sensible advice can be provided to mine operations in terms of geotechnical risk management without the need for overly conservative slope designs.

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METHODOLOGICAL FOUNDATIONS FOR MODELING THE WAYS OF PRESENTING INFORMATION IN THE ENGLISH-LANGUAGE NEWS DISCOURSE

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Abstract: The scientific article is based on the rules of cognitive linguistics, media-discourse studies, the communicative style of the English language and is devoted to the study of the specific features of the presentation of the event in the English text of the news report.
Keywords: cognitive linguistics, media-discourse studies, the concept of "representation of the event in mass media".

Introduction

It is necessary to follow the rules of cognitive linguistics, speech sciences and the communicative style of the English language when studying the specific features of the presentation of the event in the English text of the news report.

The relevance of the topic is related to the significant impact of nominative and discursive information technologies in the English language on the strategies and methods of presenting news in the world media space, the need to expand knowledge about the cognitive and discursive properties of information. Organization of news text in English-language electronic media consists of clarifying the methodology of cognitive-semantic modeling of the news event using the English language.

The scientific novelty of the scientific article is to reveal the meaning of the concept of "representation of the event in the mass media", to systematically describe the communicative-functional and social-pragmatic specificity of the information content of the English-language mass media. The thematic organization of news text is examined for the first time in a representative corpus of English news material using the nominative density measurement method of the thesaurus. Based on the developed methodology of the cognitive-discursive reconstruction of the news event, the correlation between the categorical-semantic model of the news message and alternative text implementations, the genre-compositional organization of the news text in English was determined.

The practical value of the research results is due to the possibility of using its results in teaching university courses in English stylistics, discourse theory, text processing technology, special courses for journalists and public relations specialists. The proposed complex method of cognitive-discursive analysis of the corpus of English-language news texts can be used to expand the tools of linguistic monitoring in online journalism, improve the quality of the text content of media resources.

The theoretical significance of the work is in clarifying the rules of discursive linguistics and functional stylistics of the English language to the specific characteristics of the relationship between the ontological image of the event and the linguo-stylistic image in the media discourse; establish a relationship between communicative-pragmatic tasks and genre forms

of news speech in English; Proving the position of accuracy, credibility, attractiveness, focus in English news discourse as a linguistically proven tactic of media coverage of an event.

The following proposal is put forward as a scientific hypothesis: media representation is a type of strategy for providing information about an event of social importance, and its cognitive-discursive construction in English-language electronic media is the pragmatic tasks of news journalism. is determined by The accuracy, reliability, attractiveness and focus of the discursive tactic of the news message text are used to reflect the event. They get a specific cognitive-semantic image and functional-stylistic expression through the English language.

Achieving this goal required solving the following tasks:

1) to clarify the ontological, communicative, functional and socio-pragmatic specifics of the information content of the mass media discourse;

2) to determine the content of the concept of "media representation" and clarify the genre and compositional features of the presentation of the event in the English-language mass media discourse;

3) substantiate the criteria for highlighting the informative and discursive characteristics of a news message in the English-language mass media discourse;

4) present a cognitive-discursive model of a news message and identify options for its media representation on the example of a minicorpus of English-language news texts with the tag "Natural disaster"; 5) establish the categorical-semantic features of the media representation of the event in the thesaurus of the minicorpus of English-language news texts with the tag "Natural disaster";

In the results of the scientific article, the following proposals were put forward: media presentation is a type of strategy for providing information about an event of social importance, and its cognitive-discursive construction in English-language electronic media is a pragmatic task of news journalism.

Conclusion

The news message, which has received a specific cognitive-semantic image and functional-stylistic expression in English, is carried out with accuracy, reliability, attractiveness and discursive tactics in the focus. The purpose of the scientific article is a cognitive-discursive and categorical-semantic description of a socially significant event in modern English media discourse.

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ПУШКИН КАК УНИКАЛЬНОЕ ЯВЛЕНИЕ

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Аннотация: В статьи объективно заключается в том, чтобы показать Александра Сергеевича Пушкина как совершенно уникальную личность, в которой в максимальной степени преломились и нашли ярчайшее отражение доминантные черты великой русской культуры. Именно в Пушкине логично видеть знаковую фигуру, прославившую Россию, её культуру, традиции и обычаи.
Ключевые слова: уникальное явление, гений, ментальность русской культуры, творческий диапазон, национальное явление.

В первой половине XIX века существовала неразрывная связь между различными родами искусства. В литературно-критических журналах размещались статьи о литературе, живописи и музыке. Искусствовед А.Б. Стерлигов заметил: «Начиная с Пушкина, во всей структуре художественной культуры вперёд выходит литература. Главные открытия в искусстве человековедения отныне делаются писателями, а портретная живопись следует за ними» Действительно, в это время в произведениях писателей-классиков героями становятся художники, поднимется тема изобразительного искусства, в особенности портрета. Но портретное искусство повлияло и на изображение автором самого героя. В литературоведении в связи с развитием в литературе первой половины XIX века портретного начала появились такие понятия, как «галерея образов», «литературный тип». Портретное мастерство А.С. Пушкина ярче других критиков отметил И.А.Гончаров. В статье «Лучше поздно, чем никогда» (1879) Гончаров написал: «Пушкин, как великий мастер, этими двумя ударами своей кисти, да ещё и несколькими штрихами, дал нам вечные образцы, по которым мы и учимся бессознательно писать как живописцы – по античным статуям». Об особенностях изображения в поэзии и прозе человека писали В.Г. Белинский, И.А. Гончаров, Д.И. Овсянико-Куликовский, А.Н. Пыпин. В 1901 году Н.Покровский составил сборник «Пушкин в его значении: художественном, историческом и общественном». Связи литературы и изобразительного искусства становятся центральными в работах представителей культурно-исторической и психологической школ в литературоведении. Литературоведами XX века проблема изобразительного искусства в творчестве Пушкина раскрывается в двух направлениях: создаются работы о портретах и скульптурах с изображением поэта и исследуются графические работы самого Пушкина, представленные в черновых рукописях и альбомах. Исключение составляет статья Н.Н. Пунина «Пушкин и изобразительное искусство», написанная в середине 1930-ых годов. Темой статьи явилось рассмотрение эстетических взглядов Пушкина, отношения поэта к живописи. Статья не опубликована, её машинописный вариант хранится в Рукописном отделе ИРЛИ РАН. Атрибуция изображений Пушкина в

живописи и скульптуре стала предметом как довоенного, так и современного литературоведения и искусствоведения. Профессор А.А.Сидоров к 1941 году создал цикл статей «Проблемы иконографии Пушкина»: «Прижизненные портреты Пушкина», «Картины из жизни Пушкина», «Модели памятников», «Посмертные портреты Пушкина», «Портреты А.С. Пушкина на смертном одре». Эти статьи представляют особый интерес для музейных работников, так как в них подробно рассматриваются портреты Пушкина и его семьи, представлена история их (?) создания. В 1960-ые годы монахиня Исидора (в миру Е.А. Чижова) работала над историей появления удивительной миниатюры с изображением Пушкина-ребенка. Этот рисунок появился у её предков и более 100 лет хранился в семье, пережив даже блокаду Ленинграда. Миниатюра в 1960 году поступила в собрание Государственного музея А.С.Пушкина в Москве. Об этой миниатюре монахиня Исидора не писала, только рассказывала своим знакомым. От них музейные сотрудники узнали историю появления первого портрета поэта.

А.И. Минина составила небольшой альбом «Пушкин» из серии «Семья художника» (1990). В работе представлены краткие сведения о жизни и творчестве поэта. Биографический материал дополнен иллюстрациями: наиболее известными портретами семьи Пушкиных, черновыми рисунками самого поэта. В 1996 году вышла книга «Пушкин и современная культура» [4]. В ней собраны статьи, объединенные общей темой – биография и творческое наследие поэта в контексте культуры XX века. В этом ключе поднимаются проблемы театральных постановок, кинопостановок, переводческой деятельности. Интересна статья Е.В. Павловой «Пушкин глазами художников 1970-1990-х годов», представляющая интерпретации образа поэта художниками конца XX века в графике, живописи и скульптуре. Автор статьи в своих исследованиях пришла к мысли о разнице между прижизненными и посмертными изображениями Пушкина. Художники XX века тяготели к автопортретам поэта. Интерес при изучении связей Пушкина с изобразительным искусством представляют различные художественные альбомы — результат выставок в Москве, Санкт-Петербурге, Пскове, Твери, Торжке. Самое ценное в них — многочисленные иллюстрации, воссоздающие эпоху Пушкина. Такие альбомы регулярно выходят в свет: 1976 год - «Московская изобразительная пушкиниана» [5], в 1986 году вышло дополненное и расширенное издание этого альбома. В 2003 году появился альбом «А.С.Пушкин в Тверском крае» [6], в том же году вышел альбом «Пушкин и Филарет, митрополит Московский и Коломенский». Несомненно, такие альбомы помогают изучению творческого наследия поэта в контексте культуры России XIX века.

В пушкинистике глубоко изучается проблема атрибуций графики поэта. Особенно активно это направление развивалось в трудах исследователей XX века. Упоминание о рисунках поэта встречается уже в работе П.В. Анненкова «Материалы для биографии Александра Сергеевича Пушкина» (1855). Анненков первым отметил, что рисунки поэта «обыкновенно повторяют содержание написанной пьесы, воспроизводя её» [8. с.317]. Литературоведы Н.О. Лернер, С.А.Венгеров в толковании рисунков последовали за Анненковым, называя эти работы автоиллюстрациями. Ошибочность этого вывода была доказана пушкинистами середины XX века. Первая попытка классифицировать пушкинские рисунки была предпринята Г.П. Георгиевским. Его статья «Семь рисунков Пушкина» размещена в шестом номере журнала «Русский вестник» за 1899 год. Это

первая и довольно простая классификация: рисунки разделены на пейзажи, фигуры людей, животных и цельные картины. Такой классификации для изучения графики Пушкина не хватало. Эта систематизация была доработана в небольшой статье И.К.Линдемана «Пушкин как художник и рисовальщик». Исследователь классифицировал графику поэта на портреты, картины, виньетки, иллюстрации и отдельные предметы. Но исследования Георгиевского и Линдемана нельзя назвать профессиональным изучением графических работ А.С.Пушкина: ими не была предложена методологическая база. С 1924 года было положено начало специальному изучению графических работ Пушкина. А.И. Эфрос первым предложил выделять среди графики поэта рисунки и росчерки. Он разработал метод атрибуции рисунков Пушкина. Этим методом стали пользоваться в дальнейшем все пушкинисты, изучающие графику поэта. Свои исследования А.М. Эфрос представил в работах «Рисунки Пушкина» и «Рисунки поэта». С 1926 года тема художественного мастерства Пушкина связана с именами И.С. Зильберштейна, Т.Г. Цявловской, М.Д. Беляева, Б.В. Томашевского, Н.В. Измайлова. Эти литературоведы первыми начали целенаправленное изучение графики поэта. Ими же была предпринята попытка создать первый каталог атрибуций. На основе полученных учёными материалов предполагалось создать 17-ый том собрания сочинений А.С.Пушкина 1937 года. Этот том должен был состоять из двух частей, в которых в хронологическом порядке размещались бы рисунки. Предполагалось снабдить каждый рисунок небольшой аннотацией на русском и французском языках, включающей дату, место создания, текст художественного произведения, размеры, сведения о технике изображения, архивный шифр. Но весь материал собрать не удалось, из-за чего этот колоссальный труд не опубликован. Подготовительные материалы к 17-му тому полного собрания сочинений А.С. Пушкина до сих пор хранятся в Рукописном отделе ИРЛИ РАН (ПД, ф. 373 – архив редакции академического издания ПСС А.С. Пушкина). На основе этих материалов была написана диссертация М.Д. Беляева, пытавшегося систематизировать собранные вместе с Т.Г. Цявловской рисунки поэта.

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THE ROLE OF METONYMIC TRANSFER AND SYNCEDOXES IN LYRICAL IMAGERY

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In the article, one of the most widely used types of artistic transfer in poetry - synecdoche, its place and appearance in poetry, and its aesthetic functionality are studied on the example of the poetry of Rauf Parfi, Askar Mahkam, Nodira Afokova, created in different social environments. Also, the use of synecdoche in mixed forms, metaphor, syncretism with synecdoche and its peculiarities are described.

Key words: syneldoche, metonymy, metaphorical thinking, transfer of meaning, metaphor, irony, poetic speech, metaphor, synecdoche.

The dictionary meaning of any word expands and develops as a result of the transfer of a sign, action, property to another object with similar properties. The semantic laws of each language, which determine such a development of the transfer of meaning, are directly related to artistic creativity.

In the transfer of meaning through metonymy (from the Greek metonymia - "renaming"), the name of one sign, action is not based on similarity to another, but is based on interrelationship, dependence.

In addition to metaphor, metonymy, synecdoche and function, there is also a mixed use of meaning transfer. This phenomenon also applies to metonymy: metaphor-metonymy, metonymy-synecdoche transfers are common both in oral speech and in fiction. According to the Dictionary of Literary Studies, meionymy is rare compared to metaphor in literary literature, especially in modern literature where metaphorical thinking is leading, because it is inferior to metaphor in terms of aesthetic functionality. Nevertheless, when used side by side with a metaphor in an artistic text, it gives a great artistic effect, serves to express the idea clearly and effectively.

In the "Dictionary of Literary Terms" it is said that metonymy is "a metaphorical expression based on the proximity between two concepts", and in another literary dictionary it is defined as follows: "unparalleled migration based on the proximity between two concepts." In metonymy, the name of something or an event is transferred to another, it is represented by another name, but this naming is not based on the similarity between objects or things, but on the proximity and connection between them. In this respect, metonymy differs from metaphor.

Based on the above definitions, if we generalize the concepts of metonymy, we will come to the following conclusion. Therefore, metonymy is a transfer of meaning, that is, a type of metaphor, based on the connection between two things, events, but there is no similarity or closeness between them in terms of form and content. For example, blue (sky, green, color, currency (dollar).

There are the following forms of transfer by metonymy:

1) the name of one subject is transferred to another subject in the same subject:

I listen to Istanbul with my eyes closed
A gentle breeze blows from the front
It slowly shakes
The leaves are on the trees
Far far away
The incessant chatter of the meshkobchi
I listen to Istanbul with my eyes closed.

This excerpt from the poem of the Turkish poet Orhun Veli describes the lifestyle of Istanbul in the last century, the living conditions of the people living in the city, their thoughts, worries and sufferings. The author, striving for brevity, omits the word city. It omits redundant information known to the reader. Usually, it is

method is specific to oral speech. For example, the phrase "I went to Tashkent city" is used in the style "I went to Tashkent" and this is considered a normal norm for our speech. Because such a method makes the speech concise, the thought concise and effective. The first line of the poem uses metaphor (I listen to Istanbul) and metonymy (I listen to Istanbul). Although the word "city" is omitted in the first, it is understood in the context, and in the second, listening is actually a sound, echoing object, or a characteristic of people transferred to "city".

It's like a stranger to the world
I will fly to the tip of the Indian mountain.
It gets into my head
Owner of the deserted world.

In the paragraph, the similarity of the words "mountain" and "taq" is used as a word game, the top of the mountain is a metaphor, in which the word "peak" is equated to a finger, creating the art of litota. When he says the inside of the pen, the poet does not mean the human head, but the brain, which is a part of it, and expresses the whole through a fragment, creating an example of synecdoche. Although the action of "entering" is usually used for living things, it is also used in speech in the form of a figurative compound with emotional-expressive coloring, such as thorn in the leg, soul entered, mind entered, esi entered.

Be it a poet or a prose writer, no one refused metonymy or periphrasis, and among such literary principles (methods) are known from very early times to the present day. it seemed like a solid. Along with them, new ones will appear and they will undoubtedly decorate the pages of works about the literary oddities of our time in the future, writes Jan Parandovsky. According to him, metonymy, periphrasis, social system like metaphor, regardless of what the dominant ideology is, there is a commonality characteristic of the poetry of all ages, metonymy was born in the times when man began to think.

When metonymy is interpreted as irony, it shows that it is more common in the culture of primitive peoples than in mature civilizations. Because in the shelter of metaphors, sarcasm, jokes, words that should not be mentioned are hidden, and the concepts they express are hidden and masked beyond recognition.

People refrained from mentioning the names of wild animals, natural disasters, diseases and death. In some tribes, similar traditions have been preserved to this day, including the fact that everything related to the head of the tribe cannot be said clearly, and the ingenuity and creativity of hints, signs, and creativity sometimes reach the level of Brownian complexity.

Metaphor enriches poetic speech, allows to express the attitude of the poet to the object of the image. If simile, qualification, metaphor, revitalization are also types of metaphors, metonymy, exaggeration, synecdoche, periphrasis, irony, antiphrase, sarcasm are considered mixed metaphors.

Let the moon shine in the nights of Jazba
I am a dream that knows the way.
I am no one else.
One mighty voice sword
I don't give a shit.
I buried in my throat. I'm quiet.
Don't be rude, slander, and slander
When the city is bathed in cheering flowers;
Chewing their tongues, my friends are helpless,
Poison when my penny pours into my cup;
Muddying pure souls,
The devil's host when the flag is raised;
The soul that becomes a spectator,
Friends upside down while standing
I left.

The poem is about a person whose heart is filled with injustice, oppression, and injustice, who has not seen any consequences from his friends and brothers, who has understood and admitted that no one can rely on him but himself, who is used to this misfortune, who was defeated in the fight and had to retreat, who is full of hatred, who turned away from his friends when he expected help from them . It shows the tyranny of a powerful force that kills the voice buried in the throat. The image of a despicable city welcoming obscenity, stinging, obscenity, slander is reflected. A synecdoche is revealed through the word city, not the city, but the cowardly, inconsequential false friends who live in it serve the enemy. He even joins the enemy and poisons him, only this poison is poured into the hero's coin. Poison is also used here in a symbolic sense. Poison - ignorance, treachery, cowardice, selfishness. Friends who chew their tongues - when does a person chew his tongue? Either from the intensity of pain or from the strength of fear. Apparently, fake friends belong to the second category. The devil's army is an individual metaphor, another representation of friends carrying a flag, and the flag is a sign of victory. There must be strength to raise a flag, and as long as the demon gang is carrying a flag in the city, it means that it is a people full of power and power and has united almost the entire city's people around it.

Metaphor, metonymy, synecdoche, and other metaphors created a vivid picture of the artistic idea presented in the poem, the thought the author wanted to convey, and the pain burning in the heart of the lyrical hero.

Is heaven in place?
Where are the rains?
Where did he hide his lightning?
Neglected flowers in the season of revenge...
Leaves pierced by ants.
Who is responsible for these flowers?

Tell me, people from "Analhaq", tell me!
In the poem that sold the ambassador for three coins,
Those who killed the poet, tell me!
Night, throw your curtains over my eyes.
How good is this blind help!
I'm so weak...
I'm afraid
To look at neglected flowers...

It is not in vain that the lyrical hero asks where the sky is, where are the lightnings. The oppression has reached such a level that the sky has moved. The folk proverb, "When the sky is in your hands, leave it" is reflected in the poem in a different form. Usually, when someone overdoes oppression, the oppressed is forced to say this proverb. Lightning is a symbol of revenge, but it is also lost. After all, there are only cowards left around. That is why the flowers are neglected, their leaves are pierced by ants. The flowers and ants used in the poem are figurative images, and they are a generalized image of certain categories of people in society. Those who have fallen from "Analhaq" are bigoted ignorant and unenlightened people who do not recognize and do not recognize the truth The poet, who mentioned that in history, Mansuri Halloj was brutally executed with various slanders and accusations without realizing his identity, compares the reality in a metaphorical way. A metaphor can be a word, an image, a line, a poem, or even a work. In this poem, the metaphor covers the entire work. Selling the messenger-prophet for three coins is a reference to the fate of the prophet Jesus. One of the apostles next to Jesus sells the prophet for thirty-three coins. It was also told in L. Andreev's work "Judas Iscariot" written in 1908, and this story was skillfully translated into Uzbek by N. Afaqova. Those who killed and shot the poet are cruel, executioners, people drowning in error, who killed Mashrab, Qadiri, and Cholpans. The lyrical hero does not want to live among such people, he cannot breathe the same air with them. That's why he begs, "Night, throw your curtains over my eyes." The veil of night is darkness and nothing can be seen in it. The lyrical hero also does not want to see h devil army. Curtains of the night - metaphor, revealing the curtain - diagnosis, metaphor, synecdoche. He wants not only not to see, but also not to hear, not to feel. In Askar Mahkam's works, social motives and the soul are combined in a strange way, metaphoricity covers the entire poem when the poet writes, no matter what period, what event, what human painful experience he writes. In the poems of Askar Mahkam, the metaphor is so thick and wide that it is impossible to separate the work from it. The poem "I spent one day in Bukhara" describes the worst injuries of yesterday and today. The poet asks more questions not to people, but to the towers of Bukhara with his open hand to the sky, he seeks Bukhara from Bukhara. But he can't find it, because the ones he loved, missed, and honored are no longer in this holy land. This is how the poet expresses the reason for this.

I asked people from Bukharai Sharif.
"They are living!" said Bukharai Sharif.
They are living
the dog in the madrasa
a puppy in the house
statues in the mosque
and feed themselves.
Of course they live well!

I asked people from Bukharai Sharif.
"They are living!" said Bukharai Sharif.
"Ya-sha-shyap-ti!..." he said suddenly.

The reality that emerges through the unique appearance of metonymy is forced by the ignorance of the people, the fact that they live in silence, seeing that they are trampling on their holy places, centers of knowledge, and temples. The phenomenon of the poet clearly shows this oppression, anger, and suffering. The poet reveals the idea he wants to express in an unexpected way by means of metonymy. that in order to lose a nation it is not necessary to exterminate it, it must be separated from its mother tongue, religion, belief, Yesterday's past proves that it is possible to turn a group of morally wounded people into a mob by forcing them to forget their history, and that it is easy to control such a large group of slaves.

R. Parfi's "Eyes of Dilorom" is a love story consisting of three sonnets, both in terms of form and content, and is one of the unique works not only in the poet's work, but also in the history of our literature.

Your eyes were very sad,
As if a pathless forest sheds leaves,
A verse of whispers in the black flame,
I long to listen to your eyes.

"pathless forest", "black flame" represents the sadness in the heart in the eyes of a beautiful and graceful woman. Just like the fallen leaves, the woman's gaze is painful, and the hero listens to her longingly. The poet synthesizes the painting with poetry, and this situation is visible in the eyes of the cinematographe

The world is different for everyone,
Thoughts of the mercantile affairs of existence.
It was as if the stars were twinkling
They burn the eternity of the soul...

In fact, everyone sees the world with his own eyes, measures with his own yardstick, and everyone thinks differently. When the lyrical hero sees the stars twinkling in the blue that he wants, he fills with a sad thought about eternal mental anguish - love trade.

The period of independence in modern Uzbek poetry is marked by artistic movement, including increased activity of metonymy and synecdoche, a direct change in the social system, opening a wide path to contacts with world literature, increasing globalization in the age of fast information, new words related to religion, art, literature to our national language (names of works of art, historical , the introduction of the names of legendary, literary heroes) is explained.

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THE USE OF BIG DATA PROCESSING IN A DIGITALIZED AGRO-INDUSTRY SYSTEM

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Abstract

Despite the fact that the 21st century is called the age of information technology and information society, agrarian technology and the cultivation of agricultural products necessary for the needs of people remain an urgent issue in all countries of the world. Only, as mentioned above, in the 21st century, the quality, accuracy and other characteristics of agricultural production can be affected by using modern information technologies and information society using its inventions and sciences. This article provides information on the application of big data analysis in a digitalized agro-industry system.

Keywords: BigData, API, system, contours, agro-industry, NDVI, interface, machine learning, classification, geofields, statistical analysis.

Bukhara region has long-standing experience in timely growing agricultural products of high quality. But at the same time, the difficult nature of the weather in this region, the complexity and scarcity of water supply, the salinity of the land and other effects make it difficult to grow these products. Due to this, the use of modern information technologies and related intellectual systems in this region is one of the new directions in the Republic along with the demand of the time. In the republic, Bukhara region remains a leading and experimental region in the application of new modern information technologies, software, automated systems and intellectual sciences in agriculture. Due to this, the quality and timely production of agricultural products in the existing state of the difficulties mentioned above, using a large amount of data in automated information systems used in agriculture and modern intelligent data processing systems, one of the main innovations is timely watering of agricultural products (or drip irrigation), medication (providing necessary vitamins or protection from pests), carrying out agochemical analysis, timely planting and other agotechnical works using intelligent systems to predict in advance, clustering images of growth according to the contours of the products based on the data classification using

machine learning method and pre-planning of agrotechnical work in which periods to increase the yield.

The above-mentioned issue is especially relevant today, considering the quality and timely delivery of products in the world.

In addition, in the Bukhara region, in particular, "Bukhara Agrocluster" LLC, in a large-scale cluster that unites more than 300,000 farmers, more than 40 regions and 6 districts, the use of the following automated systems as part of the hardware and software supplies for several years now provides all the opportunities to apply this issue in practice[1]. Taking into account the availability of basic systems, the practicality of using large volumes of data in this field with intellectual processing and the probability of its practical application increases several times:

- Control system of contours (on the distribution of crop cultivation) coordinated with maps (Google, UzKosmos and other providers) in the section of farms;
- A system of carrying out agochemical analyzes on contours coordinated with maps in the cross-section of farms;
- System of planning, verification and control of agro-technical works in terms of seasons (agricultural years) in the section of farms;
- A system that retrieves maps and related information from information systems providing space satellites;
- A system for storing and displaying on cloud servers the operation of equipment (tractors, earthmoving and other equipment) and the sensors installed on them in terms of seasons (agricultural years) and their contours in the section of farms;
- Collecting and systematically displaying weather information on farmers and their contours from physical weather stations and providing online service in the region;
- A system for taking photos of agricultural products in the contour section with mobile applications during the time period of the production process and displaying them in the system, as well as conducting analysis;
- System of keeping register of land, slope of slope, speed of slope and other data in section of contours;
- System of reports on the statistical analysis of the above-mentioned systems and their data, etc[2,3].

The use of big data analysis methods, in our case, determining the ripeness of the crop for timely harvesting and maintaining quality, classification methods

and algorithms help as an additional functionality for organizing big data processing and intelligent processing[4].

For this, in the Bukhara region, in particular, in the Bukhara Agrocluster LLC, in a large-scale cluster that unites more than 300,000 farmers, more than 40 regions and 6 districts, the following automated systems have been used for several years as part of the hardware and software. Taking into account the existence of basic systems, the practicality of using large volumes of data in this field with intellectual processing and the probability of its practical application increases several times:

In order to carry out this practical work, we may receive data from the following internal systems. Some data is generated through the API data exchange system, some data is obtained directly from the database (in particular, through the NoSQL MondoDB system), and data can be extracted in various formats and from other service systems. Obtaining this information is provided below. Screenshots and API documentation are omitted as they are implemented through authorization and authentication in the system[1,2].

- In the section of farms, the control system of contours (on the distribution of production) coordinated with maps (Google, UzKosmos and other providers);

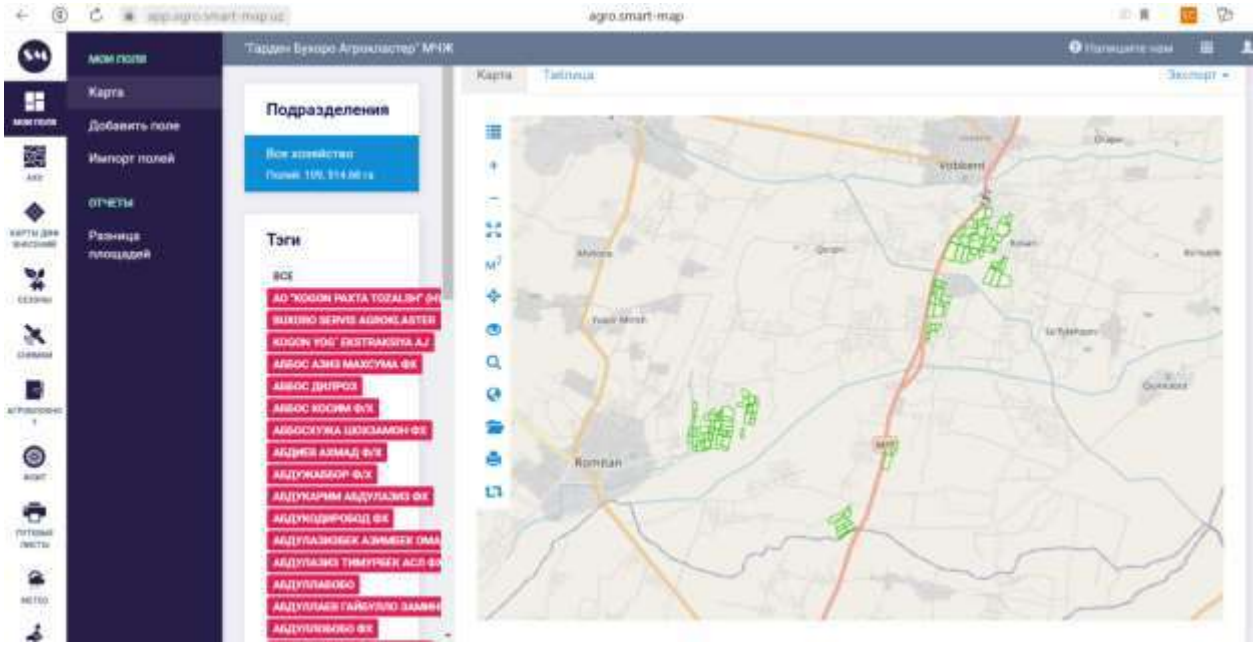

Fig 1. The section of farms, the control system of contours.

- A system for carrying out agrarian chemical analyzes in contours coordinated with maps in the section of farms;

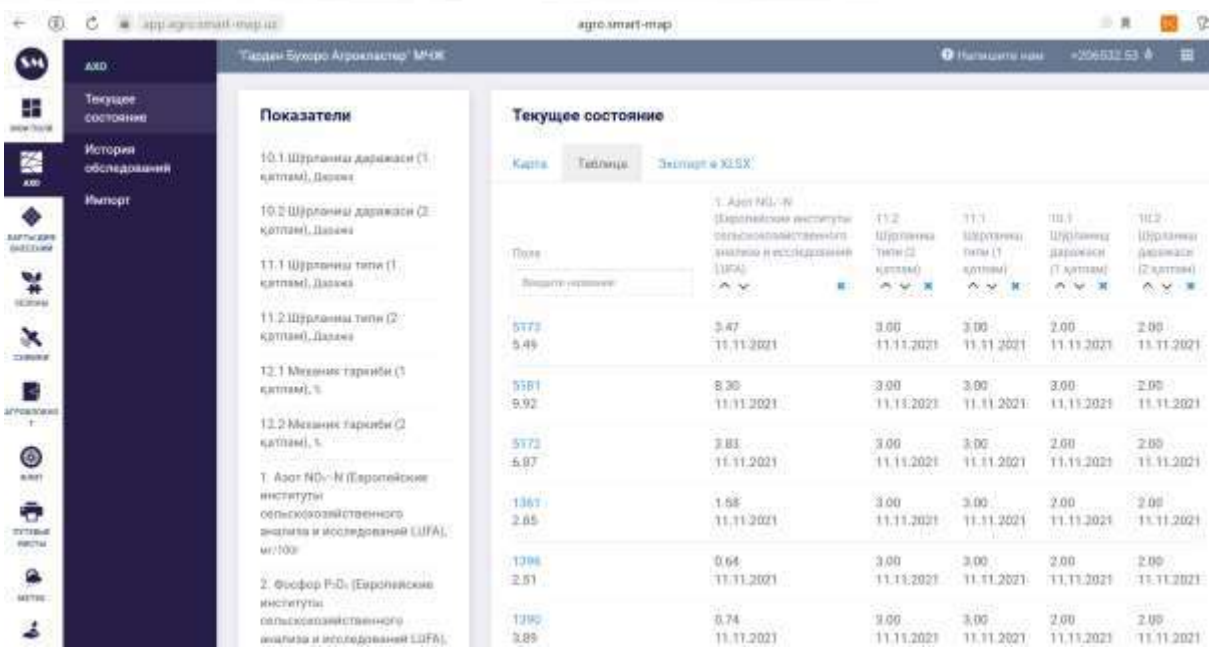

Fig 2. The system for carrying out agrarian chemical analyzes.

- A system of planning, verification and control of agrotechnical works by seasons (agricultural years) in the section of farms;

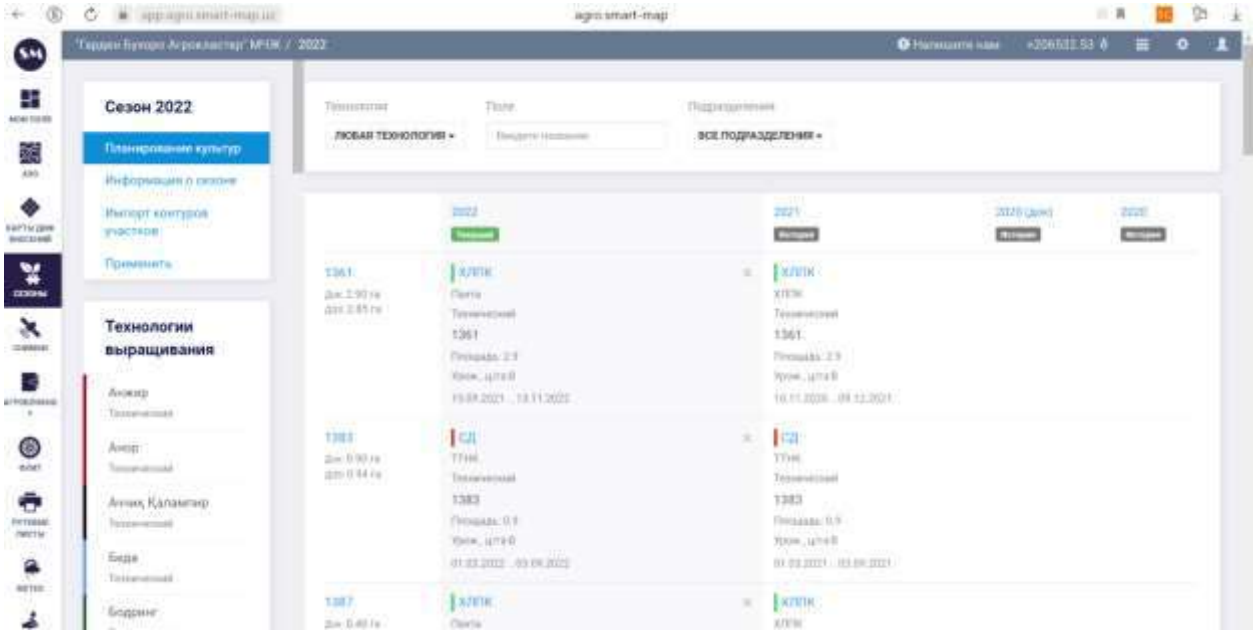

Fig 3. The system of planning, verification and control of agrotechnical works.

- A system that retrieves maps and related information from information systems that provide space satellite services;

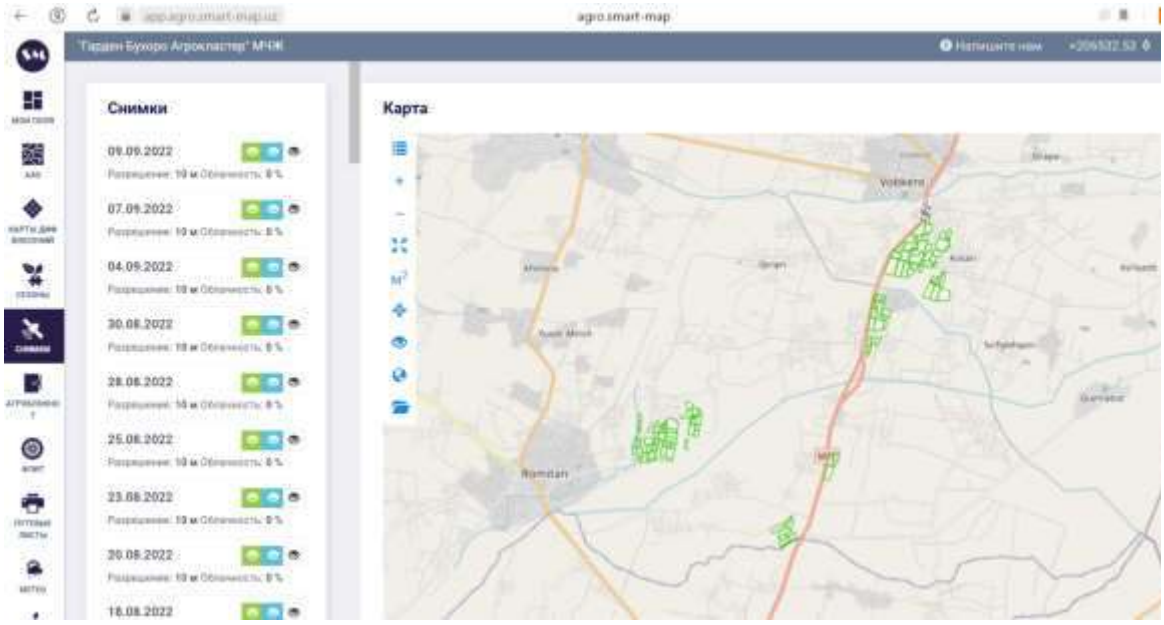

Fig 4. The system that retrieves maps and related information.

- A system for storing and displaying on cloud servers the performance of equipment (tractors, earthmoving and other equipment) and the time indicators of the sensors installed in them by seasons (agricultural years) and by their contours;

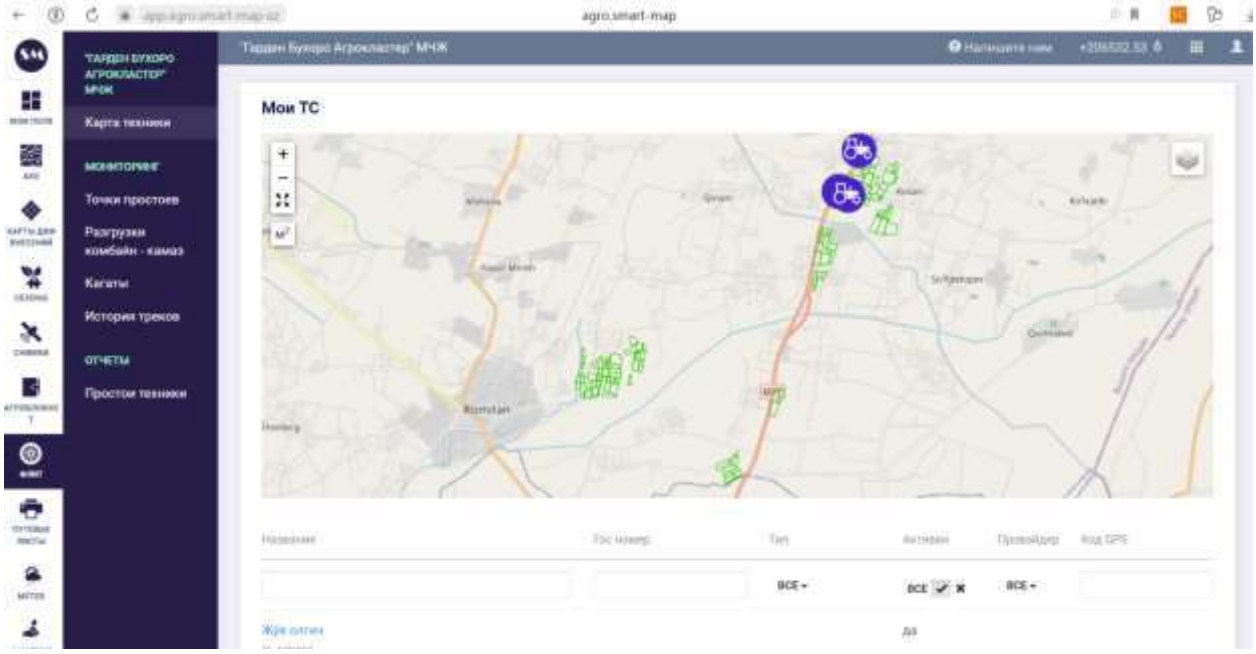

Fig 5. The system for storing and displaying on cloud servers the performance of equipment.

- Data collection and systematic display of meteorological data on farmers and their contours from physical meteorological stations in the region and providing online service;

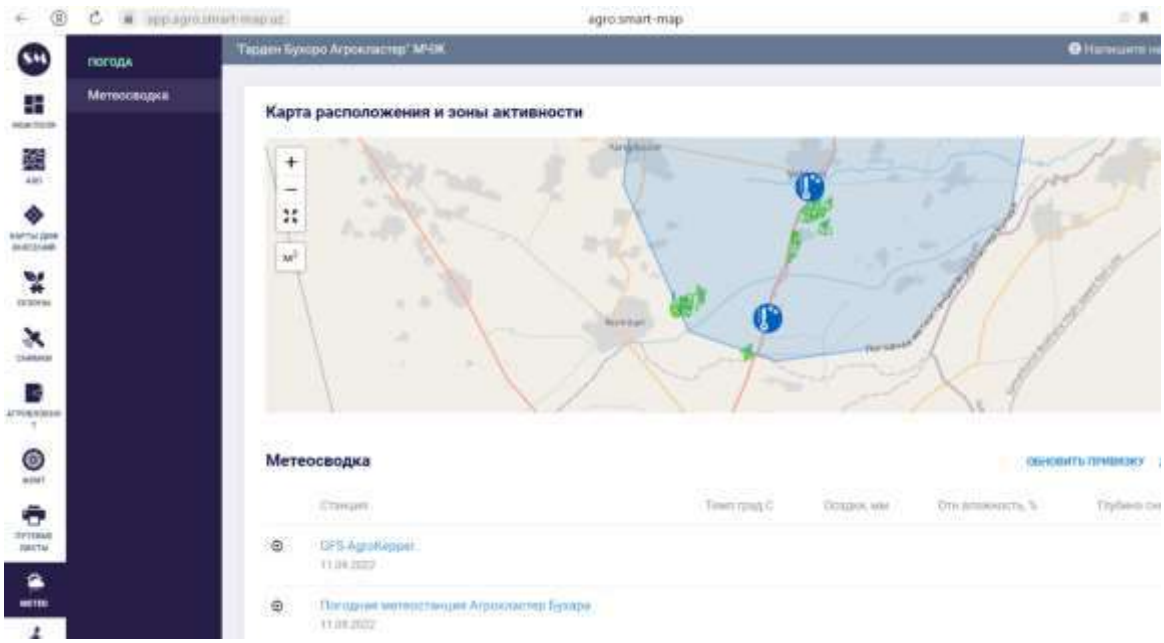

Fig 6. Data collection and systematic display of meteorological data on farmers and their contours from physical meteorological stations.

- A system for taking photos of agricultural products in the contour section with mobile applications during the period of time, reflecting them in the system, and conducting analyzes;

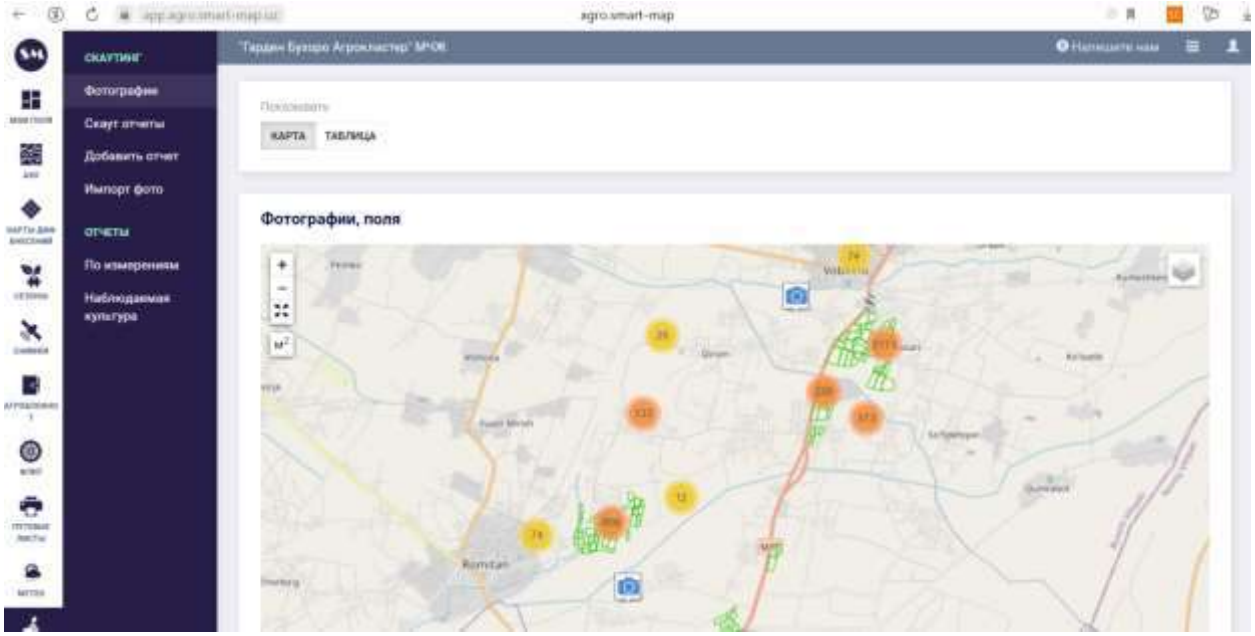

Fig 7. The system for taking photos of agricultural products in the contour section with mobile applications.

- A system for storing land registers, elevations, gradients and other data in the section of contours;

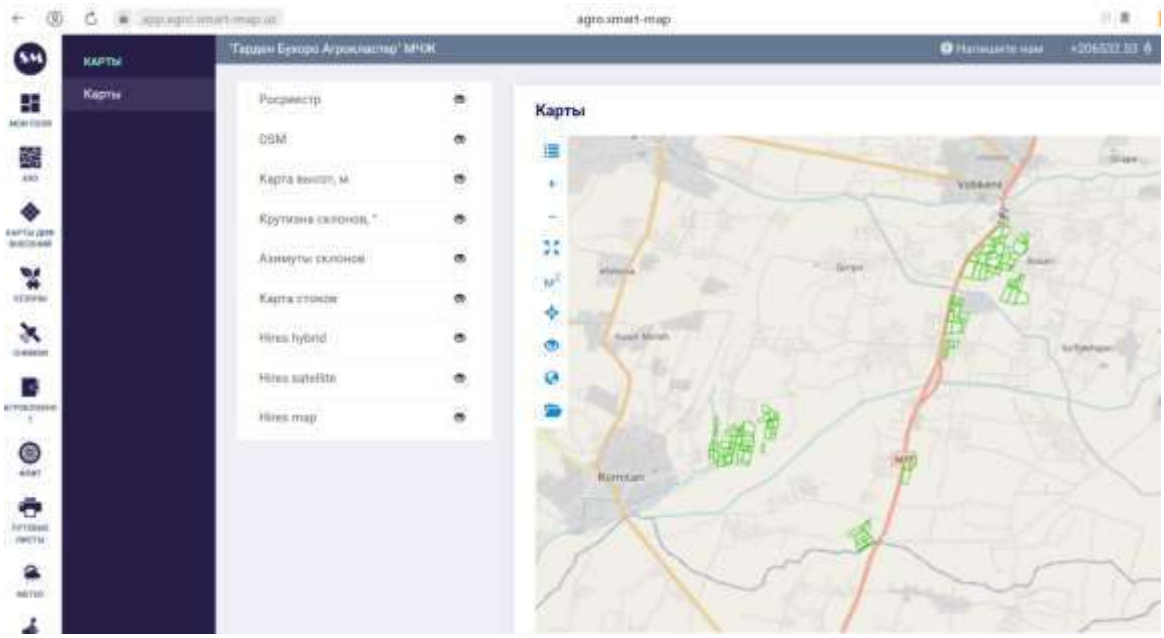

Fig 8. The system for storing land registers, elevations, gradients and other data in the section of contours.

- A system of reports on the statistical analysis of the above-mentioned systems and their data, etc.

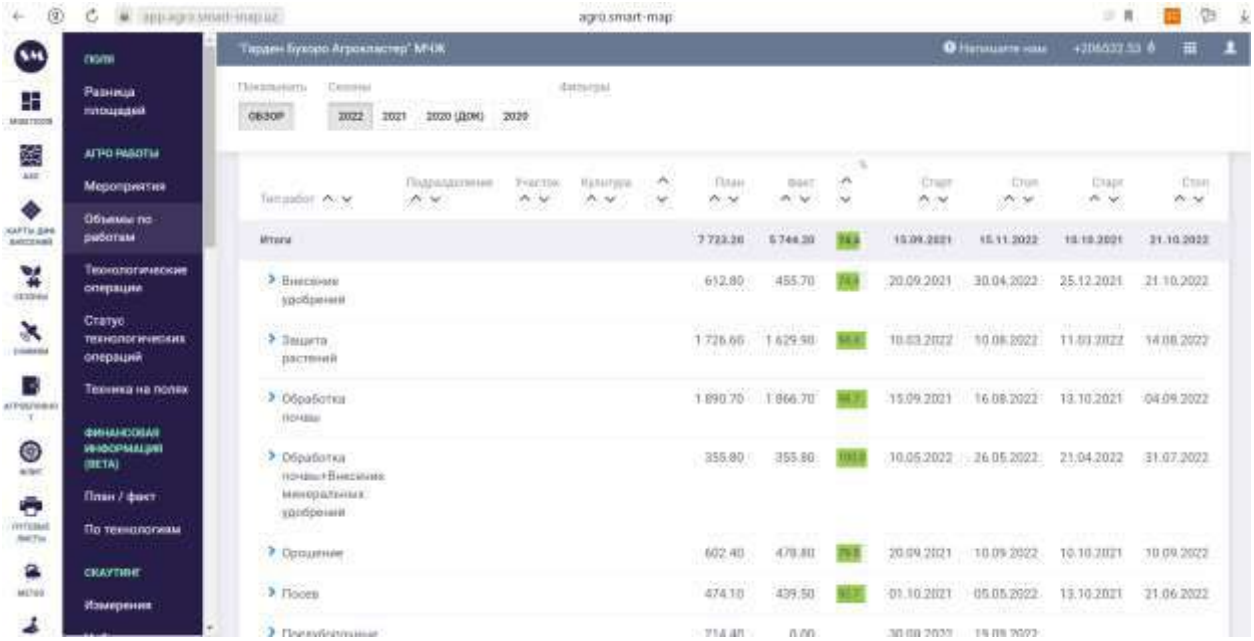

Fig 9. The system of reports on the statistical analysis of the above-mentioned systems and their data.

All this data is very effective and helps to use it as big data for processing, but in recent days, the analysis and processing of geofields based on GIS data systems and information systems filling in the database associated with geofields around the world have begun to apply new methods for analyzing big data[4].

There are two main tasks in supervised machine learning: classification and regression.

The purpose of classification is to predict a class label, which is a choice from a predefined list of possible choices. Classification is sometimes divided into binary classification, which is a special case of division into two classes, and multiclass classification, when more than two classes are involved in the classification. Binary classification can be thought of as an attempt to answer a given question in a "yes/no" format[5].

The purpose of regression is to predict a continuous or floating-point number in programming terms, or a real number in mathematical terms.

In supervised machine learning, we need to build a model on the training data and then make accurate predictions for new data we haven't seen yet that has the same characteristics as the training set we used. If the model can make accurate predictions on previously unseen data, we say that the model has the ability to generalize the result to the test data. We need to build a model that will have the maximum generalizing ability.

The more complex the model, the better it will perform on the training data. However, if our model gets too complex, we start paying too much attention to every single data point in our training set, and that model won't generalize well to new data.

There is an optimal point that allows getting the best generalization ability. Actually, this is the model that we need to find[6,7].

We propose to use these big data analysis methods in information systems as an additional functioning module in the development or modification of digitalization systems for the agro-industry.

For example, in the Bukhara region (Uzbekistan), the management of Bukhara Agrocluster LLC developed and implemented the smart-map system. We plan to use this methodology to intelligently determine crop maturity. To apply these algorithms and methods in the smart-map system, which has been used in the region for several years, there is a module called Monitoring the state of crops, determining the plant mass index (NDVI). Images are taken from unmanned aerial vehicles (UAV) and satellites. This module in the system collects big data for future analysis[2].

Fig 10. Interface of the smart-map system.

In addition to using machine learning for clustering, a hierarchy of conditions will also be included in practical development and checked against data obtained from internal systems through APIs, exported data, databases and third-party systems to get more accurate decisions and results.

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APPLICATION OF INTELLIGENT TRANSPORT SYSTEMS ON MOUNTAIN HIGHWAYS

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ABSTRACT

In this article, various factors affecting the movement of cars in the mountainous areas located in the territory of our Republic, including the complex topography of mountainous regions and the amount of seasonal precipitation, are shown. Introducing the use of VMS (variable message signs) in order to optimize the movement of vehicles and prevent possible accidents, the world experience in their use and their advantages are highlighted.

KEYWORDS

longitudinal slopes with a small radius, intelligent traffic, VMS (Variable message road signs), Electronic VMS, neon signs

INTRODUCTION

One of the main problems of the current era of globalization is the problems related to traffic, that is, road transport plays an important role in the rapid development of the economy of countries by performing cargo, passenger transportation and other special services, as well as the complexity of the process of traffic on roads, as a result of which traffic accidents occur. is also the reason for the increase in the number. That is, the death of people and material damage caused by traffic accidents continue to have a negative impact on the country's economy.

As a result of the increasing number of automobiles from year to year, traffic on our roads is becoming more complicated, which causes an increase in road traffic accidents. In the current era of globalization, modern intelligent transport systems are used to regulate traffic and prevent road traffic accidents. is conducting scientific research work on the use of the scale. [1]

OBJECT AND METHODS OF RESEARCH

About 22% of the territory of Uzbekistan is a mountainous region. The complex topography of mountainous regions has a great impact on the safety of vehicles. On mountain roads, the presence of continuous large longitudinal gradients, small radius on the plan, and the presence of curves with bad visibility force drivers to change the mode of movement abruptly, which causes accidents. [2]

The safety and speed of vehicles are greatly affected by small radius turns of 2-3 turns per 1 km of mountain highways.

One of the most important problems to be solved in the transportation of goods and passengers through mountain roads is to ensure the safety of goods and passengers by ensuring the safe movement of vehicles in different climatic conditions of mountain roads. is a problem. Roads in the mountains are very different from each other in terms of traffic

conditions. In mountainous regions, the geometric parameters of the road, that is, first of all, the width of the carriageway and the plan of curves, force the creation of roads. [2-3]

RESULTS

As the mountain passes above sea level, precipitation increases, air temperature and atmospheric pressure decrease, solar radiation increases, fog thickens, and relative humidity increases.

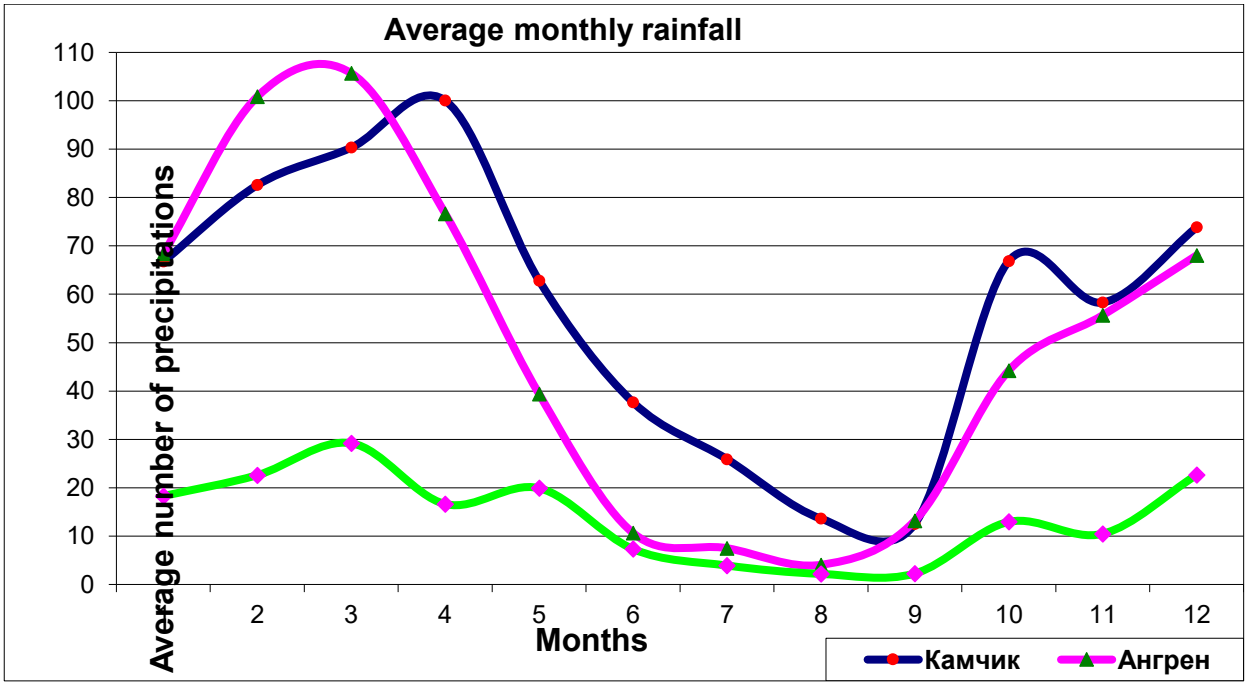

Figure 1. Changes in the amount of precipitation in Kamchik Davan, Angren and Pop districts by month.

In mountain conditions, the intensity of meteorological factors and the duration of their impact on the road lead to the following consequences:

- due to the deterioration of the adhesion properties of the pavement, the mechanical effect of cars on the road structure also changes;
- engine power decreases due to a decrease in atmospheric pressure, an increase in resistance to movement;
- Contamination of the carriageway, roadsides, engineering structures, snowfall, formation of rutted lanes, loss of visibility of the carriageway and roadsides, tracks covered by snow;
- Meteorological visibility will decrease due to fog thickening, precipitation and increased solar reaction;
- technical operational qualities of the car (systems ensuring ease of movement and safety: brakes, steering, visibility, alarm systems) deteriorate;
- deterioration of road and weather conditions negatively affects the driver's neuro-emotional stress.[4]

Changes in traffic conditions with increasing altitude on mountain roads require changes in driving modes of vehicles and this can have a negative impact on safety. [5]

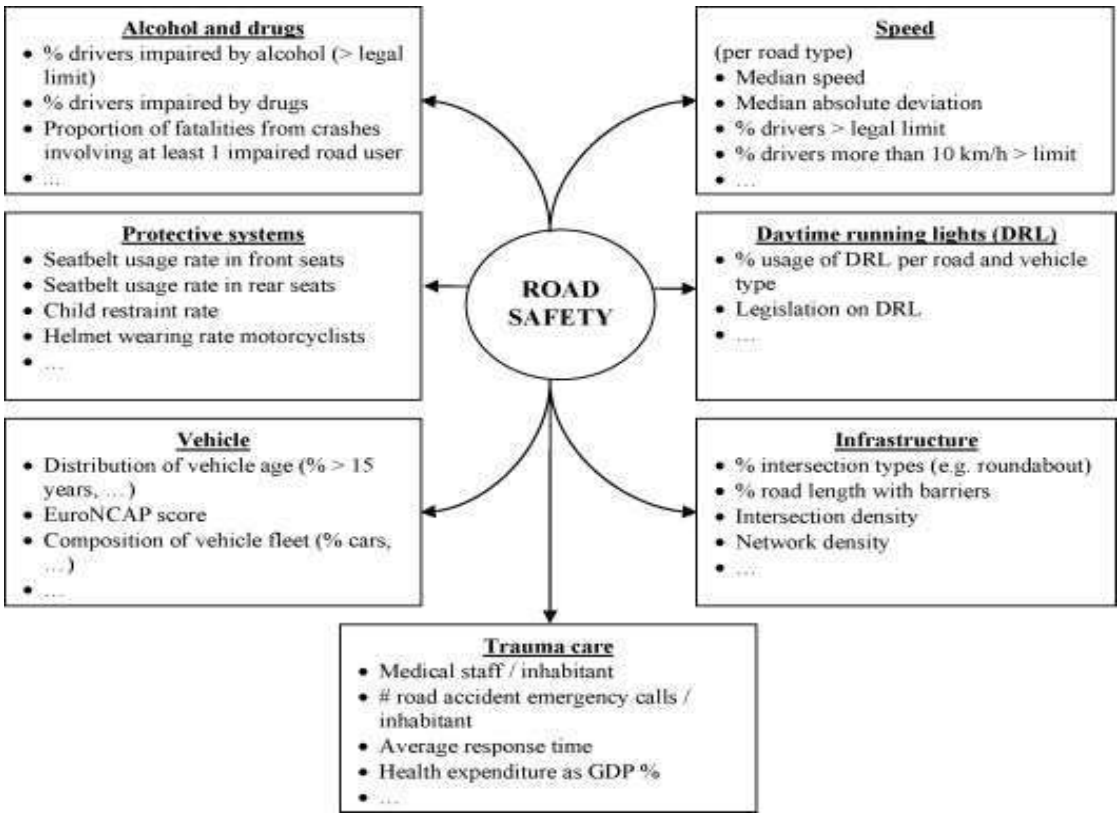

Figure 2. Various factors affecting road safety.

VMS is also known by various other names including:

DMS: Dynamic Message Signs;

SMS: Sensitive Message Signs;

EMS: Electronic Message Symbol;

VAS: Vehicle Activated Signs.

VAS is a sign that detects and warns, for example, speeding vehicles when approaching turn or speed limits, or high vehicles when approaching low bridges. VMS is usually connected to a controlled control center. The controller transmits information via one-to-one communications links, a local area network, or radio link for display in coded form. VMS types range from simple one- or two-line text message signs to full graphic displays that can include up to variable characters. A sign designer must consider a number of factors, including sign size, sign height, legibility, contrast, and viewing angle. The messages must be understandable to the majority of drivers. Due to the more complex requirements of traffic management and the need to provide additional information to drivers, the use of VMS is increasing. VMS currently uses three common types of technology. Electromechanical signs include two-sided turntables or three-sided prisms. Reflective disc signs consist of a matrix of discs that are black on one side and fluorescent on the other. A momentary application of electrical current magnetically "flips" the disk between the "on" and "off" states. These signs are ideal for displaying a combination of letters or symbols as a message. Illuminated signs typically use fiber optic, magnetic disk, or light emitting diode (LED) technologies. The main advantage of these signs is that a greater range of messages can be displayed than reflective technology signs. LEDs are solid-state devices that can produce very good reliability with minimal maintenance. Further developments may lead to applications based on liquid crystal display (LDS), matrix array, liquid dot matrix and micro-shot technologies. Technologies can be combined within the same label. When used as warning signs, it is common for them to be

fitted with amber lights. VMS are often used with other technologies, such as a variable message display that can show a different price for different times of the day, or if a camera if connected to a monitoring device, the price is different depending on the level of traffic on the road. Two main limitations of VMS efficiency are the limitation of the panel for displaying information (the number and size of symbols and icons) and the temporal accuracy of the information provided. riligi. Only limited information can be provided to the driver. Another problem is that displayed messages may not be fully understood by all drivers, and therefore icons are preferable to text messages. [6]

DISCUSSION

Taking into account the above problems, one of the most important tasks is to introduce the use of VMS (Variable Message Signs) when driving on mountain roads. Variable (also variable, electronic, or dynamic) road signs are electronic road signs used in Japan, the United Kingdom, Germany, and several other European countries. Such signs warn of traffic jams, accidents, and terrorist attacks. Used to announce speed limits in roadworks zones or a specific segment of motorway. In urban settings, VMS (Variable Message Signs) are used in information systems to provide parking guidance and direct drivers to available parking spaces. They can also ask vehicles to take alternative routes, limit speed, warn about the duration and location of incidents, inform about traffic conditions or display general safety messages. [7]

High-variable message signs come in three form factors today: front entry, back entry, and entry. Maintenance on a front-access variable message sign is accomplished by lifting the sign open from the front. Most smaller VMSs are in the anterior access form factor and are usually placed in major arteries today. The rear-entry form factor is similar to the front-entry form factor, except that maintenance is done from the back of the sign, and a medium-sized speaker is typically mounted along (instead of on top of) highway lanes. used for message symbols. A form factor input is a newer input where the maintenance of the sign is done from inside the sign. A major advantage of the crossing form factor is that lane closures are not usually required for sign maintenance. [7]

VMS are divided into several types:

1. "Reduce Speed" neon signs (1950-2010 obsolete and replaced).
2. "Variable message signs" (trilon-rotating drum signs that can be used to close roads or divert traffic)
3. Electronic VMS: signs displaying remotely controlled messages; messages are sent from the State Traffic Control Center, signs are automatically updated.
4. Variable speed limit signs - used to change speed limits in work zones and emergency situations.

Figure 3. Electronic VMS: signs displaying remotely controlled messages

While early models of VMS required an operator to be physically present to program the message, newer models can be reprogrammed remotely via a wired or wireless network or cellular connection. A full panel message usually includes a problem statement indicating the incident, roadworks, stalled vehicle, etc.; location statement indicating the location of the incident; an impact statement showing lane closures, delays, etc., and an action statement showing what to do next. These symbols are also used for AMBER Alert messages and in some states for Silver and Blue Alert messages. In some locations, VMSs are installed with permanent, semi-static displays that show estimated travel times to major transportation destinations such as major cities or major highway intersections. [8]

Early variable message signs included illuminated words (often using neon tubes) to indicate the type of event, or signs that used rotating prisms (trilons) to change the displayed message. These were later replaced by dot-matrix displays, usually using egg-crate, fiber-optic, or flip-disk technology, capable of displaying a much wider range than earlier static variable message signs. Since the late 1990s, the most common technology used in new installations for variable message signs has been LED displays. In recent years, some new LED variable message signs have the ability to display color text and graphics.

Variable message symbols are divided into three subgroups: character matrix, string matrix, and full matrix. Character matrix In VMS, each character is assigned its own character matrix, with equal horizontal spacing between them, usually two or three rows of characters. In a full-matrix VMS, the entire icon is one large dot-matrix display, allowing for different fonts and graphics. A line matrix VMS is a hybrid of the two types, divided into two or three rows like a character matrix display, except that each row is one long dot matrix display instead of being divided horizontally into each character.

Variable Message Signs (VMS) are used by Traffic Management Centers (TMS) to send information to travelers to inform drivers of incidents, travel times, detours, special events and other useful road conditions or travel information. are permanently mounted or portable electronic roadside signs controlled by remote control. A VMS can be used to host a variety of

demand management and passenger information strategies, including queue warnings, variable speed limits, route selection, and dynamic lane marking. A VMS is typically hosted in a central location such as a TMS. connected, where symbols are controlled remotely and can be quickly changed to provide current information. A VMS is particularly useful for providing advance notice of locations where travelers must move or make route decisions. Because VMS messages can only be seen when drivers drive by, strategic placement of signs, especially permanently installed signs, is critical. Portable VMS can be used to display traveler information messages for special events or other temporary conditions, such as road construction. When not used to display traveler information, VMS can display public service announcements, seat belt information, can be used to display messages. However, because overuse of VMS can cause drivers to ignore posted messages, many agencies strictly limit the types of messages that can be displayed, limiting VMS to only important passenger information or safety messages. VMS makes sense for locations where travelers need information on a regular basis (such as access to mountain passes) or before locations where travelers must make route decisions. They can also support active traffic management strategies where having a means of providing information about travelers along the route is a key element of the strategy. Portable VMS are useful for informing travelers about temporary conditions during road construction and special events. In addition, variable message signs (VMS) are digital road signs used to inform motorists of specific temporary events and real-time traffic conditions. l signs. Signs are often connected to a control center controlled by a local area network or radio link. Variable Message Signs (VMS) are an integral part of Intelligent Transportation Systems. The purpose of using VMS is to provide mandatory and supposedly advisory information to drivers at the roadside. VMS can be used for a variety of purposes, with the potential benefits of reducing driver stress, reducing travel time and increasing traffic safety. VMS can prompt drivers to change speed, change lanes, reroute, direct to an existing parking space, or provide information about current or future may request to be notified of changes in traffic conditions. The information is designed to help drivers choose appropriate routes to avoid traffic and reduce driver anxiety. In general, it is difficult to measure the merits of characters. VMS is often used to inform drivers about traffic, upcoming events, and unexpected delays, and it can reduce driver stress. Signs can be particularly useful where they can inform drivers of alternative routes or stop-and-go areas to avoid further delays, but this makes VMS an integral part of a wider and more expensive traffic monitoring system. may require. One major study shows that drivers want to use VMS more. There is clear evidence that properly designed VMS will not distract drivers. Where VMS signs are installed, the number of speed limit violations can be expected to decrease. Overall, there is still no clear evidence of the security benefits of VMS. The main barrier to implementation is cost. There may also be some concerns about the visual impact of the new characters. However, by reducing the number of stationary road signs, a properly designed VMS can reduce negative aesthetic impacts. VMS costs include purchase, operation, and maintenance. Approximate capital costs are £500,000 for 12 VMS, but costs vary significantly depending on the type of sign and the relevant data and sensors required to calculate the relevant message to drivers. Variable message signs (VMS) are an integral part of ITS (Intelligent Transportation Systems). VMS can be used where more flexibility is required than is offered by fixed direction or advisory signs. VMS is used to deliver real-time traffic information to drivers to optimize traffic safety and efficiency. In its simplest form, a variable

message sign can be a hand-operated device that says "full" or "empty" on board, as seen in controlled parking lots. Commonly VMS is the term used for computer-controlled electronic signage. Regardless of the complexity of the technology, the message displayed on a VMS must be understood by everyone, so the quality of the message is of the utmost importance. [9]

CONCLUSION.

The operating conditions of vehicles in mountain conditions have their own characteristics and have a negative impact on traffic safety. The level of use of intelligent transport systems in ensuring traffic safety in mountain conditions is low. There are a number of advantages of introducing and using variable traffic signs on mountain highways. Due to the changeable mountain weather conditions and high rainfall, mountain vehicles face various challenges. For example, the recommended speed limit for cars and trucks in sunny weather is not the same as the recommended speed limit for cars and trucks when it is raining, snowing, or frozen. The implementation of VMS in practice serves to prevent such problems that may arise.

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ТЕХНОЛОГИЯ ОЧИСТКИ СТОЧНЫХ ВОД СОРБЕНТОМ НА ОСНОВЕ МОДИФИЦИРОВАННОГО ВЕРМИКУЛИТА И ОРГАНОВЕРМИКУЛИТА

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Ключевые слова: Технология модифицированный вермикулит, текстильные сточные водыб хитозан, органосорбент, адсорбция,

Аннотация. В статье разрботана технология очистки текстильных сточных вод органосорбентом на основе модифицированного вермикулита с хитозаном.

The article investigates the modified Vermiculite with chitosan and adsorption capacity of organosorbent based on.

Key words: Technology modification vermikulit, chitosan, organosorbent, adsorption,

Несмотря на множество физико-химических процессов, используемых в настоящее время в практике очистки сточных вод, наиболее эффективными и перспективными для удаления основной массы загрязняющих веществ являются сорбционные процессы с применением природных адсорбентов. Наряду с традиционными сорбционными материалами, активированными углями, для этих целей широко используются такие природные алюмосиликаты, как глины с расширяющейся (монтмориллонит, вермикулит) или жесткой структурной ячейкой (каолинит, гидрослюда, палыгорскит). Учитывая тот факт, что состав и свойства глин индивидуальны для каждого месторождения, является актуальным получение новых дешевых и универсальных сорбентов на основе местного минерального сырья, изучение механизмов взаимодействия загрязняющих веществ с полученными сорбентами и разработка технологий очистки сточных вод, позволяющих создать системы замкнутого водооборота и снизить нагрузку на окружающую среду.

Одним из моментов цели данной научной работы является разработка технологии очистки сточных вод сорбентами на основе вермикулита модифицированного хитозаном. Актуальность разработки определяется возрастающим интересом к созданию новых экологически безопасных сорбентов из природных гидрослюд и алюмосиликатов. Однако необходимо отметить сдерживающим фактором массового использования органовермикулитов для очистки текстильных сточных вод (ТСВ) является отсутствие эффективных технологий гранулирования, поскольку сорбенты предрасположены диспергированию в водных средах.

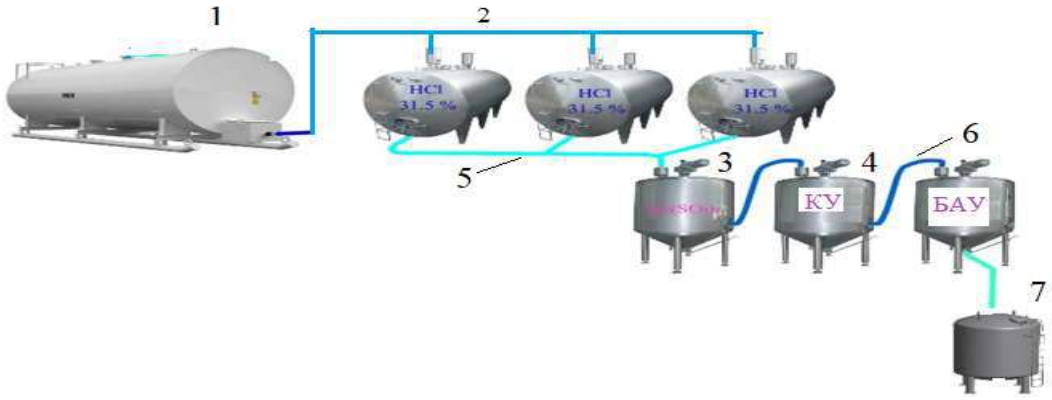
На основе полученных данных и на основе комплексных экспериментальных исследований были разработаны научно-методические принципы создания модифицированных вермикулитов органическими реагентами:

В начале процесса необходимо тщательный отбор и сортировка карьерной глины. Важная часть подготовки исходного сырья к технологическому процессу производства адсорбентов является их отделение от примесей неглинистых минералов после предварительного помола.

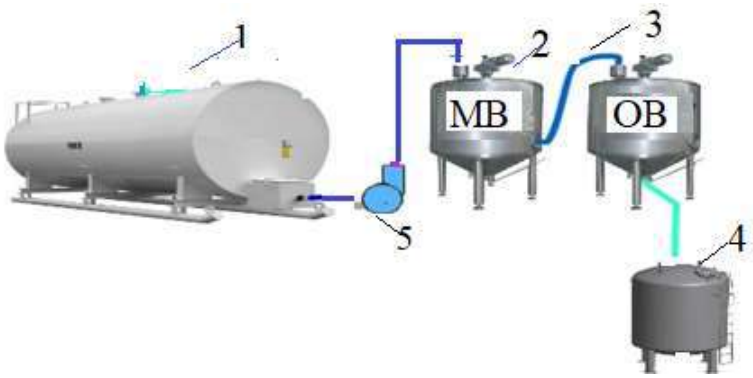
Технологическая схема производства органобентонитовых сорбентов состоит из следующих стадий:

- добыча сырья;
- подготовка сырья, состоящая из процессов отделения от примесей неглинистых веществ (полевой шпат, кварц, слюды и т.п.) и предварительного помола;
- обогащение глин с приготовлением пастообразной суспензий и седиментацией грубодисперсных фракций;
- приготовление и дозирование химических реагентов – модификаторов;
- модифицирование глинистой пасты полимерными соединениями;
-сушка и измельчение, упаковка и складирование полученных адсорбентов.

В результате проведённых лабораторных исследований была сравнена технологическая схема использования органовермикулита для очистки текстильных сточных вод. Схема включает стадию подготовки, для регулировки pH из емкости (1) подаётся соляная кислота далее в реактор с мешалкой добавляют для осаждения коагулянт сульфат алюминия (2) и смешивается с водой (2) при массовых соотношениях 1:3 и перемешивается в течение 2 часов. После 24 ч набухания в воде глина с помощью механической мешалки разбивается в суспензию, далее добавляется вода в пропорции 1:2 и суспензия тщательно перемешивается. Далее. После седиментации вода сливалась через верхний боковой сифон (6), сырье из средней части ёмкости извлекалось (6) в плоский ёмкость для воздушной сушки. Через нижнюю часть ёмкости для седиментации (7) крупный песок и другие осадочные вещества, осевшие на дне бака, отделялись и в дальнейшем технологическом процессе не участвовали. Дисперсное сырье выкладывалось тонким слоем (7) и подвергалось воздушной сушке в течение 24-48 ч. Далее полувысушенное сырье предварительно измельчалось с помощью ручного измельчителя, в качестве которого может выступать дисковая мельница. После этого следовала сушка в сушильном шкафу при температуре 110°С в течение 4 ч до до остаточной влажности 20 %. Далее высушенные образцы глины подавались в планетарную мельницу, куда с помощью дозатора (3) подавались определённые порции модификаторов (12) и поверглись модифицирования и диспергировались в течение 30 мин. Масса каждого образца составляла 1 кг (0,8-0,9 кг – масса исходной бентонитовой глины и 0,1-0,2 кг – масса модификатора).



А



Б

Рис. А) Традиционная технологическая схема очистки сточных вод текстильного производства АО «Bukhara cotton»

Б) упрошенная разработанная технология

2) бункеры для соляной кислоты глины; 3) реактор с мешалкой для коагулянта ; 4) емкость для седиментации; 5) нижний сифон для слива воды; 6) верхний сифон; 7) емкость для технической воды

В результате экструзионной формовки образовывались цилиндрические гранулы диаметром 0,5–2 мм и высотой 1–2,5 мм, которые подвергались термической обработке. Далее полученные гранулы направлялись в упаковщик.

Необходимо подчеркнуть более простоту, малозатратность, экологическую и химическую безопасность предлагаемой технологической схемы изготовления опытной партии адсорбента на основе природных вермикулитов и органических модификаторов. Мини промышленная форма данной лабораторной технологии освоено на кафедре Общая химия при ТГТУ, и на её основе в производственных условиях данного предприятия производился выпуск различных адсорбентов (Х-ВВК, МВВ) в количестве 2 кг каждого, которые были переданы для опытно-производственного испытания в «Bukhara cotton textile».

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USE OF EDUCATIONAL FLASHMOBS IN PREPARING FUTURE ENGLISH LANGUAGE TEACHERS FOR PROFESSIONAL AND PEDAGOGICAL ACTIVITY

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Abstract: The article highlights the possibilities of using educational flash mobs in the preparation of future English language teachers for professional-pedagogical activities.

Basic concepts: flashmob, development, language acquisition, English language, teacher's professional activity.

The studies conducted on a global scale show that today it is necessary to learn the foreign language being studied in harmony with the culture of the country where the language is being studied, to introduce the cultural studies and competence approach to the educational process, to teach the integrity and continuity of foreign language learning. providing is important in enriching the content of education.

Nowadays the world market situation has changed dramatically, and competition is becoming more and more intense in the context of globalization, so effective cooperation with the mass media in our country in the field of information policy, distribution of fast information within the framework of journalists and bloggers who work constantly with information services, as well as regulatory ensuring the participation of the broad population in the discussion of draft legal documents. Also, conducting monitoring and analysis of the information space, quickly responding to critical and widely discussed information attacks, organizing work on the dissemination of information related to the activities of relevant state bodies and organizations in the mass media and the Internet; together with state bodies and organizations, great attention is paid to the preparation of news, information, commentary and other information-analytical materials for distribution through local and foreign mass media.

Teaching English using flashboards in the context of digital technologies in higher education is considered one of the most relevant, scientific interest, multi-disciplinary fields in which many scientific researches are conducted both in foreign countries and in our country.

In order to solve the problems faced by the educational system in the innovative processes taking place at the present time, we need people who are able to absorb new information and evaluate the acquired knowledge by themselves, who make the necessary decisions, who are independent and think freely. Therefore, one of the main features of the pedagogical process in today's higher education system is determined by its digitization. Adopted on July 15, 2018 "On additional measures to encourage the implementation of innovative projects and technologies in production", published on May 28, 2012 "Training of qualified pedagogues and secondary -measures related to the further improvement of the system of providing special vocational education institutions with such personnel

on"[8, 7b.] decisions [1]emphasize the need for the potential of pedagogic personnel and their readiness to implement innovative changes in the educational system. Also adopted by the Cabinet of Ministers "On measures to create conditions for further development of computerization and information and communication technologies in places" (02.01.2012), "Measures on further development of computerization and introduction of information and communication technologies" "On Activities" (20.01.2012) and the set of activities and activities planned in the educational system for the implementation of these documents indicate that digital technologies are widely entering the life of our country.

May 27, 2013 No. 143 of the Cabinet of Ministers of the Republic of Uzbekistan "In 2013-2016, measures to accelerate the equipping (additional equipment) of foreign language offices of educational institutions with modern information and communication, technical means and equipment for teaching about" The decision was announced. In the [2]decision , in the educational process, the use of advanced pedagogical methods and technologies, information and communication technologies, electronic educational resources and multimedia presentations should be thoroughly and comprehensively studied , education taking into account foreign experience to re-develop new curricula and programs in order to organize the process in a new way, to abandon the traditional institutional education methods and to ensure the increase of hours of practical training and production practice. year, and on this basis, significant tasks in teaching English in HEIs were performed.

The implementation of innovative ideas in the educational system, the development and implementation of systems, mechanisms and technologies is becoming one of the most urgent tasks.

In the era of globalization, as a result of the integration of cultural, educational and socio-economic relations between countries, the training of specialists who can freely communicate in foreign languages, in particular, English, and at the same time be aware of the information transmitted on a global scale, are all defined in the process of educational reforms. plays an important role in the implementation of priority tasks.

In the process of higher education, with the help of digital technologies, the ground is created for students to widely use the achievements of world civilization and world information resources, the conditions and opportunities for the development of international cooperation and communication are expanded.

Nowadays in the higher education institutions of our country, great attention is paid to learning foreign languages, including English, and educational programs and plans are formed based on the trends of the times. However, there are still some controversial aspects of teaching English to students:

Firstly, the emergence of the need to update the approaches to teaching English in the currently operating HEIs;

Secondly, the increase of the student's need to improve his knowledge of the English language;

Thirdly, the outdated material and technical base in unsatisfactory pedagogical conditions, the lack of competent specialists;

Fourth, the need to improve the practice of teaching English;

[1] Collection of legal documents of the Republic of Uzbekistan, 2012, No. 22, Article 241; 2013, No. 23, Article 300

[2] Collection of legal documents of the Republic of Uzbekistan, 2013, No. 22, Article 283, No. 34, Article 453

for a competent specialist who speaks at least one foreign language (especially English), the increase in demand for the social order of society for the situation of practical use in his professional activity.

Due to the development of modern information and communication technologies and tools in the education system of developed countries such as the USA, Great Britain, Germany, China, the need for forms of language acquisition through the use of electronic services by education consumers is increasing, and this Extensive research is being conducted in the field.

During our research, we began to develop professional competencies in future teachers based on teaching flashbacks. For this, we are in the first stages of research (2019-2021). We have developed proposals for the use of Flashbom technologies in the educational process.

Educational flasmobs are pre-planned learning activities in which a large group of students perform pre-planned learning activities. A flash mob is a type of smart mob. Gathering of flashmob participants is carried out using electronic means of communication. So what exactly is a mob? How can it be used in education?

Martmob is a "smart mob" activity related to digital technologies, aimed at developing communication skills. This concept was introduced by Howard Reinhold in his 2002 book Smart Gangs: The Next Social Revolution. Reinhold defined a smart crowd as follows: “A smart crowd is made up of people who can act in concert even if they don't know each other...because they have the ability to communicate and compute.

“These technologies that support smart swarms include the Internet, computer communications such as Internet Relay Chat, and wireless devices such as cell phones and personal digital assistants. Methodologies such as peer-to-peer networks and ubiquitous computing are also changing the way people organize and share information” [p. 5,67]. Smart mobs are sometimes manipulated by dispatchers who operate a "mobbing system" (i.e., those who have a contact list and the means to send instant messages to the group) to keep the dynamics of smart mobbing "hidden" and not discuss such incidents on the Internet. there is a trend.

Flashmob technology on a global scale , the need for students to develop English speaking techniques, and the need for quick training based on the mnemonic base, shows the need to improve their professional-pedagogical diagnostics. Within the framework of the research, we used F leshmob technology to organize experiential training for the development of professional competence of future foreign (English) language teachers .

F leshmob technology

Flashmob technology is effective in helping students learn foreign languages and includes dozens of questions and hundreds of associated words. Mobile high-speed packets like HSDPA and web cameras come in handy when using flash mobs.

As a result of these words and phrases, the opportunity for the student to remember the words and phrases formed within the studied topic on the basis of answering logically coherent questions increases. This technology is based on the creation of connections and ideas that are not on the surface, but have opportunities for development and improvement, within the framework of the problem being studied. Also, Flash mob technology can be used to solve everyday problems, life situations, etc.

Some people are ready to come up with all sorts of new ideas easily, while others can't come up with anything interesting beyond just one or two ideas, even after a quick brainstorm. This

shows that different people have different thinking and abilities [p. 2,34 .]. A similar process of reflection occurs in the educational process. F leshmob technology helps students come up with new ideas . Flash mob technology is a system of asking specific questions that encourages the generation of new ideas.

In other words, Flash mob technology is considered a creative technique .

During our research **We were able to** approve flash mob technology with 1 course in the 1st semester. For this, students were presented with a text on the topic "Abul Kasim az-Zamakhshari" in the 1st semester.

Abul Kasim al-Zamakhshari

(Excerpt from the text)

Many great scientists who made a worthy contribution to the development of world science and culture grew up in the land of ancient Khorezm. Abul Kasim az-Zamakhshari is one of these great figures. Allama`s full name is Abul Qasim ibn Umar al-Zamakhshari , and he was born on the 27th day of the month of Rajab ^{467Ah} in the village of Zamakhshar, one of the Qasabas of Khorezm. Information about az-Zamakhshari is mainly given in medieval Arabic sources.

Although his father was not very wealthy, he was a literate, person who spent most of his time reciting the Qur'an and praying, and also served as an imam in a mosque in Zamakhshar. Az-Zamakhshari`s mother was also considered one of the religious women. It seems that al-Zamakshari's father was a nobleman. For example , the poet writes in one of his odes that his father worked tirelessly to earn a living because he had many children and a large family.

Az-Zamakhshari family belongs to Mu`tazili teachings of Islam , young Mahmud`s worldview was formed under the influence of this religious, pious Father, and he also received the first knowledge from his own father. Its known from the information about alloma that one of his legs was made of wood, and because he wore his long jacket down, the tall man thought he was lame. (Appendix 3)

above text based on Flash mob technology, the students were asked to replace the information in the table below with the relevant information in the context of the text. For this, the students of the 1st stage began to fill in the following table(-table).

Submitted text	**Text replaced by students**
Allama's full name is Abul Qasim ibn Umar A l-Zamakhshari , and he was born on the 27th day of the month of Rajab ^{467Ah} in the village of Zamakhshar, one of the Qasabas of Khorezm.	Our compatriot Az Zamakhshari, who founded the Arabic alphabet, was born in Khorezm on the 27th of the month of Rajab in 4 67

Text provided by flashmob	**Combination (combined) text by students**
Although his father was not very wealthy, he	The fact that his father and mother were religious, spent their time reciting the

was a literate, person who spent most of his time reciting the Qur'an and praying, and also served as an imam in a mosque in Zamakhshar. Az-Zamakhshari`s mother was also considered one of the religious women.	Qur'an and praying played an important role in their child's upbringing. Farzandi-Az Zamakhshari grew up honest, conscientious, and thirsty for knowledge.

This based on the examples given above, the students were able to work with the text and demonstrate their scientific competence in English. For them, this technology served as a very interesting and motivating technology. Also, on the basis of this technology, students learned to understand English words, phrases, sentences in the text, to find and replace them, to adapt the text to the situation, to react to it . Before using this technology, it was necessary to clearly define the task, that is, the problem to be solved or the idea to be developed was determined. In addition, it was found during research that this technology can be used in a completely new field. Students learned that it can be used in personal life, family relationships, work, business, provision of goods and services, and other situations.

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ЭФФЕКТИВНОСТЬ ИСПОЛЬЗОВАНИЯ ЭЛЕКТРОННЫХ ОБРАЗОВАТЕЛЬНЫХ РЕСУРСОВ НА УРОКАХ БИОЛОГИИ

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Аннотация: в статье сказано об использовании электронных образовательных ресурсов при изучении биологии в школе. Перечислены значимые качества электронных ресурсов для учащихся.
Ключевые слова: биология, учитель, ученик, метод, образовательные электронные ресурсы, знание, понятие, предмет, усвоение, развитие.

В современных условиях при изучении биологии в общеобразовательной школе приобретают огромное значение электронные образовательные ресурсы, цифровые электронные устройства, интерактивные программные схемы. Воплощение биологических понятий в знания в процессе усвоения предмета биологии происходит с помощью электронных образовательных ресурсов. Процесс обучения и эффективное использование электронных образовательных ресурсов в системе изучения современной биологии осуществляется на основе развития интерактивных образовательных стратегий и механизмов в условиях адаптации к тенденциям устойчивого развития образовательной системы. Всё это служит обогащению биологической науки новыми перспективными направлениями и имеет позитивное значение для решения педагогико-психологических проблем, их интеграции с информатизированной образовательной средой существующих образовательных процессов. Исходя из этого, создание информатизированной образовательной среды, широкое внедрение мультимедийных приложений в предмет биология, создание нового поколения учебно-методической литературы и совершенствование учебников на основе инновационного подхода считаются наиболее актуальными задачами сегодняшнего дня. В Концепции развития системы народного образования Республики Узбекистан до 2030 года приоритетными задачами обозначены «разработка мультимедийных продуктов в образовании и организация системного их применения в учебном процессе» [1, с. 1]. Интерактивные электронные образовательные ресурсы будут способствовать развитию биологических знаний и потенциала учащихся общеобразовательных школ, совершенствованию базовых и предметных компетенций учащихся средствами электронных образовательных ресурсов на уроках и внеурочных занятиях. Мультимедийные приложения к учебникам по биологии включают в себя видео, аудио источники, анимацию, таблицы, тексты и словари, освещают материалы по учебным предметам с помощью информационно-коммуникационных технологий в соответствии с государственными образовательными стандартами и учебными программами. Они способствуют эффективному усвоению содержания учебных дисциплин и развитию навыков самообразования, помогают осуществлению контроля знаний и их закреплению, обогащают основное содержание учебного предмета, что

подчеркивает необходимость применения электронных образовательных ресурсов на уроках биологии в общеобразовательной школе. Использование качественных электронных средств и правильное подключение к учебному процессу создают оптимальные условия для принятия учащимися необходимой информации, её обработки, усвоения базовых и предметных компетенций, их контроля, развития творческих способностей, введения дополнений и изменений в учебно-воспитательный процесс, непрерывной проверки результатов образования. Кроме того, намечены возможности для диагностирования и прогностики деятельности учащихся, разработки рекомендаций по проектированию уроков, определения порядка учебно-познавательной деятельности учащихся, направленной на закрепление определённой информации. Обобщение теоретических и научно-методических основ использования электронных учебных ресурсов путём интегративного подхода будет способствовать совершенствованию процесса обучения биологии в общеобразовательных школах. Использование электронных образовательных ресурсов, наглядных материалов, способствующих кинестетическому, визуальному, аудиальному, дискретному восприятию учебного материала для активизации учебно-познавательной деятельности учащихся, формированию у них базовых и предметных компетенций, связанных с содержанием биологического образования, имеет важное значение для повышения уровня знаний учеников. Демонстрация систематизированного учебного материала позволяет вести непосредственные наблюдения учащимся за сложноусвояемыми биологическими процессами, недоступными для человеческого зрения средствами электронных обучающих ресурсов. Использование образовательных компонентов в виде мультимедийных приложений, учебных программ позволит совершенствовать дидактическую систему комплекса тестовых заданий для контроля и самооценивания учащихся. А также эффективноеиспользование электронных образовательных ресурсов в обучении биологии и их широкое внедрение способствуют успешному проявлению самостоятельной деятельности учащихся. Содержание предмета биологии увлекает обучающихся, но для лучшего восприятия изучаемого материала необходимо качественное наглядное сопровождение. Так как наглядность обучения - это один из основных принципов дидактики, необходимый для развития наблюдательности, внимания, развития речи, мышления учащихся.Поэтому своей главной задачей считаю использование в учебном процессе наглядных средств обучения. Биология – один из наиболее благодатных предметов для эффективного применения ЭОР. Изучение в школе предмета "Биология" на вербальном уровне не создает правильного представления об изучаемых объектах и явлениях. Но нельзя и полностью заменять на уроках биологии натуральные объекты объектами виртуальной среды. Все средства обучения необходимо применять комплексно, исходя из цели, задач урока, особенностей учащихся.Работать с ними легко и интересно. Эти ресурсы разработаны и представлены в 3-х вариантах: информационные, практические и контрольные модули. Их можно использовать в разных целях и на разных этапах урока, их можно рекомендовать детям, не посещающим занятия по тем или иным причинам, для самостоятельного изучения материала.

Я считаю, что самыми интересными и эффективными уроками являются уроки с использованием универсальных образовательных ресурсов(Word, Excel, Power Point и

т.д., предназначенные для создания собственных образовательных ресурсов),
то есть уроки, разработанные педагогом с учётом особенностей конкретного ученического коллектива и для конкретных учащихся. В процессе создания такого урока возникает уникальный образовательный ресурс, в который вложены не только знания, умения и опыт педагога-разработчика, но и частичка его души. Именно такие уроки будут наиболее интересны детям, а значит, и наиболее эффективными

В своей работе я использую следующие виды учебной деятельности:

1. Цветные рисунки и фото. Цифровые технологии позволяют насытить издание большим количеством цветных иллюстраций. Цветные рисунки и фото позволяют расширить иллюстративный ряд, придать ему большую эмоциональность, приближенность к реальной жизни, что способствует лучшему усвоению материала.

2. Слайд-шоу - сменяющиеся иллюстрации (фотографии, рисунки) с дикторским сопровождением использую при объяснении нового материала, что дает возможность более наглядно проиллюстрировать новый материал, привлечь внимание учащихся. Особенно полезны слайд-шоу при изучении многообразия живых организмов различных систематических групп, так как позволяют иллюстрировать богатый живой мир.

3.Видеофрагменты - с использованием компьютера, позволяют использовать видеоматериал как сверхэффективное средство создания проблемной ситуации на уроке.

4. Анимации - аналоги традиционных фрагментов "мультфильмов". В подобных анимациях облегчена остановка и переход к нужному фрагменту, за счет синхронизированного звукового сопровождения возможно квалифицированное объяснение процесса с нужными визуальными акцентами.

5. Интерактивные модели и рисунки, схемы.Интерактивные модели - анимация, ход которой зависит от задаваемых начальных условий. Могут использоваться для имитации биологических процессов. К этому типу объектов можно отнести интерактивные таблицы, в которых фрагменты могут "оживать" в короткие анимации или укрупняться с появлением новых деталей.

6. Мультимедийные презентации.

Создание уроков-презентаций требует умения пользоваться компьютерной техникой и большого количества времени, что в итоге оправдывается повышением познавательного интереса учащихся к предмету, сокращает время обучения. На этапе объяснения нового материала презентация играет роль сопровождения объяснения нового материала.

Презентации готовлю не только сама, но и мои ученики. При изучении новой материала ребята показывают свои презентации (проекты) по теме. Это повышает мотивацию и вызывает интерес к предмету, учит выбирать главное.

Применение на уроках ЭОР может быть в разных формах:

1.сопровождение объяснения материала своей же презентацией, использование при объяснении видеофрагментов, картин, рисунков, схем, других медиаобъектов. При этом остается неизменной ориентация на знаниевую составляющую содержание образования, изложенного в стандарте.

2.использование в интерактивных, инновационных методах обучения: создание учебных мини-проектов, рациональный поиск информации в Интернет, использование материалов ЭОР для подтверждения выдвинутых учебных гипотез.

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STUDY OF COMPOSITION AND CRITICAL PARAMETERS OF DUST FROM LOCAL COTTON INDUSTRY.

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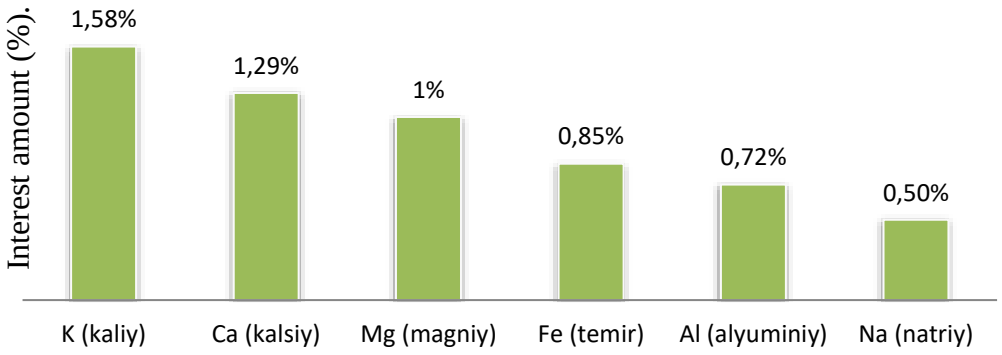
Key words:
Fibrous dust; dustiness; quantitative percentage of elements in dust; dust settling rate; deposition parameters; pieces of fibrous dust; free dust deposition time; dust settling time under pressure; dust loads; equivalent dust diameter; density of fibrous dust.

Abstract:
In the course of this study, the chemical composition of fibrous dust samples and the quantitative ratios of chemical elements in it were studied.
Also, the main parameters of the investigated fibrous dust samples were determined: length, weight, equivalent diameter of dust samples and the rate of their free (or under pressure) deposition. In this case, the dependence of the rate of settling of fibrous dust on the density of the sample was considered using the example of a local cotton gin.

Introduction.
At present, the bulk of fibrous dusts formed during cotton processing are inorganic and mineral compounds [1]. The quality index of cotton depends on several factors [2; 3]. Among them are the pre-treatment of raw cotton [4], soil particles in the feedstock and methods of its collection [5; 6].
At the same time, the amount of chemicals in fibrous dust is directly related to the stages of the technological process [7]. Fibrous dust leaving the machines for transporting and cleaning raw cotton at the beginning of the process contains up to 10-20% organic matter by weight [8; 9] and contains up to 80-90% of inorganic particles [10]. The elimination of these dusts is one of the urgent tasks.
Method and materials. For research, the composition of fibrous dust based on raw cotton was studied based on spectral analysis [11]. On the basis of experiments, the rate of free and pressure dust settling [12], specific gravity [13], equivalent diameter and density [14; fifteen].
Discussion of the results and their analysis. At the beginning of this research work, using special spectral analysis, the composition of fibrous dust emitted at a cotton gin in the Fergana region was studied. The results obtained are presented in the graph below (Fig. 1).

Figure 1.

The amount of chemical elements in fibrous dust.

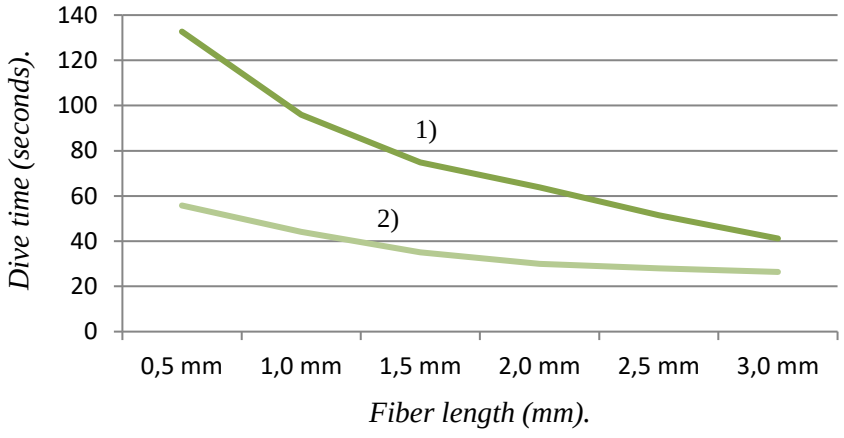


From the analysis of the graph above, it can be seen that the fibrous dust contains a large amount of chemical elements. The highest quantitative indicator in the obtained samples belongs to the element potassium (1.58%). The next are calcium (1.35%), magnesium (1.14%), iron (0.85%), sodium (0.5%). In addition, it was found that this fibrous powder contains a small amount of: titanium, manganese, aluminum, iron, chromium, phosphorus, chlorine and other chemical elements.

In the course of our research, the parameters of free and pressured settling of these fibrous powders were studied. In this case, the dependence of the length of the fibrous powder on the deposition rate was considered (Fig. 2).

Figure 2.

Fiber Powder Length depending on drop off time.



1) Free dive time
2) Settling time under pressure

Analyzing the data of graph 2, it can be seen that the settling rate of fibrous dust particles taken as a sample is proportional to their size and the pressure applied to it. That is, by exerting pressure on a fibrous dust particle of the same length, it reduces the drying time by half.

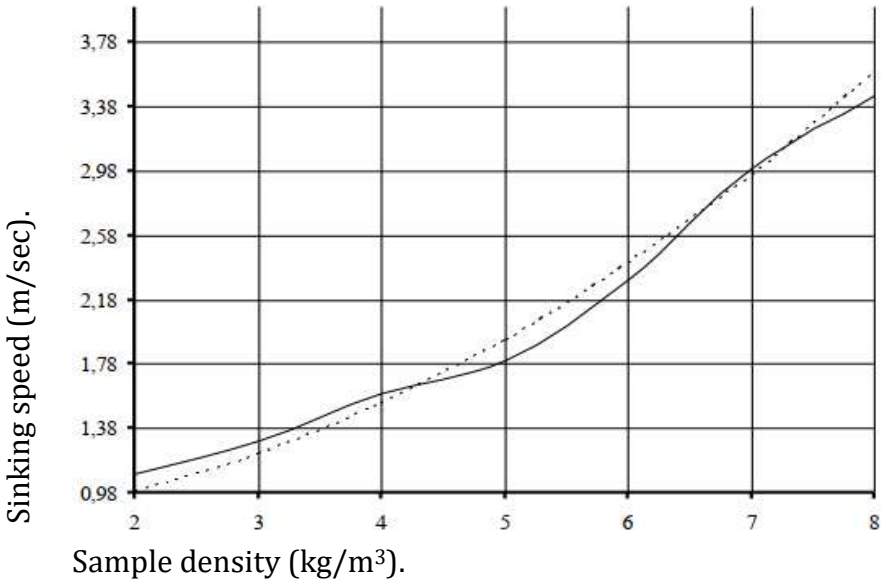
In addition, the weight and equivalent diameters of the above fiber dust samples are given in the following table (Table 3).

Table 3
Basic measurement parameters for fibrous dust samples.

Sample size (mm).	Sample weight (kg).	Equivalent diameter of samples (m).
0,5 mm	$0,4 \cdot 10^{-6}$	$0,9 \cdot 10^{-3}$
1,0 mm	$0,8 \cdot 10^{-6}$	$1,19 \cdot 10^{-3}$
1,5 mm	$1,1 \cdot 10^{-6}$	$1,32 \cdot 10^{-3}$
2,0 mm	$2,9 \cdot 10^{-6}$	$1,87 \cdot 10^{-3}$
2,5 mm	$4,5 \cdot 10^{-6}$	$2,2 \cdot 10^{-3}$
3,0 mm	$6,8 \cdot 10^{-6}$	$2,6 \cdot 10^{-3}$

and it can be seen that it depends on the equivalent diameter.
In addition, it has been established through research that the relationship between the settling rate of fibrous dust samples and their density for the study area is non-linear. Based on this, we got the opportunity to use the theory of correlation and the method of non-linear regression as the mathematical apparatus of the process.
As a result, indicators were obtained related to the change in the studied sedimentation rate. As a result, a specific mathematical model was developed that reflects the relationship between the studied indicators. The graph below shows the rate of sedimentation, obtained from the non-linear regression equation, as a function of their density. (Figure 4).

Figure 4
Settling rate of fibrous dust, sample density dependence.



The experimental points presented in the image above (Fig. 4) are obtained based on Equation 5:

$$\omega_ч = 0,7593 + 0,0312 \cdot \rho_H + 0,0403 \cdot \rho_H^2,$$

Accordingly, the established value of the correlation coefficient in this equation (r = 0.976) also indicates the presence of a clear correspondence between the studied factors. That is, with an increase in the density of the studied samples of fibrous dust from 2 to 8 kg/m3, it is reasonable to assume that the dust settling rate increases to 3.6 m/s.

Conclusions. In these studies, based on the chemical composition of local dust from cotton production, various factors affecting particle size and efficiency were investigated based on experience. In the fibrous particles under study, the aerodynamic effects of the deposition process and optimal conditions are determined.

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PEDAGOGICAL OPPORTUNITIES OF PERSONAL CREATIVITY

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Abstract: At any time, the development of the field of education is directly combined with the creativity of the participants of the educational process. In education, issues of personal creativity are considered as one of the important factors of personal development. This article tells about the essence of the concept of "creativity" in education and the pedagogical opportunities of the student's creative self-development.
Key words and concepts: creativity in the educational process, individual creativity, motivational environment, differential approach.
Аннотация: Ҳар қайси замон таълим соҳасининг ривожланиши бевосита таълим жараёни иштирокчиларининг ижодкорлиги билан уйғунлашган. Таълимда шахс ижодкорлиги масалаларига шахсий ривожланишининг муҳим омилларидан бири сифатида қаралади. Ушбу мақолада таълимда “ижодкорлик” тушунчасининг моҳияти ҳамда таълим олувчининг ижодий ўзини ўзи ривожлантиришидаги педагогик имкониятлар ҳақида сўз боради..
Таянч сўз ва тушунчалар: таълим жараёнида ижодкорлик, шахс ижодкорлиги, мотивацион муҳит, дифференциал ёндашув.
Аннотация: Во все времена развитие сферы образования напрямую сочеталось с творчеством участников образовательного процесса. В образовании вопросы личностного творчества рассматриваются как один из важных факторов развития личности. В данной статье говорится о сущности понятия «творчество» в образовании и о педагогических возможностях творческого саморазвития учащийся.
Ключевые слова и понятия: творчество в образовательном процессе, творчество личности, мотивационная среда, дифференцированный подход.

The concept of "creativity" is interpreted in different fields as qualities close in content, but different in form. In its general form, it is the creation of new, original, more developed material and spiritual values of objective or subjective value.

In philosophy, creativity is understood as a spiritual and practical activity, the product of which is the creation of unique, cultural, and socially significant values; the discovery of new facts, the discovery of new properties and laws, as well as ways of exploring and changing the world are counted. This position "if the fundamental creative relation of the subject to the world and to himself is truly accepted, then it involves the addition or completion of a new, unprecedented result in relation to existence (and knowledge)".[1]

Research scientist G. Ibragimova put forward the opinion that "...personal creativity is a process directly related to the individual-psychological characteristics of a person. Its development is influenced by the process of intellect-intuition-logical thinking". [5].

Pedagogical researchers consider the creativity of the teacher and the learner as an important

aspect of the educational process.

In the research work of A.V. Khutorsky [9], pedagogical creativity is defined as follows:

- one of the approaches to understanding a person and his essence, in which the essence of a person (his thinking as a threefold intuitive-conceptual-emotional nature) is understood through self-awareness of spiritual, intellectual and vital abilities for creative activity (in literature - creative). The self-awareness of creativity is aimed at the development of the outside world, and the individual is the subject of self-development, his ability to think, choose and recognize, and indirectly plays the role of developing society;
- the ability of spiritual and creative thinking, which allows to create unusual ideas, to deviate from the traditional, algorithmic aspects of thinking, to find solutions to problematic situations;
- the ability to create original intellectual products, including in pedagogical activities; it is the self-awareness of integrity and pedagogical consciousness and the direction of individual pedagogical thinking when the person of the information society acts as a subject of self-development at all age levels of leading (main) activity.

From a social and historical point of view, creativity appears as a process that occurs in a person at a certain time or depends on social relations, as criteria for evaluating creative products.

Creativity in various literatures:

- as an intellectual ability to "produce" unusual ideas, move away from traditional boundaries and quickly solve problematic situations [4];
- as "an ability that can manifest itself in the types of thinking, feeling, communication, individual activities, can manifest the person as a whole and its separate aspects, the products of activity, the process of their creation";
- creativity is considered as a psychological theory.

The science of general pedagogy defines the concept of "creativity" as "an ability that reflects the ability of a person to create new concepts and form new skills", **in** other words, the ability to be creative, "as a readiness to use and develop one's own abilities", "a necessary search-transformation attitude of a person" to search for oneself- is manifested in the transformation activity" [3]. As a result of the analysis of the literature, we came across different opinions and approaches about the creativity of the individual. In any approach, the unique nature of creativity is emphasized. For example, the ability to get out of a certain situation, to set a goal.

Below we have presented the opinions of some researchers-scientists within the framework of the concept of individual creativity.

Views on the concept of "personal creativity"

No	"Personal creativity" concepts
1.	The highest qualities characteristic of a perfect person are creativity, ability, love of science. (A. Navoi) [5]
2.	Pedagogical scientists define the concept of "personal creativity" as follows: A sense of openness to progress and news; this is a high level of thinking, its flexibility, uncompromisingness and originality, the ability to quickly change the methods of action in accordance with new conditions of activity. (Y.N. Glukhova)[2]
3.	A system of personal abilities (ingenuity, imagination, critical thinking, openness

	to new information) that allows optimizing the methods of actions in accordance with new conditions, and knowledge, skills, belief systems, performance of activities that determine the results of actions (innovation, originality, originality of approaches), the individual is the result of encouraging creative self-awareness and self-development. (V.G. Ryndak) [8]
4.	The superiority of the process of creating a new one (A.V. Brushlinsky, V.A. Molyako, V.N. Pushkin) [5]
5.	Social-psychological approach to non-traditional resolution of conflicts of objective reality. (E.V. Kashapova) [6]
6.	A holistic personal characteristic expressed in a person's attitude to creativity (setting, position, orientation). (Mamykin I) [7]

Despite the certain similarity and closeness of the concepts of " creativeness " and "creativity", they are not the same. To distinguish between these concepts, researchers of the psychology of creativity recommend using two characteristics: process-based (to show creativity) and subjective-conditional (to show creativeness). Consequently, creativity is something that is carried out by a person with a certain characteristic and leads to the creation of a new one, and creativeness it is understood as a process that is the source of a person's internal potential.

The content of creative education is formed at three levels: general, theoretical expression, academic subject educational materials. Among these levels of formation, we will focus on the importance of educational materials.

Educational material, both didactically and psychologically, in a general form, educational material mediates the transfer of educational content from the level of normative social knowledge and experience to the level of individual learning. Its purpose is to build public knowledge and experiences for every learner.

In addition, it serves in the activities of teachers and learners, that is, in the process of solving problems. Traditionally, educational materials are structured in such a way as to ensure the acquisition of knowledge and skills. However, modern conditions demand from a person not only the acquisition of knowledge, but also the ability to transfer it from one area of knowledge to another, the ability to think, argue, prove one's point of view, and put forward hypotheses.

Educational research activity is a tool that informs the student about scientific methods of learning. By mastering the existing elements of these methods, students acquire the skills of independently acquiring new knowledge, planning a search, and discovering new relationships and patterns. Unlike scientific research, the main goal of research activity is to seek to change reality by obtaining new knowledge about the subject of study. Educational research aims to change the learner himself by creating qualitatively new values.

The main criterion of personal creativity in education is the development of the learner's personality. In this, he sets the task of having several indicators within the framework of the professional training of the educator:

- The ability to see the individual characteristics of learners and conduct training in accordance with the individual characteristics of each of them;
- forms of reflection and self-awareness;

- ability to change lesson goals in accordance with changing reality; to be able to see the manifestation of discoveries and other aspects of learners, to be able to help their development;
- the ability to organize various forms of organization of individual creative works of students and their protection measures;
- to be able to prepare a qualitative description of the student's changes in education, to evaluate the diversity of the development of his personal qualities;
- to achieve personal creative growth;
- to be able to feel the meaning and goals of the educational activity according to the educational subject or types of activities, to be able to connect them with the creative self-awareness and creative self-development of the natural opportunities of the learners; to be able to have one's own educational position, who knows how to set educational goals in the educational topic, how to achieve them during the teaching process and clearly define them;
- is able to create an integrated curriculum that takes into account educational standards and pedagogical instructions; to be able to correlate reality with the structured program, to be able to organize the educational process.

The formation of the above indicators allows the modern teacher to organize the lesson at a creative level.

The creative level lesson is one of the forms of organizing the educational process that ensures the formation of the creative thinking of students and the development of their creative abilities. Forms a system of motives and personal characteristics (independence, motivation for self-expression); turns general ability into active creativity. This lesson covers the entire teaching system of the teacher (content, purpose, tasks, fundamental educational objects and problems, types of student activities, expected results, reflection and results evaluation forms), as well as modern educational technologies of teaching (modular teaching technology, creative teaching technology), education is a lesson that reflects the recipient's knowledge of organizing independent work (creative technologies, research technologies, etc.), creative methods, styles, and forms.

Thus, the potential of the learner in creative self-development was manifested as a set of opportunities that develop in the methods, forms, tools and knowledge of the creative level lesson, which allows taking into account the interests of the learner. It should be noted that the results of increasing the level of creativity in the teacher lead to emotional and personal changes in the learners.

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