

# Management of Students' Activities in the Digital Learning Environment \*

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## Abstract

The paper reveals some features of the digital learning environment, its new opportunities, describes the changes in the managerial activity of a teacher, and the educational activity of a student. From the position of professional-pedagogical activity, “objects” of management are defined and disclosed – a content of the digital learning environment, students, colleagues and partners of the educational process, and teacher activity. A model for managing the activities of students in the digital learning environment is presented, justified, and described. The conditions for the inclusion of students in an autonomous work, in the process of self-management in the context of digital learning are disclosed.

**Keywords:** *digital learning environment, educational activity management, management model, learner, digital educational resources, digital educational communication, network interaction, digital tools, digital footprints*

## 1 Introduction

The digital learning environment (DLE) is a prerequisite and means of achieving innovative educational results that meet the requirements of the digital economy and the needs of modern youth working with digital formats. In Russia, several regulatory documents determine the digital environment design and development. For example, they are

- The Program for the Development of the Digital Economy in the Russian Federation (until 2035);
- The Development Strategy of the Information Society in Russia (until 2030);
- The Project “Modern Digital Educational Environment in the Russian Federation”;
- The Passport of the Federal Project “Digital School”;
- The National Project “Education” (2018-2024), Federal Educational Standards, etc.

The listed documents focus on the transformation of the traditional model of learning, the expansion of the spatio-temporal boundaries of learning, the realisation of a personal request in learning, the development of prospective competencies, and the increase in students' autonomy. In

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response to these new requirements, the (DLE) is being created, with the leading characteristics of openness and accessibility, adaptability, variability, multifunctionality, flexibility and individuality, modularity and algorithmisation.

The DLE is an open complex of resources, conditions, and opportunities for training, development, socialisation, and education of a person [Blinov, 2019]. This environment operates 24/7 because of information and communication infrastructure. Consequently, the environment actualises a personalised learning process through a continuous analysis of personal meanings and needs of students, the characteristics of their educational behaviour, choices, targets, and forms of interaction. This is an environment of a qualitatively new technological level of development, the core of which are digital (“advanced”, “smart”) technologies based on the integration of different types of intelligent technologies (for example, in knowledge representation, activity planning, diagnostics and counselling, monitoring of knowledge assimilation, and learning analytics). Teachers and students use digital tools, so the capabilities of these digital tools in some measure determine their actions. The DLE soon should become a part of a complex digital educational ecosystem [Fedorov, 2019].

To achieve the full-fledged functioning of the DLE, to solve the problem of professional training for future specialists at a qualitatively new level, the teacher will have to comprehend the changes in the educational content and the relationship of stakeholders. This comprehension will help to see the multidimensional environment from different perspectives [Noskova et al., 2019]. It is important to learn how to study digital footprints, to extract new knowledge that will increase the effectiveness of pedagogical activity. When designing the DLE and filling it to achieve advanced educational results that meet the needs of the digital society and the labour market, a teacher needs to learn how to build and implement a flexible, balanced educational process management system.

## 2 Problem definition

Bespal’ko considers the management of educational activities a targeted impact on students, which consists of tracking and monitoring the quality of the activity elements assimilation and correction of errors [Bespal’ko, 2002]. According to Sosnovsky and Teslenko, the learning process management means a set of measures to ensure the effectiveness of the learning system functioning based on the analysis of the initial state of students and the results of their learning by making adjustments to the curriculum [Sosnovskij, Teslenko, 1995]. In the context of digital learning, we should understand management as a set of conditions for supporting the educational and cognitive activities of students. To ensure the effectiveness of the educational process in the DLE, we should analyse the initial state of students and the results of their learning by providing timely support and assistance, making the necessary adjustments to the curriculum. In the DLE, management is implemented in the conditions of space and time diversity of actions through information and communication resources and multidimensional feedback based on a variety of digital technologies.

The effectiveness of the managerial activity requires mastering new competencies, both by a teacher and a student. Accordingly, several urgent questions for a teacher arise. How to increase personal activity and organise students’ autonomous work in the DLE? How to engage students in productive learning activities in the DLE and make the learning process meaningful? How to motivate a student to realise own meanings, intentions, aspirations in the educational activities, and build a meaningful personal learning path? What personality traits provide effective learning in the DLE? How to make assessment flexible and effective? What should become “target points” in the DLE for assessing a student’s educational path?

The solution to the listed issues is associated with a flexible system of organising the activities of students in the DLE. Therefore, teachers will have to comprehend the systemic changes associated with pedagogical management in the context of digitalisation. They will have to understand how to use social activity familiar to young people (in the DLE) to achieve new advanced educational results, taking into account new challenges and requirements of society. Finally, they will have to find the

answer to the question - how to make management in the DSP more efficient, more effective, and “smarter”.

### 3 Justification of the management model

In digital coordinates, the semantic content of the “management” concept is expanding. The essence of management is not merely in tracking and monitoring the quality of a student’s knowledge. Management helps to accompany the development of a personality (a personal system of values, positions, and attitudes), to organise the educational process and an adequate choice of digital teaching tools, to approach a wide range of educational objectives. In the DLE, management is deprived of a rigorous control and evaluation function that is characteristic of a traditional classroom. The strategy vector of management changes from an external management contour, which is traditionally implemented by a teacher in the classroom interactions, to the internal, realised by a student himself in the course of independent activity due to self-organisation and self-regulation. Digital tools and environmental technologies provide a new way to control the educational and cognitive activities of students. Relying on databases, remote forms of communication, remote forms of network monitoring, means of network planning, and organisation of activities, students become active performers of conscious self-control self-esteem, and self-management.

The DLE management is implemented in several areas (directions): the functioning of the environment and its development, environment stakeholders, students’ educational activities organisation, interaction with colleagues, and professional development of a teacher. Let us describe in more detail the “objects” of management in the DLE.

#### 3.1 Management of the Digital Learning Environment

The innovativeness of the DLE is determined by the orientation toward the requests and behaviour of young people to strengthen students’ motivation for independent educational activities, the manifestation of an active position, and educational initiative. The educational potential of the environment is manifested largely when a learner is given freedom of action in choosing an educational path and personally significant goals. For this, the DLE should become attractive and interesting in content, adaptable, and convenient for various focus groups. That will help to involve students in cognitive processes and meet their requirements. Accordingly, in the pedagogical design of the environment, it is necessary to take into account new ways of organising and saturating the information database, designing and maintaining communication processes that providing remote educational interactions with resources and users of the environment (psychodidactic approach) [Noskova et al., 2015].

The DLE resource management has several directions. Firstly, it is necessary to expand the information field of educational activity. Information redundancy of the DLE based on remote access to a variety of resources, both in the native and foreign languages, will allow students to independently extract useful knowledge, critically interpret it, carry out research activities, build a personal learning path. It is important to enrich the environment with new resources so that students have a choice of resources. It is necessary to diversify forms and formats of digital resources, complement them with interdisciplinary and hypertext links with the possibility of actualising practical actions, accessing external resources, and network communities to discuss the materials under study.

Secondly, it is necessary to organise the process of content assimilation. A digital educational resource should be focused not only on solving the problems of professional activity, but also provide individualised support in the study of the material. This is possible if it has “built-in” flexible algorithms and control mechanisms that make it possible to learn independently. A flexible hyper-link system allows mastering the material non-linearly, freely and actively interacting with resources, building a personal trajectory for mastering the content. Freedom is manifested not only in the choice of place and time of activity but also in the choice of the necessary digital tools, the choice of

educational resources and tasks for various reasons, methods of control, and degree of independence. A student himself can plan educational activities and choose ways to achieve his goals, carry out a conscious search and analysis of resources, followed by correction of educational activities, build educational interactions, and make a request for the necessary measure of help and support from the teacher.

Interactions with the environment stakeholders and external actors (for example, discussing research issues with scientists, conducting dialogs with future employers, participating in forums with leading experts in the subject area, searching friends and colleagues on social networks) through various channels and communication methods immerse students in active communication processes. It helps to comprehend the studied problems, to realise personal meanings, and to determine a personality-oriented strategy of further educational actions. The wide possibilities of joint distributed activities of DLE enrich the familiar face-to-face communication algorithm with flexible, scalable, non-linear network communications in the formats of “one-to-group”, “one-to-many”, “group-to-group”, “group-to-many”, “many-to-many”, which contribute to the development of new competencies, self-presentation, and self-realisation in the new conditions.

Flexible communication algorithms make it possible to solve problems of a wide social context: from the assimilation of knowledge to the reflection of individual attitudes, values, and positions. They provide more opportunities in obtaining the desired result, through the choice of the necessary communication actions, the choice of various options for solving communication goals and objectives, the choice of educational activity.

The digital context of training actions allows the environment to accumulate and store all data about user actions. To take a holistic approach to the issue of the qualitative functioning of the DLE, to make the necessary adjustments in its organisation and development promptly, a teacher must learn how to get comprehensive information from it, see the needs, values, and personal expectations of students. For this, it is necessary to analyse and correct the “traces” of the information and communication activities stored in the DLE and use learning analytics.

### **3.2 Student management**

The “digital turn” in learning transforms educational activity. At the centre of the educational process is a student (in the unity of cognitive, emotional, regulatory spheres of personality), and not a teacher, as in classroom studies. Therefore, the productivity of educational actions in the environment depends not only on the professional competence of a teacher but also on a student’s sufficient preparedness - the formation of a personal position, readiness for learning with a high degree of autonomy and self-organisation.

The transition of a student from the position of a passive consumer to an active stakeholder requires changes in internal psychological attitudes. It is necessary to activate the processes of “self-hood” by creating certain conditions for stimulating the student’s subjective position, achieving his own goals, and satisfying personal needs. To do this, a teacher will have to guide the independent activities of students through various types of educational resources of the DLE (information, communication, and management). It is necessary to work on the formation of motivation, self-regulation, and educational skills of students, increasing the degree of freedom, providing choice, flexible educational process through multivariate educational practices, personalising learning paths, gradually transferring control and responsibility for learning outcomes to students.

A student becomes a subject of activity, cognition, and self-realisation when he accepts the goals as personally significant, reformulates and redefines them, taking into account his needs and individual characteristics. Interactive learning through polylogical forms of interaction (distributed network joint activity) allows simultaneous solving a wide range of educational tasks: cognitive, communicative, and social. Strengthening a student’s activity intellectualisation, closing feedbacks in the process of reflexive activity (Figure 1) will help to strengthen self-organisation and regulatory

processes, together with self-learning and cognitive activity.

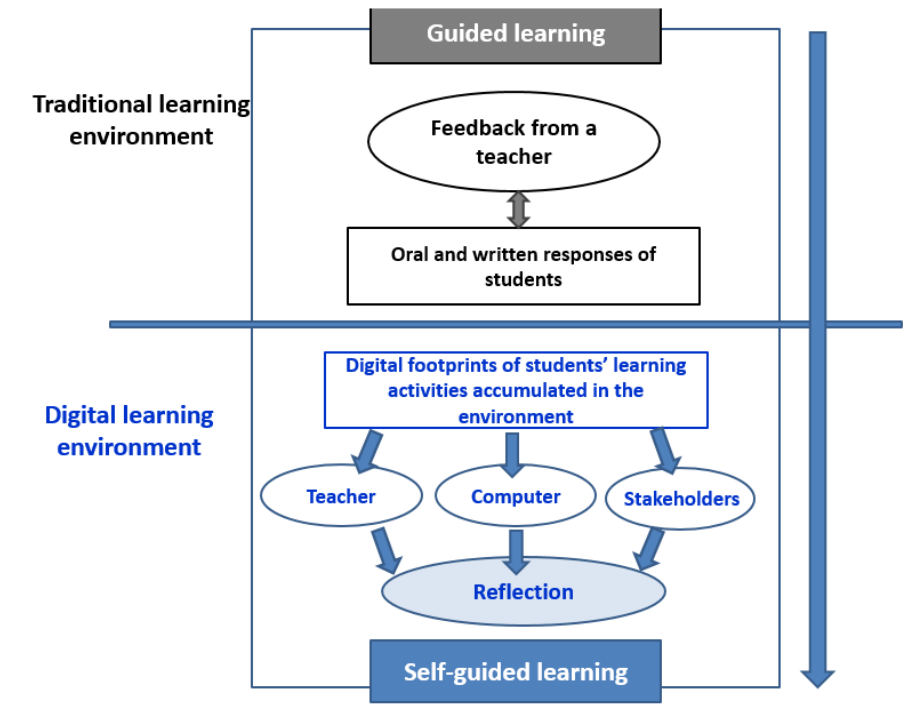


Figure 1: The nature of feedback in the traditional learning environment and DLE Source: own work

### 3.3 Management of colleagues and partners in professional activity

The professional activity of a teacher is multiobjective. A teacher is actively involved both in internal corporate communication and in external communication processes to familiarise with joint professional activity, build effective professional and personal ties, and enrich the pedagogical experience. A teacher in the DLE will have to solve a whole range of new professional tasks: design an electronic resource base for the environment, model targeted educational communication, manage individual and distributed group work of students, develop the environment and organise competent support for students' educational activities. It is necessary to develop a creative and educational orientation of the environment, saturate it with interdisciplinary and social connections, combine various types of information, process and analyse it, and connect automated forms of control and evaluation. This kind of work requires enormous efforts.

Interaction with colleagues and partners becomes relevant. Together with psychologists, a teacher will have to realise how to transform the information and communication flows to modify the psychological aspects of the flow of cognitive and regulatory processes, organise network interaction in real-time and delayed communication. Together with educators, it is necessary to comprehend a new system of attitudes and values of the environment, behaviours of students in the DLE, design, and implementation features of "environmental" educational influences on the formation of a learner's personality, socialisation in the DLE. Together with programmers and engineers, it is necessary to solve issues of effective human-machine learning, comfort, and convenience in interacting with the environment, supporting it at a high level of innovative development. Interaction with teachers of various subject areas helps to implement integration processes and acquire "holistic knowledge" on an interdisciplinary basis ("horizontal connections"). Interaction with external colleagues (partners and scientists, social pedagogues, media specialists, etc.) helps to comprehend different scientific positions

and approaches, the effectiveness of transferring knowledge to new conditions, in various situations of quasi-professional activity that can be modelled using digital tools.

Professional pedagogical activity in the DLE is becoming collaborative. Interaction with colleagues and partners is seen as a partnership, cooperation in the interests of developing the environment, the effective organisation of independent work of students. This is manifested in the joint activity, in which mutual understanding and interaction, mutual control, and co-management come to the fore, helping to maintain the functioning of the environment at a high level of effectiveness. Based on common goals and ideas, specialists are immersed in a common matter of interest to them; they are united in professional communities, where the opportunity is given to actively interact in various statuses (from performer to the researcher), to present and critically evaluate their activities, promptly receiving feedback and help from colleagues.

### 3.4 Management of own professional pedagogical activity

For a teacher, the DLE is a new object of professional activity, a means of creating special conditions for the organisation of students' autonomous work by modern methods of information behaviour, focus on active self-development and self-education in the network information space. In the design of such an environment, teachers will have to set new goals and recognise new values, take into account the individual aspects of students' cognitive, motivational and regulatory areas in the organisation of the educational process, adapt the content of the environment to various typological groups of students, and personal learning paths [Levanova et al., 2019]. Teachers need to be aware of new forms and strategies of pedagogical activity, to critically evaluate the model of training in the DLE.

## 4 Description of the management model

Summing up the above-described features of the DLE, the strategy, nature, and “objects” of management, a model for managing the activities of students in the digital learning environment was developed (Figure 2).

Management in the DLE must be aimed at mobilising the educational and cognitive abilities of students, mastering the elements of educational activity that provide training for continuous self-education in dynamically changing conditions of the future, help in the formation of advanced professional competencies, awareness of personal meanings, values and needs. It is important to focus control actions on supporting the independent activity of students, stimulating the position of the active subject of self-development and self-realisation, ready to build activities in an individual way that meets abilities and motivation [Polupan, 2018].

Due to the realisation of the conscious, independent and responsible activity of the student in the DLE, a change in the vector of managerial actions should take place: from rigid “external” management (from a teacher) to flexible “internal” management based on independent management decisions, self-organisation, and self-regulation of personal processes.

A student in the DLE will not only have to remember sets of ready-made solutions [Kudina et al., 2017], but will learn how to manage his educational activities by himself: consciously formulate the goals of the activity, plan and organise ways to achieve them, adequately choose the necessary digital tools, carry out self-monitoring and self-esteem, and correct his actions. Management in the DLE should become a “turning axis”, launching the innovative course of the educational process that implements subject-oriented (student-centered) learning with the possibility of freedom of choice and responsibility for the student's educational results.

The DLE provides opportunities for students to manifest the subjectivity of their personality - activity, independence, individuality, creativity, and initiative. To do this, it is necessary to organise in a new way the flow of information and communication processes in the DLE. Resources and network communication become the managerial components of the environment, defining the individual



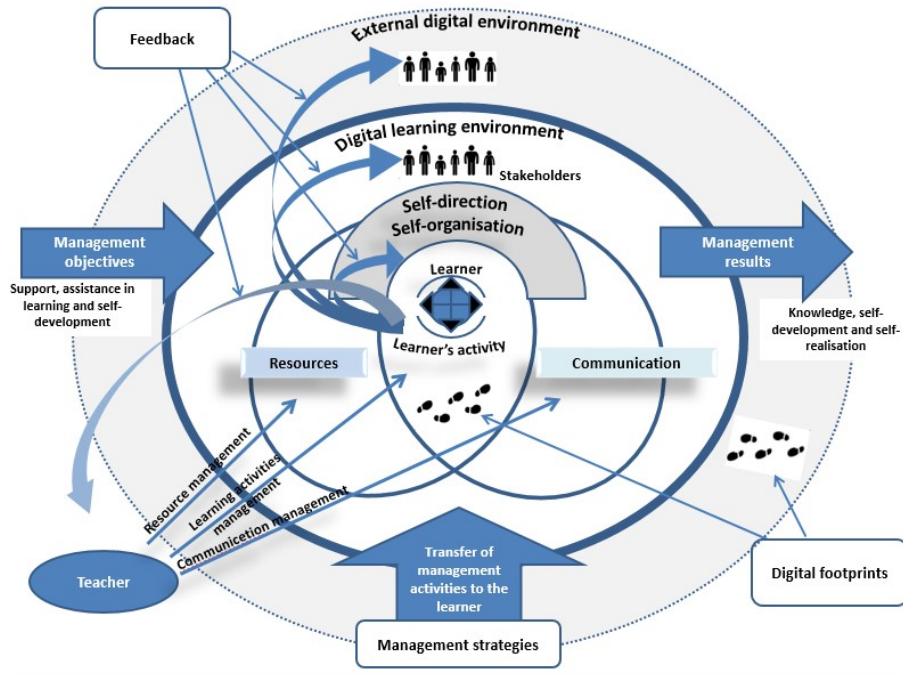


Figure 2: A model for student management in the DLE Source: own work

trajectory, pace, direction of the student’s educational activity, activating his “self” processes.

The absence of continuous interaction with a teacher in the DLE requires the saturation of the environment with special resources - management resources [Noskova & Kulikova, 2019]. These are invariant resources of the DLE for educational and methodological purposes, which require concentration on the learner, concentration of attention, perseverance, and certain efforts in the study and understanding of their content. They help in goal-setting, planning, and organisation of educational activities, in checking the quality of the actions taken.

The work of students with management resources changes the educational behaviour of the subject, such activities as analysing information, understanding its value and significance (from personal and professional positions), organising their educational actions, choosing adequate ways to achieve goals and objectives, time and pace of development become dominant material, measures of necessary assistance. For example, problem situations, educational advertising, thematic planning, route sheets, guidelines and instructions, activity algorithms and task lists, electronic journals and grading scales, ratings, etc. Thanks to the management resources, the subject begins to recognise the successes and failures of the steps taken, to evaluate the relevance of information, its objectivity, and reliability. As a result, there is not only an increase in the intellectual activity of the learner but also an increase in self-organisation processes – self-management and self-regulation.

The basis of digital educational activity is the communication process. Thanks to digital tools, environment stakeholders can actively engage in dialogue communications, for example, internal dialogue with themselves (in the process of interacting with a resource), human-machine dialogue (interaction with an intellectual system), dialogue with educational partners (in the course of network interaction, in the process of distributed network activities, discussion of current issues of the network community). Through digital communication, information is transferred, the experience is exchanged, communication barriers are overcome, and the psychological state of a person and his knowledge component are affected. It becomes important to teach students to hear each other, to speak logically and reasonably, to rely on linguistic and multimedia tools to quickly convey their thoughts and correctly interpret other people’s statements. Communication in the DLE teaches us to join a discussion and to

become the initiator of communication processes, not to be afraid to ask for help, consult in difficult decisions, and agree on mutual assistance and/or to provide support to another person.

Choosing services for communication, scaling the circle of partners (interacting with external partners), students learn to see the depth of the problem, establish multidimensional relationships, collectively seek and analyse information, draw conclusions and find different solutions. Through distributed joint activities, they learn to join forces, collaborate, help and motivate each other to achieve the desired result.

Information and communication actions of environmental actors are deployed because of digital tools and technologies that allow instantly receiving feedback and achieving the desired goals and objectives as quickly as possible. In the DLE, a semantic content of the concept “feedback” becomes more complicated. Of particular value are the “internal” feedbacks; these are the connections that a student gets in the process of self-control, self-esteem, reflection, and correction of his actions.

An “external” feedback does not disappear in the DLE. It manifests itself through the fulfilment of instructions and prescriptions, in the planned organisation of activities, systematic monitoring, control, and evaluation by the teacher. However, this connection should be limited; a learner must become the centre of the educational interactions.

A teacher needs to learn how to track feedback in the environment. It is important to receive feedback not only about the cognitive processes of a student (I know, I can) but also about the motivational and emotional (regulatory) processes. It is necessary to teach a student in terms of distributed network activities, to receive feedback not only from himself (because of reflective actions) but also from peers or external users of the global digital environment [Sedrakyan et al., 2020].

In terms of feedback in the DLE, a student needs to learn to adequately evaluate his actions and the actions of peers, learn to assist himself and others on time, make the necessary correction, and exchange new knowledge and skills. In turn, a teacher needs to learn to “see” the student in the DLE. That means being able to extract information from the medium about students - about changes in their personalities, changes in motivations, attitudes, mastering knowledge, developing competencies. As a result, it will be possible to provide timely assistance, support students’ autonomous work, and adjust the content of the environment.

The lack of continuous monitoring in the DLE, the constant teacher’s impact, brings to the fore other forms of control and evaluation activities. The focus shifts to formative assessment, personalised diagnostics, reflective assessment, continuous monitoring of the educational activities, and learners’ behaviour, with the help of intelligent technologies.

Thanks to digital tools and technologies, intelligent systems, a large number of educational data, and facts, educational information is accumulating in the DLE. These can be products of cognitive, research, design and creative activities of students (for example, essays, cases, projects, presentations, quests, games, completed tasks, photographs, screenshots, etc.), products of digital communication and network interaction (for example, electronic discourses). On the other hand, this is the data stored in the log files of the information system, about the results of tests and surveys, the number of attempts to solve problems, the trajectory of movement in the environment, the duration of interaction with the resource, etc.

Digital footprints in the cumulative model allow tracking personal indicators of students’ progress and learning outcomes (electronic portfolio), analysing students’ activity and information and communication preferences in the learning process. The study of different types of students’ educational activity (e.g., frequency, regularity, etc.) in the DLE, comparison of values with an average indicator allows evaluating the regularity of educational activity, the ability to work independently. Overall, such information helps to determine an individual learning style [Bolkan, Goodboy, 2019]. The study of digital footprints allows identifying the physiological, psychological, and cognitive characteristics of students, and that allows adjusting current educational objectives and development of educational scenarios.

The educational value of digital footprints lies in modelling the digital educational profile, build-



ing a personal learning path, identifying students with special educational needs and requirements, and, as a result, building individual recommendations and making timely corrections to pedagogical activities.

## Conclusion

Teachers need to learn how to manage the learning process and students' development at a distance in the DLE with a wide arsenal of digital tools. To develop a learner's personality, not only to transfer knowledge through digital resources. That involves the development of values, beliefs, relationships, connections of a learner. It is necessary to learn to "see" a student in the DLE, to measure and correct his activity from the perspective of different areas of knowledge - pedagogy, psychology, computer science, and digital technology. This requires new professional thinking of a teacher, advanced professional competencies, in particular competencies that help to design the DLE, digital culture, and digital skills. Of particular importance is a systematic study and self-analysis of professional activity, its objective assessment through reflection, diagnostic procedures, and examination.

Thus, a modern teacher will not only design and create information content, implement educational interaction in the DLE, but also competently build a flexible, balanced system of management for students' educational activities to achieve high educational, personal, and professional results that meet the requirements of the digital society.

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