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Information support for quality management of education in general educational institutions of Ukraine

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Abstract. The article presents the research findings received throughout the study in the general secondary educational institutions in Ukraine. The processes of creation, receipt, processing and submission of information to the end consumer are substantiated and practically verified, namely, the system of information quality assurance of education quality management in the general educational institution is methodologically substantiated. Questionnaires were developed and conducted for GEI executives and administrative and management staff who are the part of the methodology for studying the state of the informational support for the quality management of education at GEI. It is established that not only the knowledge of the external information content, which is necessary for the implementation of the cycle of the educational quality management in the educational institution, but also the sources of its receipt and creation of great importance for the heads of the general educational institutions.

Keywords: management, information support, quality of education.

1 Introduction

The entry of the world community into the era of globalization and digitization of society, the advance information resources development and management systems, the updating of information technologies require the constant development of educational and management modernization.

The accumulation of unstructured information, its overload in educational institutions, led to the emergence of spontaneous information flows and resources, positioned the urgent need for competent management of the information support process, as one of the effective vectors for improving the quality of educational services, which is decisive and confirms the relevance of our research.

Under such circumstances, it is necessary to analyze, systematize and summarize the scientific and practical results obtained on the problem of educational quality management in the institution of general educational institution (GEI) through the prism of the usage of information technologies.

A wide interdisciplinary range of concepts and phenomena within our research: “quality of education as a pedagogical category and management object”, “theoretical and methodological foundations of educational quality management”, “development of methodologies of diagnosis of educational quality monitoring”, “management of the educational activity quality”, “monitoring of the quality of all educational levels and its scientific and methodological support”, “quality of pedagogical and administrative activity”, “resourcing of quality education”, “professional readiness of the GEI heads for the educational quality management”, “informational competence of management team in the SEI” made it necessary to study and analyze a lot of works of such scientists as M. Albert, M. Barad, M. Weber, J. Juran, M. Mescon, S. Parkinson, A. Fayol, F. Taylor, M. Hedouri and others.

The aforementioned scientific works reveal the essence and features of product quality control, characterized by the components of effective management, which in turn provides a high predicted result.

The profound social and economic shifts that have taken place in Ukraine have prompted a revision of management studies, an appeal to the global experience of countries that exist in market conditions, and a tremendous amount of management experience. The results of pedagogical researches of many scientists testify that under modern conditions of managing of educational institutions becomes a professional activity. Its content goes beyond the pedagogical knowledge, it requires mastery of pedagogical management, interdisciplinary knowledge and skills [1].

The components of the system of information support in educational institutions (EI) and the readiness of the heads of the EI for quality management of this process are investigated in the scientific achievements of domestic scientists (G. Yelnikova, O. Liashenko, V. Oliynyk, Z. Riabova, L. Kalinina, L. Zabrodska).

The analysis of the scientific literature has allowed us to establish that the majority of research on the problem of organization of educational ensuring quality in the GEI was carried out in pedagogy from the standpoint of school studies and educational management (N. Bibik, I. Bulakh, N. Guba, N. Kent, V. Maslov, V. Panasiuk, T. Neville Postlethwaite, O. Savchenko, N. Selezniova, I. Dzehelenok, O. Subetto, et al.).

V. Bepalko, E. Borovska, V. Popov, P. Golubkov et al. studied the issues of organization of monitoring of the quality of the GEI at different levels.

Various aspects of the usage of pedagogical monitoring results were explored by V. Gorb, L. Zazorina, and E. Pliusnina; problems of the usage of informational systems and technologies in the organization of monitoring of the educational quality were analyzed by V. Bykov, I. Dzehelonok, L. Kalinina, V. Luniachek et al.

The purpose of the article is to provide a scientific substantiation and practical verification of the information support system of educational quality management in the GEI.

2 Research methodology

The pedagogical research under consideration has been carried out as part of the research work “Economic, social and informational mechanisms of formation and improvement of the project management system” (RK 0119U000543) to be conducted in 2019–2021 by the Department of Public Administration and Project Management of the Educational and Scientific Institute of Management and Psychology of the University of Education Management of the National Academy of Educational Sciences of Ukraine. At the same time, the research under consideration has been carried as part of the scientific-practical study “Development of the information-analytical competence of the teacher in the conditions of transformational changes of society”, headed by O. Dubinina, PhD (copyright certificate № 93490 of 10/28/2019).

In the course of the research, a number of methods were used. It correspond to the purpose of the research, namely: theoretical (analysis of scientific and pedagogical and methodological literature; analysis, synthesis, systematization of the content, forms and methods of organizing work with teaching staff of the GEI, generalization of the research results to determine modern approaches to information support for the educational quality management of the GEI; empirical methods (generalization of pedagogical experience, testing, observation, interviewing, questioning, discussing; observing the activities of the teaching staff of the GEI, questioning of

teachers, heads; modeling of different situations, methodological measures to substantiate the state of educational quality management of the GEI of Kyiv using ICT); experimental methods (pedagogical experiment, processing of research results in order to systematize research results and substantiation of modern approaches to information support in the educational quality management in the SEI).

3 Results and discussion

The educational reform in Ukraine greatly alters its purpose and principles for transforming the quality of educational services. Modern approaches to the development of education in Ukraine require a change in the strategy and tactics of managing a general educational institution, it means the creation of a new school management system based on the following basic components: a new content of education based on the formation of the life competencies of the educational recipients necessary for successful self-realization in society; partnership between student, teacher and parents; the teacher motivation of those who has the freedom to be creative and professionally developed; orientation to the needs of the student in the educational process, child-centrism; the over-arching process of education and development, which shapes the student universal values.

According to the world experience, education is a priority policy of any country. Our country proceeds from the fact that education is a strategic resource of socio and economic, cultural and spiritual development of society, improving the well-being of people, securing national interests, strengthening the international authority and image of our state, creating the conditions for self-realization of each individual. The National Strategy for the Development of National Education defines the main directions, priorities, tasks and mechanisms of implementation of state education policy, staff and social policy and forms the basis for amending the current legislation of Ukraine, management and financing, structure and content of the educational system.

The current tendencies of educational reform have led to the emergence of a new managerial philosophy based on a motivational and systematic approach and a personally oriented goal of its implementation. Researchers understand the purposeful activity of all subjects, which ensures the formation, stabilization, optimal functioning and obligatory development of the educational institution. The quality of management of the teaching staff is determined by the purpose of education: the formation of a free, democratic, creative, competent, competitive personality.

The head of the NUS should be aware of the role of responsibility for the archival task of organizing the educational process in the school; to self-assess the ability to fulfill this role; to position motivation for implementation of the New Ukrainian School Concept among all participants of the educational process. Effectiveness and effectiveness of management activities depend on the successful implementation of each factor, which means improving the quality of school education [2].

The quality of education is driven by the need for dramatic changes aimed at improving the competitiveness of educational recipients through innovative management activities.

An important direction of the educational management modernization, defined by the National Doctrine of Educational Development of Ukraine in the 21st Century, is the transition from operational to programmatic and targeted managing of educational institutions, which is provided with professional scientific and methodological support for the implementation of administrative decisions [3]. With this approach, the problem of scientific substantiation of theoretical and methodological provisions of program-target management of educational institution and determination of necessary conditions for their implementation in practical activity are going to be extremely important.

The National Doctrine of Educational Development became one of the main documents that defined the strategic directions of reforming and development of the Ukrainian educational sector. Section IX “Information Technologies in Education” states that “The priority of the development of education is the introduction of modern ICTs, which provide for further improvement of the educational process, accessibility and effectiveness of education, preparation of the young generation for life in the informational society” [3].

V. Kremin notes in his scientific works that “... our time requires rethinking and defining our own worldview. And also making certain adjustments to the objectives, objectives and content of the educational process” [4].

According to L. Grinevich “Children must acquire the skills and competences of the 21st century, which are agreed upon by the countries of the European Union and which are needed today by the modern Ukrainian. In addition to knowledge of the mother tongue, foreign languages, information technology, the ability to think critically, to analyze, to work in a team, financial literacy skills, our children need “education for life”. And this is the main objective of the new Ukrainian school” [5]. This leads to fundamentally new requirements for the teacher, the head

of the GEI, because their professional qualities, level of their educational and general culture, ability to creative activity depends on the formation of socially active personality and creation of favorable conditions for the development of students' creative abilities. Only a competent educator who skillfully exploits the latest educational tools that can level out the gaps in the educational process on its own, which is a partner for the student in the development of innovative informational technology training, able to educate a competitive graduate of the New Ukrainian School.

Creating an "optimal" information environment is a key task in the transition to the information society. The widespread adoption of ICT in the educational sector poses the problem of computerization of GEI in priority. The development and implementation of ICT are aimed at their comprehensive information, resource and methodological support [6].

In the modern historical era, computerization of the educational process is regarded as one of the most promising ways of improving the quality of education. This issue is given considerable attention both at the level of educational authorities and at the level of educational institutions. However, computerization of the educational process in educational institutions is a complex problem that requires lengthy focused work and constant attention.

The usage of computer programs and electronic educational tools significantly improve the quality of education. Instead, there are some barriers for the ICT usage in the governance and educational process of the GEI: insufficient logistical and scientific and methodological support for the educational institution; insufficiently developed methods of the ICT usage in the educational process; insufficient training of executive and teaching staff to use ICT in the educational process.

The First Vice-President of the National Academy of Educational Sciences of Ukraine, V. Lugovyi, emphasized that "... it is necessary to solve urgent tasks in the direction of educational informatization, namely: to complete the technical equipment of educational institutions, offices, laboratories, libraries with computer systems; substantially update the content, pedagogical technologies, methodological support of ICT-based learning and teaching; implement the latest ICT training systems; to shape the information and communication culture of educators and society as a whole" [7].

Thus, solving the problem of managing the information security of the GEI through the usage of ICT requires the implementation of a systematic approach to informatization of the educational process in general educational institutions and provides:

- the development of the concept of informatization of school activity;

- the definition of strategic goal, specification of tasks, principles of school informatization;
- the creation, development and usage of telecommunication computer networks providing communications and information services;
- the relationship with other aspects of educational policy;
- taking into account the amount of economic costs for informatization;
- the formation and development of the information infrastructure of the institution.

Implementation of educational development program, development of educational informatization ideas, including creation of electronic educational tools for general and vocational education, training and retraining of teaching staff in the ICT sector, creation of a system of education online-portals, creation of an integrated automated information system of the education sector for solving problems of management of educational institutions and industry [8].

We are convinced that the information technology will improve the efficiency of managing of the GEI. At the same time, information support for the management of the educational process in the school is based on information that has social, pedagogical, psychological, organizational and managerial contexts. This idea is confirmed in the research of L. Kalinina and allows to enable the informatization of the planning of the educational institution and to implement it [9].

In our opinion, only timely and reliable information on the course of the educational process in the GEI can be the basis for making management decisions that are predicted to improve the quality of school education.

Such information can be obtained using appropriate procedures and systems of data collection and processing, which are the basis of the educational process monitoring at the educational institution level.

Domestic researcher B. Zhebrovskyi conducted the research, in which the role of the Head of the GEI on ensuring quality of the educational process was studied, the domestic and foreign experience of management activity of the director was analyzed regarding his professional readiness to provide quality school education; a system model for forming the future school director's professional readiness to manage the quality of education has been developed and theoretically substantiated [10].

This approach allows us to predict a new level of solving the problem of managing the development of the teaching staff using ICT, which we consider from the position of a competent leader in the context of educational transformation.

Management Informatization of the GEI is the creation of the unified information and educational environment, which includes a set of personnel, technical, software, telecommunications and methodological tools that allow the usage of new information technologies in the educational and management processes, the collection, store and processing data of the education system.

The main functions of informatization of the GEI (receiving, fixing, storing and transforming information) allow to provide the appropriate conditions for the implementation of the school informatization program to meet the informational needs of management team, teaching staff and students (potential consumers of educational services).

In the research, L. Zabrodska developed an algorithm for the technology of implementation of an information system for managing the educational process, which included the following steps:

- the analysis of pedagogical feasibility of implementing information management technology;
- the determination of the purpose of functioning;
- the determination of the composition of the functional tasks;
- the development of information and functional model of information system for educational process management;
- the development of information processes;
- the identification of the functional systems that are part of this system;
- the experimental verification;
- the analysis of implementation results;
- the evaluation of the effectiveness of the management information technology implementation;
- development of methodological recommendations for the heads of the GEI on the integration of ICT into the educational process [11].

An important vector for the development of the basic principles of information security management of the GEI using ICT is the creation and development of the information base of the GEI informatization, which envisages the purchase of computers, the development of computer programs, the creation of a corporate network, the connection to the Internet, the equipment of the relevant premises etc.

The head of the school is delegated the authority to solve several management tasks at once. One of these is the development and

implementation of an organizational structure for managing the process of informatization, it means the formation of the educational environment. The educational environment of the GEI has the following components, some of them should be highlighted [12]:

- the target component that defines the objectives of the institutional functioning and development;
- the managerial component that constitutes the organizational structures for managing the educational institution;
- the pedagogical systems that include the methods and means by which learners acquire education;
- the resource component that combines the financial, staffing, organizational, energy resources needed to support the life and development of an institution;
- the regulatory component that includes legislative and regulatory guidance for the management information system.

According to L. Kalinina “management information system (MIS) — is a complex of various comprehensive relevant information, data on the state of operation and development of the management unit and indicators of processes in it, collected, analysed and processed by the management subjects and employees within the equipment, hardware and software, developed or selected methods and specified algorithms in accordance with the objectives of the educational organization” [9].

One of the tasks of the management information system of the educational organization is to ensure the process of implementation of management functions in managerial decision-making. The presence of functional elements in the managed system causes the emergence of the relevant subsystems in information systems. In the organizational structure, the separation of managerial decision-making and control functions into separate structural elements causes the availability of appropriate subsystems within the information system, such as management decision and control. The first one provides the formation of plans, the development of orders and other forms of management decisions, and the second one provides their information support.

According to O. Savchenko, the purpose of creating of the management information system is the improving of the quality of student preparation through the improvement of management by the director, public organizations, educational, methodical, personnel and economic activities on the basis of operational and comprehensive information; the improvement

of activity of all divisions of the school due to introduction of scientific organization of work, the automatization of collection, processing of information, optimal usage of material, labour resources of the school due to automatization of curriculum development, the scheduling of classes, examinations, consultations; the increasing of the efficiency of management at all intra-school levels through timely and complete provision of management information with prompt information for optimal decision-making [13].

Taking into account the historical fact that the part of Ukraine suffers from the aggressor, L. Kartashova has developed tools that can be used not only to create a system of distance learning, but also to manage the school [14]. This is particularly true for aggressor-affected areas. The electronic resource of the school's information environment was created on the basis of the electronic educational platform "ACCENT" and is aimed at ensuring the availability of quality education for persons in the temporarily occupied territories. The electronic resource has the stamp of the Ministry of Education and Science of Ukraine as recommended for the usage in the educational process. This resource is relevant not only for the training but also for the involvement of people displaced from the occupied territories. Both trainees and trainers may be involved.

MobiSchool e-learning system developed by L. Kartashova contains interconnected WEB-rooms: e-director office, e-learning rooms, school WEB-library, e-students offices, e-parents offices. The system is recommended for the usage in full-time, distance and external forms of study (including e-learning).

The great advantage of such a system is that teachers are able to work in the "Personal WEB-room", which provides:

- chat with students and parents;
- provision of the educational materials to students (including multimedia);
- means of creating homework, scheduling, filling out the test system;
- control over student's activities;
- work with a testing system to assess student's educational achievement;
- filling and usage of the personal library of educational materials and the WEB-library of modern educational and methodical materials.

The head of the school can use the WEB-library of modern teaching and methodological materials through "Personal WEB-rooms" in order to:

- control and manage the educational process in the teachers WEB-rooms;
- review the training materials of the GEI WEB-rooms;
- view homework volume and class schedule;
- review student's grades;
- view calendar plans and create management organizers;
- communicate with the teacher face-to-face;
- receive statistics on the institution as a whole (class, teacher, subject, student separately);
- apply to the current legal framework and use the WEB-library of modern teaching materials.

Also, in educational institutions, in order to optimize its management, a dialog system is widely used. It makes it possible to use: record the program of observation, record the results of student attendance, record the lesson in order to compare the results and provide timely methodological assistance to the teacher. The dialog system you to streamline planned information for its online analysis and to improve the control within school. The school principal is provided with a personal calendar (organizer) that also contains up-to-date and delayed information. As the scheduled tasks are completed, information is deleted from the computer's memory, or a list of completed cases can be printed out as needed to accumulate performance information or reporting to higher-level organizations. In this case, there is no need to write detailed reports, which take a long time. On the same basis, a program of reporting to higher-level organizations relating to statistics reporting, financing, etc. can be built.

Based on the aforementioned information, we can affirm that the availability of material and technical conditions in the GEI (such as ICT) allows us to optimize the management process, to intensify it and optimally improve the quality of school education.

Analysis of the practice of school management by means of ICT has allowed to evaluate the state of information support for educational quality management in the GEI by such rates: rate of information support for management of GEI (R_{ism}), rate of managerial information support (R_{mis}), rate of scientific information support (R_{sis}).

In the course of our research, we analysed the results of the survey of the respondents and determined the rate of information support for the management of the GEI (R_{ism}) according to the following formula:

$$R_{ism} = \frac{1}{n} \sum_{i=1}^n R_{is},$$

where we define it as the simple average. The results of the initial processing of the received data are presented in Table 1.

Table 1. The results of the assessment of the quality of education quality management by regulatory legal information (R_{ism})

Content of external and regulatory information on the quality of education and its management structured according to the forms of its presentation	Score by respondents in the context of the region. Ukraine (360 respondents)		
	Cities of other regions of Ukraine	Kiev region	Average value
Legislative acts in education	1.51	1.35	1.43
Decisions of the Cabinet of Ministers of Ukraine	1.60	1.38	1.49
Provisions and instructions for the functioning and development of the GEI, ensuring equal access to quality education (MES of Ukraine)	1.78	1.63	1.70
Regulatory documents on the activities of the GEI and educational quality management	1.60	1.53	1.56
Instructional Letters of the Ministry of Education and Science of Ukraine	1.27	1.66	1.46
Information on international cooperation in the education system and ensuring quality of education	0.38	0.7	0.54
R_{ism}	0.67	0.68	0.675

The data presented in Table 1 indicate that the highest-grade point average (GPA) is the legal and regulatory information, which is imperative for all hierarchical levels of quality management of education in GEI. The average rate is $R_{ism} \approx 0.74$ and corresponds to the upper limit of a sufficient level. In particular, within the instructions of the Ministry of Education and Science of Ukraine (GPA ≈ 1.70), the lowest rate has the information about international cooperation in the educational system and the ensuring quality of education (≈ 0.54).

According to the rates (Table 1), it is also possible to make a comparative analysis of the provision level of regulatory and normative information by the subjects of management and educational process of the GEI of Kyiv region and cities of other regions of Ukraine (Sumy, Chernihiv, Zhytomyr, Kyiv). According to the results of the comparative analysis of the provision level data of educational institutions of Kyiv, Sumy, Chernihiv, Zhytomyr is somewhat lower than the Kiev region, since the rate value refers to a satisfactory level, as well as the absence of significant differences between the values of the rate $R_{ism} \approx 0.67$ and 0.68 respectively, it means it is at the lower boundary of a sufficient level.

Table 2. The results of the assessment of the state of the educational process support in the GEI and its content information (rate of management information support, R_{mis})

Content of internal management information	Score by respondents in the context of the region. Ukraine (360 respondents)		
	Cities of other regions of Ukraine	Kiev region	Average value
Information on the content and organization of training and cognitive work in the GEI	1.52	1.30	1.41
Information on the content and organization of socially educational work in the GEI	1.49	1.39	1.44
Information on improving the professional and general competence of teachers	1.00	1.32	1.16
Information on the methodological support of the educational process in the GEI	1.43	0.96	1.19
Information on strengthening and modernizing the GEI educational base	1.22	1.03	1.12
R_{mis}	0.67	0.60	0.63

In this information subsystem (its indicators presented in Table 2), the highest score of the respondents rated the state of information providing on the content and organization of student's trainings (≈ 1.38), and the lowest score — information on strengthening and modernization of educational

and material base of educational institutions (≈ 1.07). As a result of ranking, the value of the rate is in the range of values of a satisfactory level ($R_{mis} \approx 0.56$) and the lower limit of a sufficient level ($R_{mis} \approx 0.56$).

The results of the assessment of the state of the GEI management scientific information support are presented in Table 3.

Table 3. The results of the assessment of the state of the GEI management scientific information support (rate of scientific information support, R_{sis})

Content of external and internal scientific information in accordance with the fields of its production	Score by respondents in the context of the region. Ukraine (360 respondents)		
	Cities of other regions of Ukraine	Kiev region	Average value
Information about modern achievements of pedagogics	1.03	1.02	1.025
Information about the modern achievements of psychology	0.82	1.18	1.0
Information on the modern achievements of the educational management theory, general and informational management, general quality theory, systems of monitoring the quality of education in developed countries, the essence of international comparative studies of the quality of education	0.96	0.86	0.91
Information on the modern achievements of the sciences related to management — social informatics, qualimetry, information science, information civilization philosophy, attributive and functional concept of information	0.51	0.55	0.53
R_{sis}	0.42	0.45	0.435

In the array of scientific information content (Table 3), the highest average score ($R_{sis} \approx 1.025$) respondents rated information about the modern achievements of pedagogical science, and the lowest ($R_{sis} \approx 0.53$) the information about modern achievements of the sciences related to

management science, but which at the present stage of science development are of great importance for improving the quality of education and managing it effectively.

Also, the production of external information is of great importance in our research. The analysis of the data (Table 4) of the respondents' questionnaire on the sources of external information receipt makes it possible to conclude that its greatest share is the periodic pedagogical press.

Table 4. The results of the questionnaires ranking on the sources of external information to the GEI

Sources of external information	Number of respondents (360)	Rank
MES of Ukraine	155	3
Department of Education and Science of Regional State Administration (RSA)	18	11
Regional State Administration (RSA)	18	11
District State Administration (DSA)	24	10
Executive committees	39	8
Department of Education and Science of the Executive Committee of the City Council	150	4
Regional Institute of Postgraduate Teacher Education (RIPTE)	120	5
Department of Education of the district state administration	114	6
District methodical office, scientific and methodological center	240	2
Periodic Pedagogical Press	323	1
Pedagogical and methodological literature	102	7
Institutions that are functionally related to the GEI	36	9
Media	15	12

It ranks first in the ranking of other sources of information. Second and third places were shared by the district methodical office (scientific and methodological centre) and the Ministry of Education and Science of Ukraine. The fourth place in terms of sources of information production for the GEI is occupied by the education and science department of the city executive committee, which is logical because it is a structural unit of the city executive committee, whose activity is aimed at implementing

state educational policy in the city's educational system. It has 8 rank, and ranked 8th.

Therefore, for the heads of GEI are of great importance not only to know the content of the external information necessary and sufficient for the implementation of the quality cycle of education in the educational institution and to make science-based management decisions on improving the quality of education, but also the sources of its receipt and creation, accounting, preservation and presentation. information, processing techniques, possible and pedagogically appropriate forms of managerial decision-making, the ability to rationally identify users of information and the means of its transmission or storage.

Each of the above components of the information support process requires a study of its state in the quality management practice of the GEI. Accordingly, we have developed a series of questionnaires for the heads of GEI and the administrative and managerial staff that are part of the methodology for studying the state of information support for the educational quality management in GEI. Conducting such in-depth research through the questionnaires made it possible to learn more about the state of the support of the educational quality management in order to further create a full-fledged model of the informational support system of the educational quality management in general educational institutions in Ukraine.

4 Conclusions and follow-up research

Today much attention is focused on the identification of the factors that impede the creation of a complete informational support system of the educational quality management in general educational institution and aimed at exploring new approaches to overcome or minimize a number of difficulties encountered in the management process. And the methodological substantiation of the informational support system of the educational quality management in the GEI of Ukraine and its usage in management practice will allow to raise awareness of all subjects of management process on issues of management, information and communication support, optimal forms and methods of the team interaction. For the GEI leaders, the constant development of informational competence is a condition for the simultaneous implementation of many acts related to various activities: managerial, pedagogical, psychological, methodological, organizational, research, economic, entrepreneurial, informational, innovation, public and others.

The conducted questioning and interviewing of the respondents and determination of the rate of educational quality management by different types of internal and external information provided the basis for revealing more low and satisfactory levels of information support of the educational quality management, which is adequate realities of modern management practice.

The results obtained provide a basis for our further research, namely the identification of methods and means of processing external management information and the development and scientific substantiation of a model of information support of the quality management education in the GEI, which would provide quality support for management activities to improve the quality of education and further improve the usage of strategic, tactical and operational information by the heads of the GEI.

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