Monitoring the psychological component of higher education quality using ICT tools

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Abstract. This study examines the use of information and communication technologies (ICT) to monitor the psychological component of higher education quality. A literature review covers the concepts of higher education quality and its monitoring, the psychological factors involved, and the potential of ICT tools, including Google services. The study details a monitoring procedure using Google Forms to assess indicators like relationships between participants, satisfaction levels, and organisational climate. The computer program "Personnel – Ψ" is also presented as a tool for comprehensive psychological diagnostics of teachers. The advantages of using ICT tools for efficient data collection, analysis and management are discussed. The results demonstrate the feasibility and effectiveness of using ICT to improve monitoring of the psychological aspects of educational quality and make evidence-based decisions to enhance the educational environment. The use of user-friendly tools like Google Forms facilitates regular assessment of quality indicators and aids institutions in ensuring participant satisfaction and optimal conditions for learning and growth.

Keywords: higher education, quality, monitoring, psychological component, ICT, Google services, Google Forms

1. Introduction

In the information society, information and communication technologies (ICT) are transforming all aspects of human activity, including relationships, organisations, and education. ICT enables more intensive communication and transmission of information to individuals or large communities.

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ICT is especially crucial for education, as educational institutions shape society and facilitate economic, socio-cultural, political and professional development [12]. Today's challenges require new knowledge and strategic reforms in higher education in Ukraine, prompted by factors like technology advancement, commercialisation, global competition, and the COVID-19 pandemic [38].

According to Masuda [32], the information society will bring changes like removal of restrictions on educational institutions, replacement of existing systems with information networks, reduced gaps between regions, increased self-study with teachers as guides, more adult education, and shift from mass education to meeting individual skills and preferences [32, p.289].

Quality is a key focus, as seen in the EFA Global Monitoring Report 2005, emphasising the conceptualisation of education quality [47, p.36]. Control and compliance with European quality standards in the information society will enable high-quality education, greater independence, career planning, and continuous self-progress [21, p.11]. The World Declaration on Higher Education highlights developing students' learning abilities and initiative [1].

Quality education is vital in building key competencies for individuals and society and ensuring Ukraine's growth. The right to education is enshrined in the Universal Declaration of Human Rights. The Incheon Declaration sets out fundamental principles for global education development by 2030 [23].

The COVID-19 pandemic accelerated the digitalisation of education systems [24, 27, 45]. The Rome Communiqué states that higher education should advise on overcoming limitations, ensuring cooperation, and promoting dialogue. Institutions have the potential for significant change through improving knowledge, skills and competencies for sustainable development [36].

Education quality is the heart of education for all [30] and positively impacts student learning and potential [13, 46, 49]. ICT in education provides quality implementation, forming professional competencies, and developing intellectual and creative potential based on personal motivation, success, self-esteem and subjective control [5]. Updating the monitoring of psychological aspects of higher education quality using ICT is extremely important today.

ICT includes digital technologies for creating, transmitting, disseminating information and providing services like the Internet, software and psychodiagnostics [14]. ICT can be studied directly or used as a learning tool, enhancing professional activities. ICT monitoring ensures quality and meets public needs, aiding personal growth and environment development in higher education [7].

Modern ICT enables efficient data collection, analysis and management. Thus, the direct influence of the technology of implementation of monitoring methods and its subject area, and indirect allows taking into account the results of monitoring in management decisions, correction of the activities of participants in the educational process [6, p. 104].

It is expedient to conduct monitoring research:

- to ensure the quality of educational activities and the quality of education;
- to develop strategies, policies and procedures for ensuring the quality of education;
- to study the needs of participants in the educational process;
- to manage educational activities in higher education institutions, etc.

Thus, the monitoring works as a tool for correcting the educational process and the activities of all participants in the educational process (both teachers and students), ensuring the quality of education and the conditions of its implementation.

The quality of the educational process and the effectiveness of the knowledge provided are only possible with diagnostics and monitoring, among which the diagnostic forms are questioning and testing. From this perspective, Google services attract our attention as an innovative tool of cloud technology, which lets us control, collect, summarise and analyse the information through questionnaires (surveys) using simple online forms (Google Forms), view the spreadsheets, and visualise the survey results in graphs and charts for further analysis.

Google Forms is an utterly convenient tool, the online service for forming feedback forms, tests and surveys to organise the remote interaction of participants and experts in assessing the quality of higher education. These complex sets of questionnaires or computer programs provide personality testing, determining its psychosocial suitability for work and study. Complexes may be used to determine the opportunities for professional and personal growth, status and psychological compatibility of team members, learning, selection and distribution of specialists in institutions and organisations, etc.

2. Literature review

Monitoring the quality of teachers of higher education institutions contains an information system that is constantly updated and replenished based on continuous monitoring of the state and dynamics of the main components of educational quality on a set of defined criteria to develop management decisions to correct undesirable imbalances based on analysis of collected information and forecasting the further development of the studied processes [39].

Monitoring makes it possible to collect and analyse information to study and evaluate the quality of education and educational activities and make decisions on the development of the educational process based on the analysis of identified typical features and trends. The methods of online assessment (online tests) have significant advantages [50] because they make it possible to measure and evaluate student performance and acquaintance, guide the educational process, accelerate the reporting process, and so on. Online tests help ensure privacy and are more economical.

In general, monitoring studies of educational problems using online applications for testing originated in the 1970s in the United States [18]. The research results showed significant advantages: impartiality of assessment, speed of controlled validity of the test, accuracy, scope, and the possibility of international scope.

Mills et al. [33], Russell, Goldberg and O'Connor [37] have confirmed correlations between online forms and offline forms of testing to measure intelligence and personality abilities. There were no significant differences between the test results. We are impressed by the opinion of Pellegrino et al. [35] concerning using stable and mobile objects in research through computer technologies (drawing, recording the reaction time of the answer to test tasks, etc.

Reliability, the validity of online tools (reliable, valid data gathering instrument) while studying the attitude of teachers to educational activities, to online assessment methods on the Internet substantiated by Gül, Çokluk and Gül [18].

The quality of education is a problem that worries the whole world community. The qualities of education as a component of the "Education for All" program is a broad concept without a single interpretation defining its essence, content and components now; moreover, as Haddad and Demsky [19] claim, it depends on the state's policy. Quality education includes students, educational environment, content, process and results.

The Law of Ukraine "On Higher Education" regulates the quality of higher education as "the level of knowledge, skills, abilities and other competencies acquired by a person, which reflects its competence following higher education standards" meets the standards of higher education, ensures the acquisition of quality higher education and promotes the creation of new knowledge" [28].

"National Education Glossary: Higher Education" defines the quality of (in) higher education as "a characteristic of higher education that reflects the compliance of learning outcomes, educational processes and institutional conditions with the current goals of personal development and society" [51].

The concept of "quality" is constantly influenced by economy, politics, and culture, so it should be flexible and capable of changing during the evolution of education and progress [17]. For instance, changeability, fairness, efficiency and quality are often used as synonyms [17].

The quality of education is a multifaceted category by its essence and covers various aspects (philosophical, pedagogical, psychological, social, economic, etc.). Thus, the quality is understood as the normative level to which the product of enlightenment corresponds [40]; the level of achievement of specific goals and objectives of education, and the set of indicators characterising various aspects of the educational process (content of education, forms and methods of teaching, etc.) [41] and others. The quality of education is about the value of education (regarding its contribution to the learning process and its outcome) [2].

Control and monitoring of the quality of education, continuous monitoring of the educational process in order to identify its compliance with the desired result and determining, where necessary, corrective and developmental measures are the essential tasks of monitoring aimed at the systematic collection, processing, storage and dissemination of information on the state of education, forecasting with reason of objective dynamics data and the main tendencies of its development and science-based recommendations making to take the managerial decisions according to the improving the efficiency of the education industry functioning; the current adjustment of higher education institution's activity [44] etc.

The monitoring of the quality of the teachers' educational activities in higher education institutions following the public requirements and stakeholders' needs provides a purposeful and specially organised system of continuous (regular and planned) observation (study), measurement, evaluation, analysis of data on various aspects of teachers' professional activity, consequently, the forecasting, the development of science-based recommendations for timely management decisions due to the improving the quality of the educational process and results.

2.1. The monitoring psychological component of the quality of higher education

Monitoring the quality of higher education determines the state and effectiveness of the educational process in higher education institutions and its compliance with the requests of society

and the individual; alongside, it provides an opportunity to anticipate further steps to improve its quality.

According to the "Standards and Recommendations for Quality Assurance in the European Higher Education Area" [4], higher education institutions are in charge of the competence of teachers and providing them with a favourable environment. Creating a comfortable atmosphere allows teachers to perform their work effectively, and higher education institutions – implement the main task of ensuring the quality of teaching staff.

Monitoring the procedures for ensuring the quality of education in higher education should first give a clear answer to the question of creating a positive socio-psychological atmosphere for participants in the educational process, both students and teachers. After all, the quality of the educational process depends on the teaching staff. Therefore, to ensure the quality of higher education, the leadership of the Free Economic Zone should create an environment in which the teacher values his/her professional skills, seeks to improve, develop, generate original ideas, and implement them in the educational process. Moreover, the teacher wants students to intensify their activities, develop tolerance, form critical thinking, worldviews, and so on [48]. These and many other issues need special attention from the Free Economic Zone.

Monitoring of quality assurance procedures in higher education institutions should give a clear answer to the question of how clear, transparent and fair the enrollment procedures are; opportunities for the professional development of teachers; ways to stimulate scientific activity, conducting research; motivation to implement innovations, creative teaching methods and the use of new technologies.

Monitoring is one of the most crucial tools which changes the information space, improves efficiency, objectivity and accessibility of information; allows the identification of problems that have arisen in the process of achieving educational goals, identifying trends in education to develop appropriate educational policies; and identify psychological atmosphere in the educational institution. Thus, monitoring serves as a mechanism for ensuring quality education.

The higher education quality as a transformative process leads to a focus on psychological factors of quality of higher education, which contribute to the development of a creative and safe educational environment [7]. *The psychological component of monitoring the quality of education* involves providing information about the psychological status and satisfaction with the quality of educational services of the participants of the educational process, their relationship, the socio-psychological climate in higher education institutions, etc.

The criteria of this component are: satisfaction of the requests and needs of the listeners, and indicators:

1) the level of satisfaction of the requests and needs of the listeners;
2) the relevance of the training content to the listeners' professional needs and the stakeholders' requests as a whole;
3) the listeners' psychological status and level of satisfaction with the quality of educational services;
4) the nature of the relationship between the participants of the educational process and the level of satisfaction with them;
5) the socio-psychological climate in higher education institutions as an indicator of the level of development of organisational culture [2, p. 6].

Therefore, as the educational practice shows, it should be indicated that the regular study and the data assessment are directly or indirectly carried out mainly by the first three indicators.

Hereat, the analysis of data on the relevance of the quality of education to the requests not only of listeners but also of stakeholders, as a whole, indicates the expediency of intensifying the processes of self-education, self-knowledge and self-development of education workers, improving their qualification. In particular, this is evidenced by the results of a large-scale study made by us from 2014 to 2019 (about 1000 respondents from all regions of Ukraine who passed the advanced training at the Central Institute of Postgraduate Education of the University of Educational Management); the attitude of the education institutions' employees to their psychological competence, by which the ambivalent character was revealed [44]. In particular, assessing positively the results of the acquisition of psychological competence in higher education institutions, the respondents-educators mainly note its need to influence other participants of the educational process. A tiny part of the listeners (less than 10%) remarks on the expediency of using the acquired knowledge for introspection, reflecting on their professional and personal development process.

In regards to the indicators "the nature of the relationship between the participants of the educational process and the level of satisfaction with them", as well as "the socio-psychological climate as an indicator of the level of development of organisational culture", they were, despite all actuality, practically not monitored. Thus, the psychological component of monitoring the quality of education still needs to be fully implemented and requires a particular study, the procedure of which is greatly facilitated by the use of Google services.

2.2. ICT tools in the educational activity

ICT is a wide range of digital technologies used to create, transmit, and disseminate information and provide services (Internet, e-mail, software, psychodiagnostic, etc.). Google services include many concepts (infrastructure, platforms, software, data, etc.).

In the study, we will understand ICT as a set of various technological tools and resources used to ensure communication, the quality of education and the quality of educational activities, creation, dissemination, storage and management of information by determining the most complete and optimal content of personal competence of participants, their professional knowledge, skills, abilities and qualities [5]. In particular, one can use traditional – Google services and supplementary specially designed websites for professional psychological diagnosis [26], author's psychological testing programs, for example, "Comprehensive diagnosis of psychosocial development of the pedagogical worker with the computer program "Personal – Ψ" (V. Kyrichuk) and others.

According to Burlachuk [10], computer psychodiagnostic is a research field involving computer technology to examine and analyse the results, as the development and application of computer tests. This research area aimed at developing tools and methods of computer psychological diagnostics, accompanied by the boost of fundamentally new types of research and working methods with psychological information [31].

Maksymenko and Kokun [31] substantiated the theoretical, methodological and practical principles of designing diagnostic websites to ensure the practical implementation of remote (online) professional psychological diagnostics. According to scientists, compliance with the

policies proposed by them guarantees psychological diagnosis websites: attracting visitors, maintaining the required level of confidence and interest; providing anonymity, clarity, convenience and ease of use; has a high information value, richness of content and scientific nature; allows to differentiate respondents and help to receive feedback from them.

The primary function of Google services is to meet the users' needs, requiring the remote processing and storage of data [26]. Google services is a full-fledged educational tool which enables the most effective to create their own online space and forms a personal, educational environment for teachers and students of higher education institutions. Google services is a flexible, cost-effective model that can easily and quickly adapt to new software requirements, supporting the standardisation of software and various applications, and simplified maintenance through centralised updates. Moreover, they are supported by various devices (tablets, laptops, desktops, etc.) of teachers and students; can be used both in educational institutions and abroad; enable to save time and increase security through the remote control and maintenance, etc. [42]. Using Google services enables to develop the digital competency (the ability to consciously and critically use the digital society technologies), as well as the information and communication competence as a person's ability to use information and communication technology in practice to meet individual needs and solve the socially significant, in particular, professional tasks in a subject area [34].

There are many types of Google services, but in the context of the problem under study, we are interested in the Google Drive cloud storage service that can help organise the monitoring of the quality of education, etc. In order to work with it, a Gmail account should be created. The browser-based application can create any number of Google Forms (web pages) that host a form or a questionnaire. Google Forms opens up a vast field of opportunity and creates an opportunity to achieve the stated goal quickly and collect answers to questions.

2.3. The monitoring procedure of the quality of the psychological component of the educational process

In addition to that, the improvement of the internal system of ensuring the monitoring of the quality of education in higher education institutions, we have compiled a series of express methods (based on Google Forms) on the indicators "the nature of the relationship between the participants of the educational process and the level of satisfaction with them", "the socio-psychological climate in higher education institutions as an indicator of the level of development of organisational culture", etc. scientifically-based recommendations for further improvement of the quality of the educational process in the educational institution by the psychological component.

Google Forms permits making the questionnaire available to respondents as soon as it is created; upon its being edited, the questions can be opened and analysed, embedded on a site page, and distributed through mobile networks, where potential respondents can fill it; the service automatically to generate a spreadsheet to collect and process the responses to the author of the form, and to display the results of the survey as a spreadsheet (or filtered list) which has all the features and capabilities of a regular Google chart; the service to make it possible to view the answers of all the respondents and separately each of them individually without a spreadsheet, but with the appropriate statistics in the diagrams and graphs data

given in qualitative and percentage values formats; to summarise the answers in graphical and numerical format.

We have created the Google Forms [44], namely "The Quality of the Educational Process: the Psychological Component" containing four techniques. The first method, due to the assessment of the psychological atmosphere in the unit (team), proposes to choose the opposite by contents pairs of words (by A. Fiedler), which allows describing the nature of interpersonal relationships in the unit [15].

The respondent chooses the correct answer for him/her and puts a mark in each pair (1 to 7), thereby choosing closer to the right or left word, which indicates a more pronounced sign of interpersonal relationships in the unit, such as "agreement" or "disagreement", "satisfaction", "dissatisfaction", etc. (figure 1).

Figure 1: The interface of Google Forms for learning the quality of the educational process.

The screenshot highlights the study's title, "The Quality of the Educational Process: the Psychological Component", as well as the Method 1 instruction for the respondents to determine the psychological atmosphere in the team.

During the implementation of the second methodology for the diagnosis of psychological atmosphere in a small production group (authors – V. Shpalynskyi, E. Shelest) [8], in the adaptation of O. Bondarchuk), on a 5-point scale, the respondents rate the degree of their favourable climate for the team (goodwill, trusting relationships, joy for success of colleagues, relations with management, adherence to rules in the team, etc.) (figure 2).

Figure 2: The interface of Google Forms for learning the psychological climate (Method 2).

Referring to figure 2 Method 2 "Rate the proposed statements on the 5-point scale by the algorithm" is shown in the previous screenshot:

1. 1 point – strongly disagree;
2. 2 points – disagree;
3. 3 points – hard to say;
4. 4 points – agree;
5. 5 points – completely agree

Based on the respondents' answers, Google Forms allows the team to determine the level of favourable (high, above average, average, below average and unfavourable) psychological climate.

Likewise, the Methods of learning the group cohesion (Sisor Index, adapted by O. Bondarchuk) and the psychological security of the educational environment, allowing determining the level of psychological security in the educational environment (by I. Baeva, modified by O. Bondarchuk [8]), (The Methods 3 and 4 respectively) were applied.

After filling in the Google Form, the respondent must click the button "Submit" (figure 3).

Referring to figure 3, the screenshot shows the option of choosing the answers for the employee's protection "From the unfriendly attitude of the administration" and "How satisfied are you with your life as a whole?". The "Submit" function is visible at the end.

After receiving the answers, we can review them and create a spreadsheet or chart where it is possible to examine the statistics for each question, analyse appropriately, evaluate, etc.

Figure 3: The interface of the "Submit" function.

The results of the answers can be obtained in the form of the linear scale figure 4 or diagrams figure **??**.

The example of the analysis of the answers in the form of the linear scale to the question "Would you go to another unit if this opportunity happened (without changing other conditions)?" and "What are the relationships between the members of your unit?" is given in figure 4.

The results of the study provide the following answers to the questions – "yes, I would strongly like to move", "I do not know, it is hard to say", "would rather move than stay", "see no difference", "most likely would stay into my unit", "would strongly like to stay in my unit".

The analysis of the results enables us to make a deep analysis of the psychological conditions and facilitate the development of recommendations and programs for improving the social and psychological climate in the educational institution.

Thus, in particular, the analysis of the results of the pilot survey of the Yuriy Fedkovych Chernivtsi National University and University of Educational Management teachers, the case of which is given in figure **??**, allows to conclude about the significant problems of the psychological assurance of the quality of education, nevertheless, as it is seen from the figure, just 47.8% of teachers consider the relations in the team as favourable. 25% of the respondents would change jobs. Providing a student-centred approach to the organisation of the educational process in such a situation is quite problematic.

Accordingly, it is urgent to develop special psychological and managerial measures to minimise the negative tendencies revealed in the activity and interaction of teachers in higher education institutions.

To ensure the psychological component of the quality of higher education and its diagnosis,
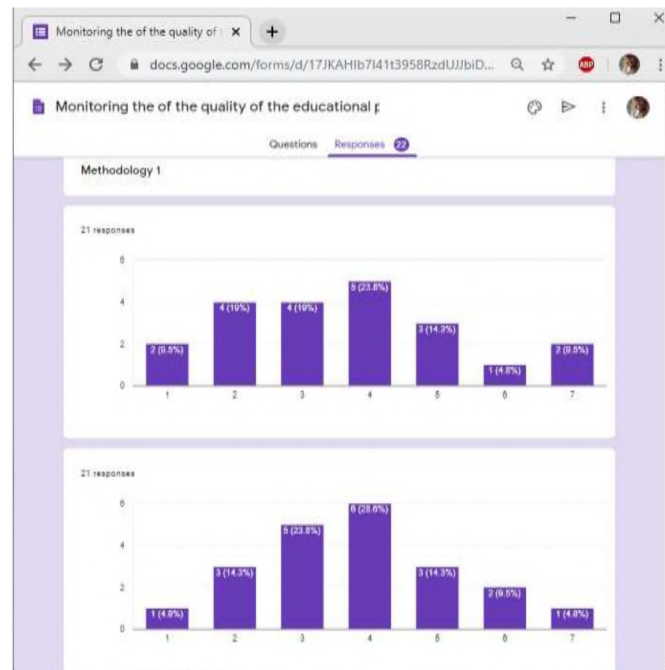
Figure 4: The statistical analysis of the answers to the questions in the form of the linear scale.

the teacher of the Department of Management Psychology of the University of Educational Management V. Kyrichuk developed a computer program "Comprehensive diagnosis of psychosocial development of the Teacher "Personnel – Ψ".

The comprehensive program allows for personality testing to determine psychosocial suitability for work in various fields of science and production, opportunities for professional and personal growth, status and psychological compatibility of team members and more. Using the complex for the study, selection and distribution of specialists in institutions and organisations is practicable.

The program allows to direct testing in different directions (figure 6):

1. "Data" – This section allows entering personal data, editing data on existing staff, and saving and downloading data from a file.
2. "Polls" – The section includes questionnaires and allows to print them, i.e.:

   - personality type;
   - features of interpersonal relationships;
   - features of professional-pedagogical activity;
   - socio-psychological attitudes;
   - personality orientation;
   - motives and motivation of activity;
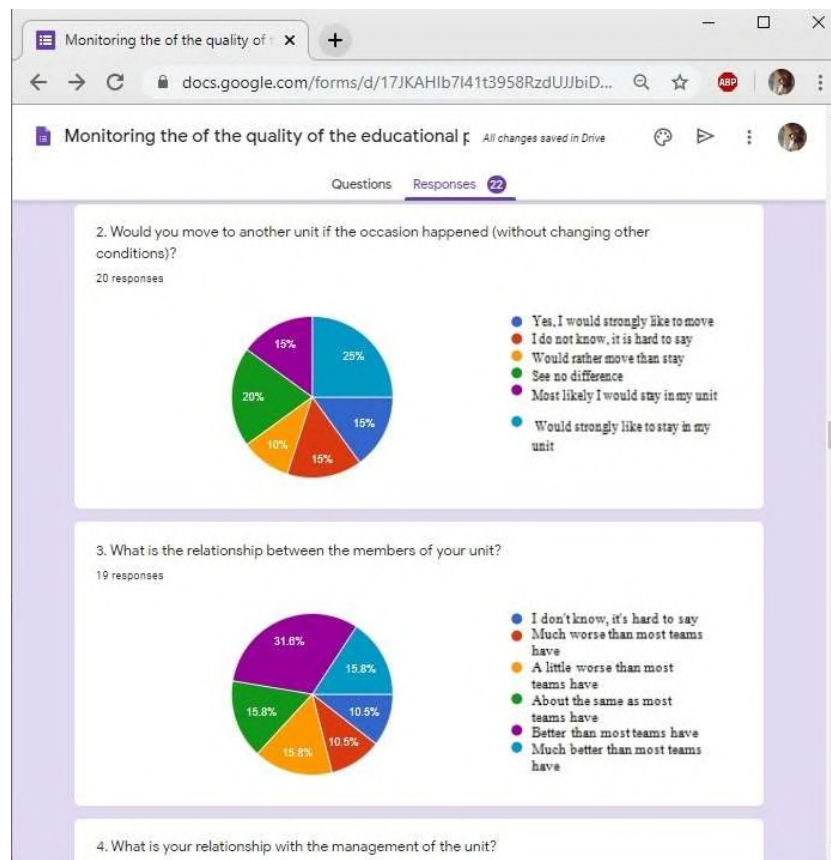   - leadership and leadership styles;
   - teamwork.

Figure 5: The statistical analysis of the answers to the questions in the form of diagrams.

3. "Forms" – The section includes answer sheets and allows printing them.
4. "Testing" – The section allows entering the results of blank testing.
5. "Dialogue" – This section allows testing with questions on the monitor screen.
6. "Characteristics" – The section includes test results, allows view and print text and graphic characteristics of the tested persons
7. "Statistics" – The section includes statistical information for the team and allows select staff to meet various social and psychological criteria for the study.
8. "Conclusions" – The section includes the problems and potentials of one or a group of respondents and the design of an algorithm for solving problems through potentials.
9. "Options" – This section allows configuring the technical parameters of the program.
10. "Help" – The section includes help with the program.

Figure 7 shows an example of a test interface with the input of results into the program's database for processing. Besides, it is possible to view and print statistical data according to the socio-psychological guidelines of the team, which is sorted by social indicators or selected in the section "Selection of persons for statistics".
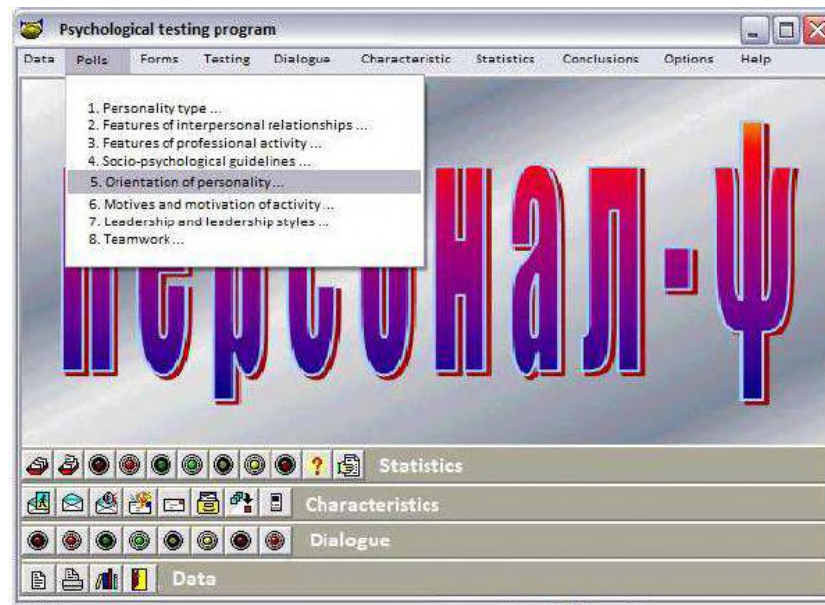
Figure 6: The interface of complex diagnostics of psychosocial development of individual educational worker using a computer program "Personnel – Ψ".
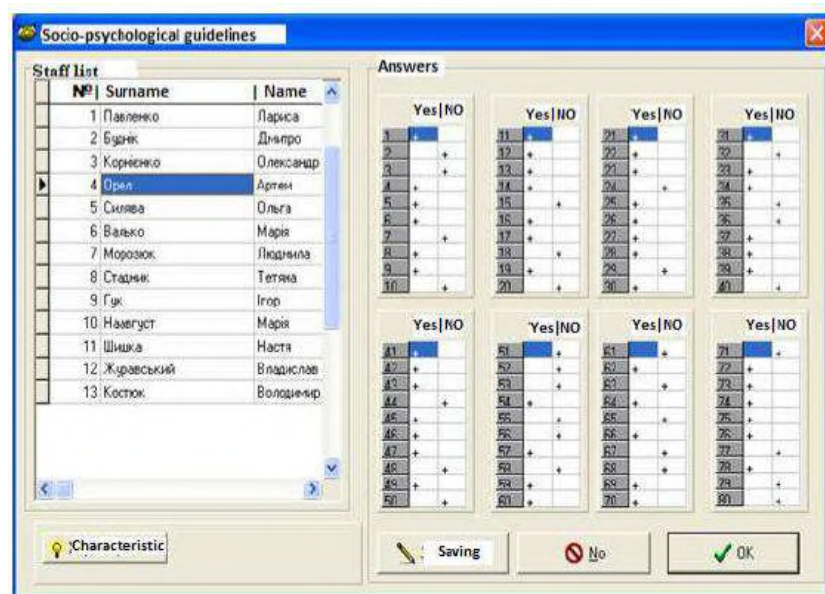

Figure 7: The testing interface for processing the results into the program's database.

The program includes a group of techniques (questionnaires) that allow you to obtain diagnostic information that lets you quantitatively and qualitatively compare the individual (group) with other individuals (groups) according to some psychological and social parameters.

The program allows testing in the form of a simple dialogue with the user: to study the motives and motivations of the individual, professional traits, aspirations and preferences, leisure activities, opportunities to work in a team, etc. (figure 8).
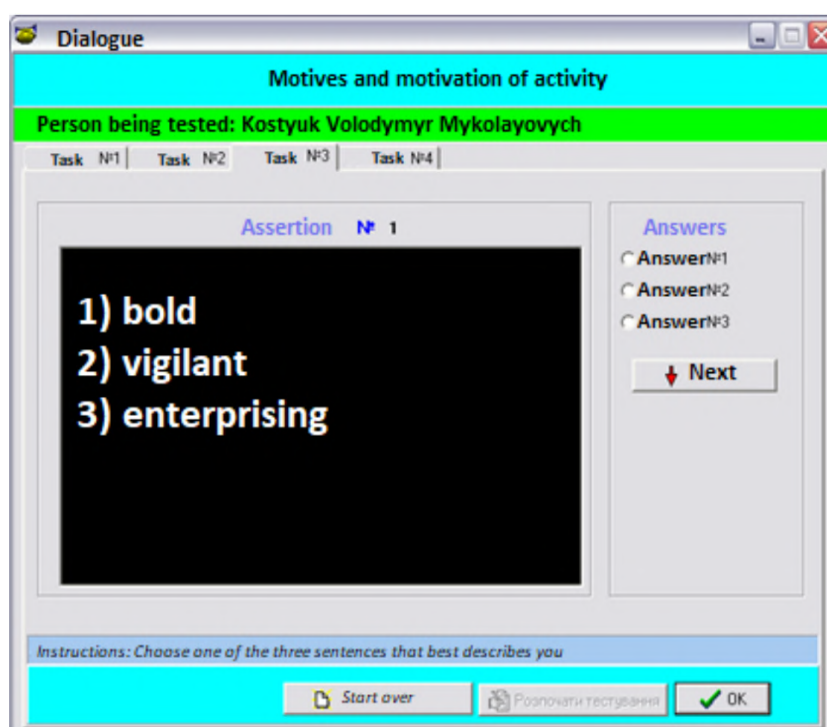

Figure 8: The testing interface is in the form of a simple dialogue with the user.

It is acceptable that the graph on the vertical axis shows the number of people who correspond to one of the motivation levels, and on the horizontal axis, four types of motivation. The table shows the level of motivation for each person separately.

The program generates a personality characteristic based on the results of all passed tests. The characteristic or type of personality describes the vital qualities as a bunch of the most developed abilities; analysis of the possibilities of realisation of qualities in practice. The program also determines the features of the teacher's thinking (theoretical or practical), communication, peculiarities of value, motivational, cognitive spheres, ability to work in a team, leadership qualities, etc (figure 9).

The computer program "Personnel – Ψ" enables us to determine the psychological portrait of the team on the teachers' characteristics in the team of higher education (figure 10).

The psychological portrait takes into account the following indicators:

- personality type (12 types),
- orientation (orientation can be determined as for individual and the team as a whole)
- interpersonal relationships (authoritarianism, moderation, dependence, aggression, ability to cooperate, altruism, etc.),
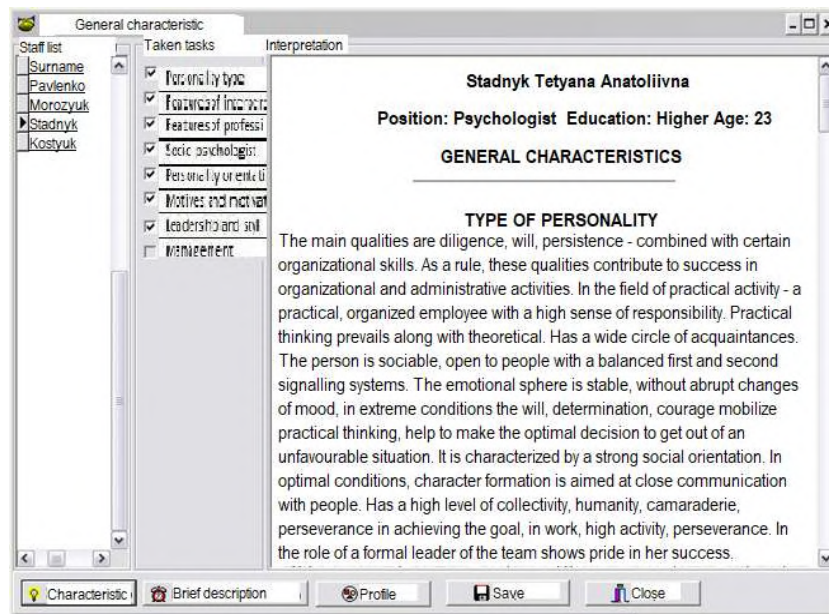
Figure 9: The interface of generating the program characteristics based on the results of all tests passed.

Figure 10: The interface "Psychological portrait of the team" of the computer program "Personnel – Ψ".

- priority values (process, result, altruism, selfishness, work, freedom, power, money),
- teacher as a professional (value priorities, psycho-emotional style, self-esteem, teaching style),
- motivation (aspiration, success, willingness to take risks, avoidance of failures, etc.),
- management style (authoritarian, passive, democratic),
- leadership (leadership, management styles and self-management in the team),
- driving style (levels of truthfulness for each individual and in the team as a whole)

The program saves data about respondents, creating a database. In the section "Statistics," one can search and elect staff according to socio-psychological criteria.

According to the selected parameters, the program formed a portrait of the individual or group of respondents as a whole, which makes it possible to predict and project the rise of business and interpersonal relationships of the individual in the team (figure 11).
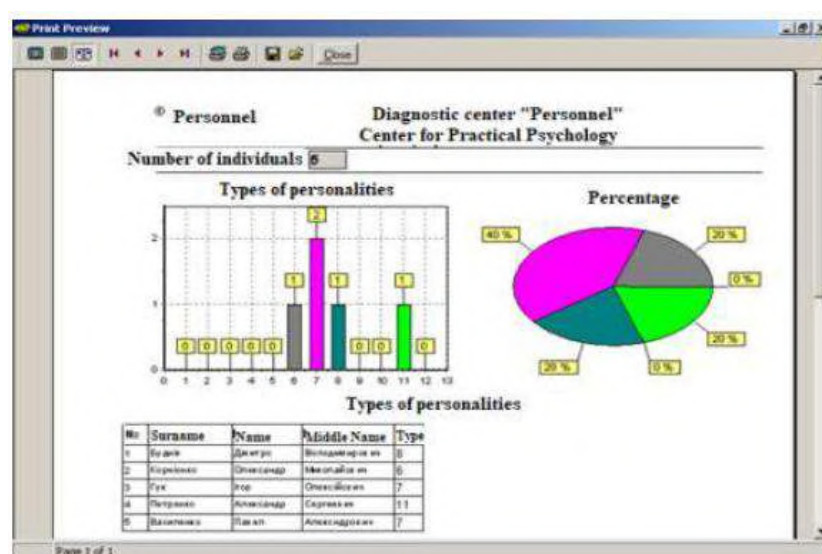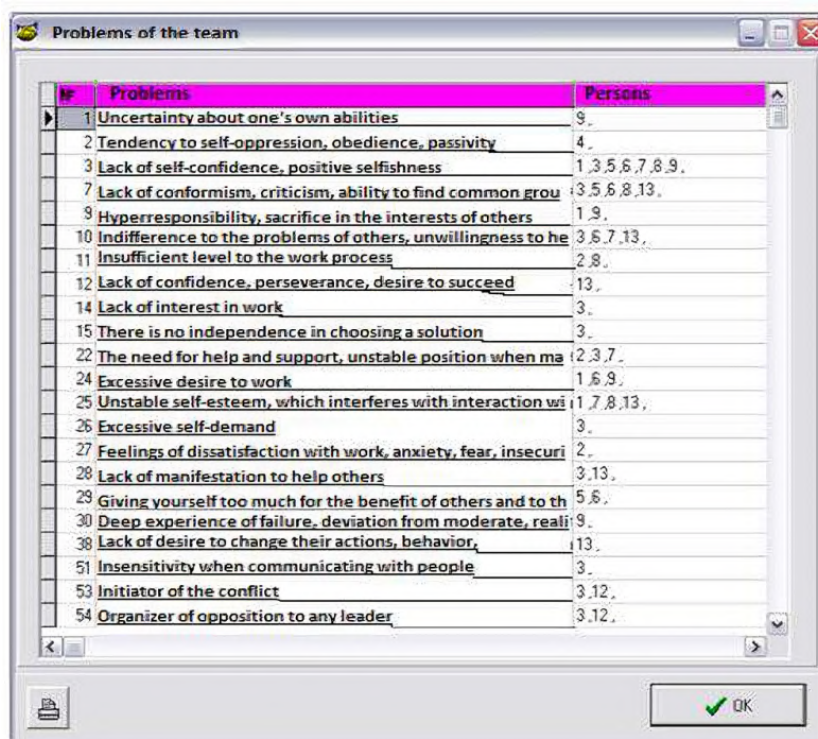

Figure 11: The interface of the "Statistics" section of the computer program "Personnel – Ψ".

Figure 11 shows the graph on the vertical axis, which shows the number of people who correspond to a particular type of orientation, and on the horizontal axis, six orientations. The percentage of types of orientations in the team is also shown. The table shows the focus on each person separately.

The computer program "Personnel – Ψ", according to the test results, offers to review the problems and potential capabilities of the person and the whole team (figure 12, figure 13).

Figure 12 shows that the program analyses the existing problems in the teaching staff, alongside determining the number of people who have another case. The program presents the following: insecurity in their abilities; tendency to self-oppression, obedience, submission to all, passivity; lack of conformism, criticism, ability to find common ground; hyper-responsibility, sacrifice in the interests of others to the detriment of oneself; indifference to the problems of others; insufficient interest in the work process; lack of confidence, perseverance, desire to

Figure 12: The interface of the section "Statistics": "Problems of the team".

succeed; there is no independence in decision-making; the need for help and support; excessive desire to work; unstable self-esteem; excessive self-demand; feelings of dissatisfaction with work, anxiety, fear, insecurity; lack of manifestation to help others; too much self-sacrifice for the benefit of others and to the detriment of oneself; deep experience of failure, deviation from a moderate, realistic lifestyle; insensitivity when communicating with people; initiator of the conflict, organiser of opposition to any leader, etc.

In addition, the program allows you to determine the potential of the teacher and the entire teaching staff of the educational institution (figure 13): the ability to organise the work of the group, the tendency to leadership; loyalty to others; self-confidence, independence to have one's own opinion; conformism in adapting adequately to the situation; desire for cooperation, tendency to compromise; attention to the concerns of others, emotionality, desire to support others; the process of work captures on a par with the end result; confidence, persistence in achieving the result; the presence of positive selfishness for the benefit of oneself and others; persistent desire to work; the ability to independently choose a decision or action; purposefulness, the presence of strong-willed qualities; a sense of the reality of receiving and spending money; a positive psycho-emotional state increases work efficiency; property of positive self-education; adequate assessment of success in activities and status in the team; confidence in situations of achieving real goals; realism in choosing goals in order to achieve success; high risk appetite; close acceptance of students' interests and problems; high degree of

Figure 13: The interface of the section "Statistics": "Potential opportunities".

acceptance of oneself and others, good psycho-emotional state; lack of supremacy, authoritarian tendencies, etc.

After testing, it is possible to view and print the results; also, the computer program "Personnel – Ψ" offers socio-psychological guidelines for both the individual and the team of teachers (figure 14).

Thus, monitoring the quality of the psychological component of educational activities in higher education institutions using the computer program "Personnel – Ψ" showed the feasibility and effectiveness of its use.

The program allows not only the exploration of the psychosocial development of teachers but also identifies problems, offers socio-psychological guidelines, takes into account the potential of the individual (of the team), and improves the quality of education and educational activities in higher education.

2.4. Appraisal of ICT as a tool for monitoring the quality of education

In modern conditions, the importance of lifelong learning is growing, which gives impetus to the development of new models, ICT, which contribute to the emergence of new learning approaches and forms and methods of interaction [3].

ICT is not only a tool for learning that allows solving real problems of the educational process, using simulation systems to analyse situations [20], but also provides an enabling environment that helps teachers and students create a climate of collaborative knowledge building, thereby changing their traditional roles [9] and forming a new understanding the process of teaching,
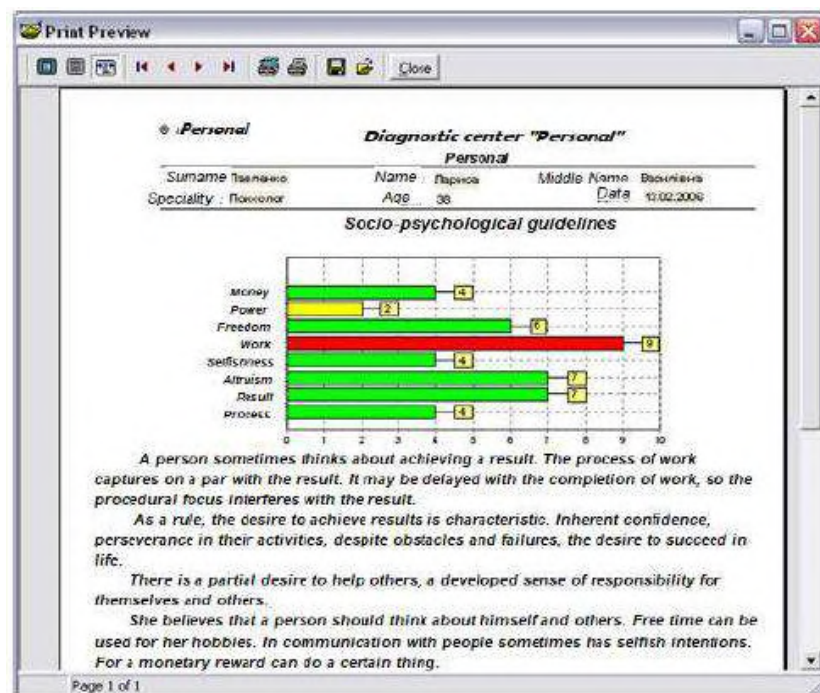
Figure 14: The interface of the program section "Personnel – Ψ" "Socio-psychological guidance".

learning, developing methods to transform these new views into educational practice [16].

Among the advantages of using ICT, in particular for monitoring the psychological component of the quality of education in higher education institutions, scientists [11, 22, 31] identify:

- increase the efficiency of activities due to (due to) the speed of data processing and the ability to cover a large amount of research (scale) in a short time by simultaneously testing many respondents;
- the ability to focus on solving exclusively professional problems;
- clarity, reliability and validity of research and exclusion of data processing errors that can be made by manual calculation of the original data;
- standardisation of diagnostic conditions due to the same instructions for all respondents;
- the possibility of both presentation and re-examination of the survey results separately by each respondent and all together;
- the ability to be more precise and more open to respondents during testing due to the confidentiality and automation of testing;
- opportunity to enrich the experience of teachers with the help of a computer, interpretation of test results;
- the ability to collect statistical data of the respondent (team) and store test results for a long time;
- re-diagnose, analyse and compare data.

Oleg Kokun substantiated the theoretical, methodological, and practical principles of developing diagnostic website design for the practical implementation of the computer for professional psychological personality diagnosis (on the Internet). Researchers claim that adherence to the principles they define guarantees attracting visitors and maintaining a certain level of confidence and interest; ensuring anonymity, clarity, convenience and ease of use; high information value, content and scientific nature of websites; differentiation of respondents and assistance in obtaining feedback. Oleg Kokun has developed websites for professional psychological diagnostics, which have been implemented and tested in practice (http://prof-diagnost.org, http://hr-test.org).

The sites have different orientations and contribute to the solution of various research tasks: psychophysiological support of becoming a specialist by the type of professions "person-person"; study of psychophysiological patterns of professional self-realisation of the individual; adaptation of the scale of psychodiagnostic methods, occupational stress and the scale of occupational disability, etc.

Monitoring the quality of education with Google Forms enables swift feedback from the participants of the educational process on the quality and outcomes of the educational activity. This is evidenced, in particular, by the validation of the Google Forms created in the pilot study, which confirmed the efficiency in obtaining information and analysing the quality and percentage values in graphical and numerical format, reaching many participants in a short time.

It is noteworthy that the data from a Google Forms spreadsheet is easily imported into other spreadsheets (including SPSS) with the aim of in-depth processing of results using factor, cluster or regression procedures and other kinds of statistical analysis.

Based on the evaluation of the monitoring results of the quality of education, a set of corrective and developmental measures is determined in accordance with the conceptual goals and objectives of the functioning and transformation of the educational system presently [15].

Consequently, the usage of Google services, Google Forms notably, contributes to the improvement of the internal system of ensuring the monitoring of the quality of education, the development of science-based recommendations for the further improvement of the quality of education in higher education institutions with the psychological component, and the improvement the competitiveness and attractiveness of educational institutions regarding the analysis of their resources.

The documents and spreadsheets created by using Google services are stored on Google servers (or can be saved to a file) [25], which is one of the critical benefits of the program since access to the given data may be entered from any computer or mobile phone connected to the Internet.

Furthermore, the obtained resources can be used to adjust the management system in the educational institutions, managing goals, vision, mission, and the educational environment [43], as well as to increase motivation and efficiency [29], to train a person to learn and apply modern international relations.

3. Conclusions

This study examined information and communication technologies as tools to monitor the psychological component of quality in higher education. ICT encompasses various technological resources like Google services, diagnostic websites, and psychological testing programs used to ensure communication, quality implementation, competency building, and data management.

Google Forms enables the creation of online questionnaires for rapid participant feedback on educational quality and outcomes. The results demonstrated the efficiency of Google Forms in collecting information, analysing values in graphs/charts, and reaching many respondents quickly. The data integrates easily into other platforms for further statistical analysis.

Monitoring results helps determine corrective and developmental actions aligned with education systems' conceptual goals and transformation. Hence, ICT tools like Google Forms can improve regular assessment of quality indicators and provide evidence to enhance the educational environment.

The computer program "Personnel – Ψ" allows comprehensive psychological diagnostics of teachers, identifying problems and potentials and offering guidelines to improve individual and collective quality. The program generates personality profiles, motivation and orientation analysis, relationship mapping, and team dynamics – creating a database to predict performance.

Key advantages of ICT tools include efficiency due to automated data processing, standardised conditions, confidentiality, enriching experiences via interpretation, statistical capabilities, re-diagnosis and data comparisons. They focus solutions on professional issues and exclude manual errors.

Overall, user-friendly ICT tools facilitate monitoring psychological factors to help institutions ensure participant satisfaction and optimal growth conditions. Further research can develop a robust toolkit for holistic, real-time monitoring of all educational quality parameters through Google services. This will bolster the competitiveness and appeal of institutions by enabling data-driven management and forecasting.

References

[1] Asatiani, D.N., 2018. Dvadtcat let Vsemirnoi deklaratcii IuNESKO o vysshem obrazovanii dlia XX veka. *IX Mezhdunarodnaia nauchno-prakticheskaia konferentciia "Uchitel, uchenik, uchebnik", MGU imeni M.V. Lomonosova, fakultet inostrannykh iazykov i regionovedeniia, Rossiia, 18-19 oktiabria 2018.* pp.19–21. Available from: https://elibrary.ru/item.asp?id=38140471.

[2] Babalola, J.B., 2004. Quality assurance and child-friendly strategies for improving public school effectiveness and teacher performance in a democratic Nigeria. *Management of Primary and Secondary Education in Nigeria.* Ibadan: NAEAP Publications, pp.303–312.

[3] Balacheff, N., 1993. Artificial Intelligence and Real Teaching. In: C. Keitel and K. Ruthven, eds. *Learning from Computers: Mathematics Education and Technology.* Berlin, Heidelberg: Springer, pp.131–158.

[4] Balakhtar, K., 2019. Professional tolerance as a component of foreign language lecturers'

readiness to creative professional work at universities. *Psychological Journal*, 5(12), pp.9–20. Available from: https://doi.org/10.31108/1.2019.5.12.1.

[5] Balakhtar, V.V., 2018. Influence of information and communication technologies for forming professional personal competence of social work specialist. *Information Technologies and Learning Tools*, 66(4), pp.93–104. Available from: https://doi.org/10.33407/itlt.v66i4.2066.

[6] Bazhenov, R., Bazhenova, N., Khilchenko, L. and Romanova, M., 2015. Components of Education Quality Monitoring: Problems and Prospects. *Procedia - Social and Behavioral Sciences*, 214, pp.103–111. Available from: https://doi.org/10.1016/j.sbspro.2015.11.600.

[7] Bondarchuk, O., 2017. Subjective well-being of university teachers as a psychological factor of quality of higher education. In: V. Oliynyk, ed. *Management of higher education quality: problems and prospects*. pp.86–89. Available from: http://web.archive.org/web/20201231232221/https://www.files.gisap.eu/sites/files/digest/special_collection5.indd.site.pdf.

[8] Bondarchuk, O., 2018. Psychological safety of the educational environment in secondary schools as a factor of innovative activities motivation for the Ukrainian teachers. *Studia Universitatis Moldaviae. Seria "Ştiinţe ale educaţiei"*, (9 (119)), pp.216–220. Available from: http://web.archive.org/web/20201230063908/http://ojs.studiamsu.eu/index.php/education/article/view/1208.

[9] Bottino, R.M., Chiappini, G., Forcheri, P., Lemut, E. and Molfino, M.T., 1999. Activity theory: A framework for design and reporting on research projects based on ICT. *Education and Information Technologies*, 4(3), pp.279–293. Available from: https://doi.org/10.1023/A:1009692126355.

[10] Burlachuk, L.F., 2008. *Psykhodyahnostyka*. 2nd ed. Piter.

[11] Bykov, V.Y., Kuchanskyi, O.Y., Biloshchytskyi, A.O., Andrashko, Y.V., Dikhtiarenko, O.V. and Budnik, S.V., 2019. Development of information technology for complex evaluation of higher education institutions. *Information Technologies and Learning Tools*, 73(5), pp.293–306. Available from: https://doi.org/10.33407/itlt.v73i5.3397.

[12] Büyükbaykal, C.I., 2015. Communication Technologies and Education in the Information Age. *Procedia - Social and Behavioral Sciences*, 174, pp.636–640. Available from: https://doi.org/10.1016/j.sbspro.2015.01.594.

[13] Chorna, O.V., 2020. Monitoring of quality of higher education in Ukraine and Germany: comparative aspect. *Educational Dimension*, 2, p.213–225. Available from: https://doi.org/10.31812/educdim.v54i2.3869.

[14] Chornyi, O.P., Herasymenko, L.V. and Busher, V.V., 2021. The learning process simulation based on differential equations of fractional orders. *CTE Workshop Proceedings*, 8, p.473–483. Available from: https://doi.org/10.55056/cte.301.

[15] Fetiskin, N.P., Kozlov, V.V. and Manuylov, G.M., 2002. *Sotsialno-psikhologicheskaya diagnostika razvitiya lichnosti i malykh grupp [Socio-psychological diagnosis of personality development and small groups]*. Moscow: Izd-vo Instituta Psikhoterapii.

[16] Forcheri, P. and Molfino, M.T., 2000. ICT as a tool for learning to learn. In: D.M. Watson and T. Downes, eds. *Communications and Networking in Education: Learning in a Networked Society*. Boston, MA: Springer US, pp.175–184. Available from: https://doi.org/10.1007/978-0-387-35499-6_16.

[17] Glasser, W., 1990. *The quality school: Managing students without coercion*. New York:

Harper and Row Publishers.

[18] Gül, E., Çokluk, Ö. and Gül, Ç.D., 2015. Development of an Attitudes Scale toward Online Assessment. *Procedia - Social and Behavioral Sciences*, 174, pp.529–536. Available from: https://doi.org/10.1016/j.sbspro.2015.01.699.

[19] Haddad, W.D. and Demsky, T., 1995. *Education Policy-Planning Process: An Applied Framework, Fundamentals of Educational Planning*, vol. 51. Paris: UNESCO: International Institute for Educational Planning. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000100994/PDF/100994eng.pdf.multi.

[20] Hampel, T., Ferber, F. and Müller, W.H., 1998. mechANImateach - A New Approach to the Teaching of Mechanics. In: G.B. Davis, ed. *Teleteaching '98 - Distance Learning, Training and Education, IFIP World Computer Congress 1998*. Austrian Computer Society, *books@ocg.at*, vol. 120, pp.393–402.

[21] Hope, J. and Hope, T., 1997. *Competing in the third wave: the ten key management issues of the information age*. Boston: Harvard Business School Press.

[22] Hänsgen, K.D. and Perrez, M., 2001. Computer-based psychodiagnostics in family and education - concepts and perspectives. *Psychologie in Erziehung und Unterricht*, 48(3), pp.161–178.

[23] Incheon Declaration: Education 2030: Towards Inclusive and Equitable Quality Education and Lifelong Learning for All, 2015. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000233813.

[24] Kartashova, L.A., Gurzhii, A.M., Zaichuk, V.O. and Sorochan, T.M., 2023. Digital twin technology for blended learning in educational institutions during COVID-19 pandemic. *CTE Workshop Proceedings*. Available from: https://doi.org/10.55056/cte.666.

[25] Kondratenko, Y.P., Simon, D. and Atamanyuk, I.P., 2016. University Curricula Modification Based on Advancements in Information and Communication Technologies. In: V. Ermolayev, A. Spivakovsky, M.S. Nikitchenko, A. Ginige, H.C. Mayr, D. Plexousakis, G. Zholtkevych, O. Burov, V.S. Kharchenko and V. Kobets, eds. *Proceedings of the 12th International Conference on ICT in Education, Research and Industrial Applications. Integration, Harmonization and Knowledge Transfer, Kyiv, Ukraine, June 21-24, 2016*. CEUR-WS.org, *CEUR Workshop Proceedings*, vol. 1614, pp.184–199. Available from: http://ceur-ws.org/Vol-1614/paper_18.pdf.

[26] Kremen, V.G. and Bykov, V.Y., 2013. Categories of space and environment: features model representation and educational application. *Theory and practice of management social systems: philosophy, psychology, pedagogy, sociology*, (3), pp.3–16.

[27] Kukharenko, V.N., Shunevych, B.I. and Kravtsov, H.M., 2023. Distance learning expert and leader. *Educational Dimension*, 8, p.19–40. Available from: https://doi.org/10.31812/ed.597.

[28] Law of Ukraine "On Higher Education", 2015. Available from: https://zakon.rada.gov.ua/laws/show/1556-18.

[29] Lukina, T.O., 2007. Monitorynh yak mekhanizm informatsiynoho zabezpechennya upravlinnya yakosti osvity. *Testuvannya i monitorynh*, (12), pp.16–20.

[30] Madani, R.A., 2019. Analysis of Educational Quality, a Goal of Education for All Policy. *Higher Education Studies*, 9(1), pp.100–109. Available from: https://doi.org/10.5539/hes.v9n1p100.

[31] Maksymenko, S.D. and Kokun, O.M., 2019. Principles of website design for professional

psychological diagnosis in different specialties. *Information Technologies and Learning Tools*, 73(5), pp.284–292. Available from: https://doi.org/10.33407/itlt.v73i5.2963.

[32] Masuda, Y., 1990. *Managing in the information society*. Blackwell Publishers, Inc.

[33] Mills, C.N., Potenza, M.T., Fremer, J.J. and Ward, W.C., 2005. *Computer-based testing: Building the foundation for future assessments*. Routledge.

[34] Oliynyk, V.V., Gushchyna, N.I., Kondratova, L.H. and Kasian, S.P., 2023. Developing digital competence of teachers in postgraduate education using Google Workspace for Education. *CTE Workshop Proceedings*. Available from: https://doi.org/10.55056/cte.662.

[35] Pellegrino, J.W., Hunt, E.B., Abate, R. and Farr, S., 1987. A computer-based test battery for the assessment of static and dynamic spatial reasoning abilities. *Behavior Research Methods, Instruments, & Computers*, 19(2), pp.231–236. Available from: https://doi.org/10.3758/BF03203790.

[36] Rome Ministerial Communiqué, 2020. Available from: https://www.ehea.info/Upload/Rome_Ministerial_Communique.pdf.

[37] Russell, M., Goldberg, A. and O'Connor, K., 2003. Computer-based Testing and Validity: a look back into the future. *Assessment in Education: Principles, Policy & Practice*, 10(3), pp.279–293. Available from: https://doi.org/10.1080/0969594032000148145.

[38] Saukh, P., 2020. Strategic vision of a new model of higher education: Movement to create world-class universities. *Herald of the National Academy of Educational Sciences of Ukraine*, 2(2). Available from: https://doi.org/10.37472/2707-305X-2020-2-2-13-7.

[39] Sergienko, V. and Sorokina, N., 2013. Theoretical and methodological basis of monitoring quality of higher education. *Zbirnyk naukovykh prats kamianets-podilskoho natsionalnoho universytetu imeni ivana ohiienka. seriia pedahohichna*, 19, pp.119–124. Available from: http://ped-series.kpnu.edu.ua/article/view/31606.

[40] Shamova, T.I., Tretyakov, P.I. and Kapustyn, N.P., 2002. *Upravleniye obrazovatelnymi sistemami*. Vlados.

[41] Shishov, S.Y. and Kalney, V.A., 2000. *Shkola: monitoring kachestva obrazovaniya*. Pedagogicheskoye obshchestvo Rossii.

[42] Spirin, O.M. and Vakaliuk, T.A., 2019. Formation of information and communication competence of bachelors of informatics on the use of cloud-oriented learning environment. *Information Technologies and Learning Tools*, 72(4), pp.226–245. Available from: https://doi.org/10.33407/itlt.v72i4.3262.

[43] Sranamkam, T., 2014. The Effects of Web-Based Instruction in Physics Entitle Momentum Using Collaborative Learning by Google Application to Enhance Problem Solving Skills for Grade XI Students. Available from: https://doi.org/10.2139/ssrn.2474698.

[44] Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), 2015. Available from: https://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf.

[45] Tkachuk, V.V., Yechkalo, Y.V., Semerikov, S.O., Khotskina, S.M., Markova, O.M. and Taraduda, A.S., 2022. Distance learning during COVID-19 pandemic: mobile information and communications technology overview. *Educational Dimension*, 7, p.282–291. Available from: https://doi.org/10.31812/educdim.7612.

[46] Tymoshko, A., Dubinina, O., Kravchynska, T., Burlaienko, T. and Sholokh, E., 2020. Information support for quality management of education in general educational in-

stitutions of Ukraine. *Educational Dimension*, 3, p.285–302. Available from: https://doi.org/10.31812/educdim.v55i0.3949.

[47] UNESCO and EFA Global Monitoring Report Team, 2004. *EFA Global Monitoring Report 2005: Education for All – The Quality Imperative.* Paris: UNESCO Publishing. Available from: https://www.right-to-education.org/sites/right-to-education.org/files/resource-attachments/EFA_GMR_Quality_Imperative_2005_en.pdf.

[48] Vasyliuk, A.V., Yakovets, N.I., Dei, M.O., Titko, E., Voloshchenko-Vislobokova, O., Kyrychenko, M.O., Otych, O.M., Otamas, I.H., Muliar, H., Lukina, T.O., Bazeliuk, V.H., Nikolaienko, S. and Vitchenko, A., 2019. *Yakist vyshchoyi osvity: teoriya i praktyka [The quality of higher education: theory and practice].* Kyiv, Nizhyn: Lysenko M.M.

[49] Welzant, H., Schindler, L., Puls-Elvidge, S. and Crawford, L., 2015. Definitions of quality in higher education: A synthesis of the literature. *Higher Learning Research Communications*, 5(3), pp.3–13. Available from: https://doi.org/10.18870/hlrc.v5i3.244.

[50] Wen, M.L. and Tsai, C.C., 2006. University Students' Perceptions of and Attitudes Toward (Online) Peer Assessment. *Higher Education*, 51(1), pp.27–44. Available from: https://doi.org/10.1007/s10734-004-6375-8.

[51] Zakharchenko, V.M., Kalashnikova, S.A., Luhovyy, V.I., Stavytska, A.V., Rashkevych, Y.M. and Talanova, Z.V., 2014. Natsionalnyy osvitniy hlosariy: Vyshcha osvita.