VI International Forum on Teacher Education

The Psychological and Pedagogical Management of Individual Learning Trajectories in the Era of Digitalization

Irina N. Pogozhina (a), Margarita S. Aslanova* (b) , Margarita B. Agasaryan (c)

(a), (c) Lomonosov Moscow State University, 125009, Moscow (Russia), Mokhovaya str, 9-11;
(b) Sechenov First Moscow State Medical University of the Ministry of Health of the Russian Federation (Sechenov University), 119435, Moscow (Russia), Bolshaya Pirogovskay, 2-4, simomargarita@ya.ru

Abstract

Relevance of the problem is the necessity of the organization of psycho-pedagogical management for students and the transition to individual learning paths (ILP) is associated with the increasing role of digital knowledge, the adoption of the concept of Lifelong Learning. The information-educational space performs educational, socio-practical and educational-reflective functions.
The purpose of the study: the choice of the optimal method for management of forming the students' ILP in the era of knowledge digitalization is based on a comparative analysis of popular approaches to management of forming the learning process.
Leading research method is theoretical critical analysis and synthesis of domestic and foreign literature.
Results. Three approaches to the management of educational activities were chosen for analysis: tutoring, supervision, coaching. The key aspects in the structure of each approach are identified: the object, the result of the impact, the transformation process, the means of transformation. The results of the comparison revealed features of approaches on the implementation of the functions of the educational space, the process and means of transformation and formal and substantive restrictions.
Conclusions. Practical significance of the study based on introducing academic tutoring as a professional mentoring. The implementation of ILP and personality development in the modern educational space is the most optimal and acts as an element of innovative learning.
Recommendations. We have proposed the organization of tutorial psycho-pedagogical management based on a generalized indicative basis of activity based on the activity theory of learning.

Keywords: training, mentoring, tutoring, individual learning trajectories, lifelong learning, distance learning

Published by Kazan federal university and peer-reviewed under responsibility of IFTE-2020 (VI International Forum on Teacher Education)

---

* Corresponding author. E-mail: simomargarita@ya.ru

Introduction

The organization of psycho-pedagogical management for students and the transition to individual learning paths (ILP) is associated with the increasing role of digital knowledge, the adoption of the concept of Lifelong Learning (Butenko et al., 2017). Today the processes of learning and mental development are increasingly unfolding in the Internet. The information-educational space performs educational, socio-practical and educational-reflective functions. Only the first function is implemented by the teacher. For students, it carries risks of a substantial and formal nature: lack of metacognitive skills, possible inaccuracy of information in the digital environment, limited remote access to methods and means of organizing the educational process, etc (Shchennikov et al., 2016; Soldatova & Rasskazova, 2017). The situation is aggravated by the fact that if yesterday learning in the Internet environment was considered rather as an addition to offline learning, today, during the pandemic and the forced self-isolation of participants in the educational process, the educational environment has dramatically expanded its boundaries and distance learning in online format has become binding. The full transition to distance learning is sharp and prolonged. In addition, there is a high probability that a number of innovations related to the transition to the remote format will remain in the learning process after the pandemic (Basilaia & Kvavadze, 2020; Ebner & Press, 2020). Students are urgently faced with the question of how to realize their own goals of cognition, which should correspond to their capabilities, abilities, and interests. In other words, it becomes necessary to build an individual learning path. An individual learning path is an individual style of activity in the development of educational material. Thus, the problem of organizing psycho-pedagogical management of the process learning becomes acutely relevant. Mentoring is gaining popularity at all stages of the pedagogical life of students, starting from the preschool period, ending with periods of adult education (Bergman et al., 2003; Klarin, 2015; Mansvetova, 2017; Iliffe-Wood, 2014; Obrist, 2014).

Purpose and objectives of the study

Purpose of the study is the choice of the optimal method for management of forming students' ILP in the era of knowledge digitalization is based on a comparative analysis of popular approaches to management of forming the learning process.

Literature review

In these conditions, it is necessary to solve questions about the most effective forms of organization of management for the learning process and the training of qualified personnel. Formally, new posts appear in educational institutions, for example, a tutor, an educational psychologist, and a social educator. However, we are faced with the fact that the requirements for them in relation to the organization of activities to build

individual learning paths and their management aren`t clearly formulated (Klarin, 2016). The lack of a competency-based model of a «mentor» leads to the inability to conduct a critically-based assessment of applicants for work in a psycho-pedagogical environment. To make the job requirements for mentors more transparent for the administration of educational institutions, students and their parents, it is necessary to identify clear steps and criteria for the effectiveness of their activities.

Any technology of psychological assistance, including in the field of construction and management of individual learning paths, is based on one or another model of determining the formation and development of mental processes and behavior, and is a training (development) program. Therefore, the choice of a scientific paradigm that describes the relationship between learning and development processes comes to the fore when building innovative technologies. Three main paradigms are traditionally distinguished and experimentally studied in the literature: 1) learning and development are identical; 2) causally unrelated; 3) training is the reason for development. Each paradigm follows from a particular model of determining the development of the psyche or behavior, developed within the framework of a certain theoretical direction in psychology, and is determined by the accepted ideal of rationality (table 1) (Pogozhina, 2016a).

The choice of the 3rd paradigm as the one that most fully describes the system of determinative influences for solving the problems of prevention, correction and rehabilitation of mental development disorders, educational activities, communicative, behavioral, and speech disorders seems most obvious.

The problem, however, is that not one of the paradigms existing today in psychology has complete experimental evidence in explaining the processes of formation and development of the psyche and behavior (Pogozhina, 2016b).

There are a number of approaches to the organization of mentoring: tutoring, supervision, coaching, etc. Specialists working in the field of individualization of training and education processes use technologies built on the basis of different determination models in their professional activities. Each model and the technology resulting from it solves a clearly defined circle of problems and has its own limitations. Therefore, further analysis of popular approaches to management of forming the learning process, understanding their capabilities and limitations, is necessary. This will help professionals choose and use those approaches that are most effective for solving human problems at this stage of the learning process.

Table 1. Linkages between learning and development. Models for determining the development of the psyche or behavior developed in the framework of a certain theoretical direction in psychology

The paradigms of the relationship between learning and mental development	Development determination models and their examples	Determinants highlighted in models and type of determination
Identic	Classical: associationism, behaviorism	• External - rigid (unambiguous) determination
Causally unrelated	Nonclassical: Piaget, gestalt psychology, psychoanalysis and others	• External • Internal - probabilistic determination
Learning is the cause of development	Postclassical: cultural-activity approach	• External - • Internal - • rigid + probabilistic determinat

Methodology

2.1. Theoretical Methods

The research is based on a theoretical critical analysis and generalization of domestic and foreign literature on the problem of psychological and pedagogical management of individual learning trajectories in the digitalization era. Supplementary, the method of theoretical modeling and forecasting was used.

2.2. Empirical Methods

For an external assessment of the educational environment we used the scale SACERS (School-Age Care Environment Rating Scale). The SACERS scale is based on the criteria of the appropriateness of the

development of students of school age, the satisfaction of the needs of their development in the school environment, with the emphasis on the influence of the environment on the development of children (Harms et al., 1996). SACERS includes seven scales: 1) interior space and furniture; 2) health and safety; 3) active activity / pastime; 4) interaction; 5) teaching and learning process; 6) staff development; 7) special needs. These scales include 48 indicators. Each of the 48 indicators is evaluated on a 7-point scale. Assessment of the educational environment using SACERS scales is based on observations on the indicated indicators. The SACERS scale is used in many countries (Germany, USA, Sweden, etc.) and is a valid, reliable tool for assessing the characteristics of the educational environment (Vinogradova & Ivanova, 2018).

For the internal assessment of the educational environment (from the perspective of students included in the teaching and learning process), the following methods were used: "Psychological safety of the educational environment of the school" (Baeva, 2006) and the "Express methodology for studying the socio-psychological climate in the collective" (Mikhalyuk & Shalyto, 1983).

The results were processed In IBM SPSS Statistics 22 [eng] and Microsoft Excel 2007.

2.3. Participants

The study involved 50 students of the 10th grade of school 1448 in Moscow. Four experts acted as experts to assess the implementation of external conditions of the educational environment: two external experts and two teachers of School 1448.

2.4. Procedure

At first, the characteristics of the educational environment were assessed as factors affecting the efficiency of the organization of the teaching process from the point of view of experts and students. The assessment was conducted in two stages.

At the first stage, factors of the educational environment were evaluated by students using the methods "Psychological safety of the educational environment of the school" (Baeva, 2006) and "Express methodology for studying the socio-psychological climate in the collective" (Mikhalyuk & Shalyto, 1983). Based on the results of the methodology "Psychological safety of the educational environment of the school", we concluded that the diagnosed educational environment of the school is safe from the point of view of students. According to the results of the "Express-methodology" for the study of the socio-psychological climate in the team, we identified 3 components of the attitude in the collective of 10s

classes: cognitive, emotional and behavioral. Then, according to the profile of the three components, we concluded about the nature of the socio-psychological climate in the student body. Since the diagnostic period (March-April 2020) partially fell to the peak of the spread of the COVID-19 pandemic, part of the study was conducted in an online format using the Simpoll.ru platform.

At the second stage, the factors of the educational environment were evaluated using the SACERS scale by four experts: two teachers and two invited external experts. Based on the results of the assessment, we identified "zones of well-being" and "zones of deficits" of this educational environment, as well as an index of the quality of the educational environment. "Well-being zones" are an area of educational environment indicators with high expert ratings (above average). "Deficit zones" are an area of educational environment indicators with low expert ratings (below average).

Then, key aspects were identified in the structure of each of the three approaches to the management of educational activities selected for analysis (tutoring, supervision, coaching): the object, the result of the impact, the transformation process, and the means of transformation.

At the final stage, the effectiveness of each approach was assessed when working with the identified "zones of deficits" of the educational environment in the construction and maintenance of individual learning paths.

Results

3.1. Empirical results

In the table 2 presents the results of assessing the characteristics of the educational environment for students (Descriptives Statistics), obtained using the methodology "Psychological safety of the educational environment of the school" (N = 50). The results are positive, neutral and negative answers to the questions of the methodology. The student's attitude to the educational environment is defined as positive, neutral or negative in terms of the sum of the responses of each category.

As can be seen from table 2, 10-graders are dominated by a positive attitude (60%) to the educational environment of the school.

In the table 3 presents the results of assessing the socio-psychological climate in a collective of students (Descriptives Statistics), obtained using the "Express Methodology" (N = 50). When assessing the emotional component of the socio-psychological climate, the team takes into account the criteria of attractiveness: "like - not like", "pleasant - not pleasant". When assessing the behavioral component, the

criterion "desire - unwillingness to work, study together" is taken into account. In assessing the cognitive component, the main criterion is "knowledge - ignorance of the characteristics of the members of the collective". Average values falling in the range from -1 to -0.33 are considered negative, in the range from -0.33 to +0.33 - contradictory, in the range from +0.33 to +1 - positive.

Table 2. The results of the average values of the attitude of 10th graders to the educational environment of school 1448 (N = 50) (Descriptives Statistics)

№	The components of the attitude	M	SD	Sum of points	(%)
1	Positive attitude	4.81	2.08	236	60
2	Neutral attitude	1.61	1.22	79	20
3	Negative attitude	1.57	1.76	77	20

Table 3. The results of distribution of average values of components of social-psychological climate in the collective of 10th-graders of school 1448   (N = 50) (Descriptives Statistics)

№	Collective relationship components	M	SD	%	Evaluation results
1	Cognitive	0.53	1.29	33	Positive
2	Emotional	0.85	1.21	54	Positive
3	Behavioral	0.20	1.24	13	Contradictory

As can be seen from table 3, assessments of the cognitive and emotional components of relationships in the team are positive, and the assessment of the behavioral component is contradictory.

As part of the second stage of assessing factors, the effectiveness of the organization of the teaching and learning process (SACERS scale), an assessment of the degree of consistency of expert opinion using the Kendall coefficient of concordance. The consistency of expert assessments of the educational environment of the school is W = 0.61 (Kendall's coefficient of concordance), which is an indicator of the average degree of agreement of expert opinion and allows using the data presented by experts to highlight "zones of well-being" and "zones of deficits" of the studied educational environment, as well as calculations educational quality index. In addition, the opinions of internal experts can be fully taken into account to assess the conditions of the educational environment along with the opinions of external experts.

In the table 4 presents the quality indices of the educational environment, calculated on the basis of expert estimates (Descriptives Statistics). The quality index of the educational environment is the total value of the expert's ratings for all indicators of the scale (48 indicators), divided by the number of these indicators. The quality index makes it possible to characterize the level of development of the educational environment in the range from "unsatisfactory" (1 point) to "excellent" (7 points). The general index is an average of all expert ratings.

Table 4. Indices of the quality of the educational environment of school 1448 (Descriptives Statistics)

The experts	M	SD
m1	5.52	1.99
m2	5.67	2.11
m3	5.56	2.19
m4	4.90	1.97
General quality index	5.41	0.34

As can be seen from table 4, the general quality index of the educational environment of school 1448 is M = 5.41, which indicates the average level of development of the educational environment.

High average values of indicators of expert opinions represent "zones of well-being", and low average values of indicators represent "zones of deficit", reflected in table 5.

Table 5. Comparison of zones of well-being and deficits of the educational environment of the school, which are factors in increasing / decreasing the effectiveness of education

Well-being zones	Deficit zones
1) Furniture for everyday use	1) Space for mobile activity
2) Furniture for relaxation and comfort	2) Music and dancing
3) Access to specialized services	3) Discipline
4) Health instruction	
5) Security measures	
6) Personal hygiene	
7) Fine arts and technology	
8) Design	
9) Mathematics / cognitive activity	
10) Meeting / departure	
11) Teacher / teacher interaction	
12) Communication Teacher / Teacher	
13) Peer Interaction	
14) Communication between teachers and subject teachers	
15) Teacher / administration interaction	

As can be seen from table 5, the educational environment of school 1448 has high rates of expert assessment on 15 scales, the number of low indicators that form the "deficit zone" is equal to only three scales. This indicates a high level of well-being of the educational environment of the surveyed school.

3.2. The results of the analysis of approaches to the management of educational activities

In the traditional educational system there is no clear description of the subject of educational activity and a description of its educational goals (only cognitive). Training is work is carried out with the class as a collective subject, which threatens the possibility of building an ILP (Klarin, 2016). Psycho-pedagogical management is a fundamentally different type of activity, affecting all three functions of the educational space (educational, socio-practical and educational-reflective).

Three approaches to the management of educational activities were chosen for analysis: tutoring, supervision, coaching. The key aspects in the structure of each approach are identified: the object, the result of the impact, the transformation process, the means of transformation (Glozman, 2016; Kasitsina & Krupskaya, 2015; Klarin, 2015; Leontiev, 1983; Mansvetova, 2017; Iliffe-Wood, 2014; Obrist, 2014). According to the results of the comparison revealed:

1) With regard to the implementation of the functions of the educational space, these approaches are characterized by: a socio-practical function (supervision), an educational and reflexive component (tutoring, coaching).

2) Regarding the process and means of transformation: the coach solves more general tasks directly related to the ILP, the tutor has a wider methodological and technological base (group methods allow students to get closer to the ILP).

3) There are formal and substantive restrictions: the use of psychotherapeutic agents by non-certified specialists (coaching), staff shortages (supervision, tutoring), proper funding and methodological apparatus (supervision), the risk of reducing socialization of students as a result of individual work (tutoring).

Discussions

An analysis of the assessment of the indicators of the educational environment of school 1448 by experts showed that this educational institution is characterized by a high level of well-being, which is confirmed by the beginning of a large number of "zones of well-being" and only three "zones of deficiency" (Table 5). The values of the quality index of the educational environment indicate its average development and high potential, which also confirms its well-being (Table 4).

Evaluation of the characteristics of the educational environment from the position of students demonstrates the predominance of a positive attitude among students in grades 10 (table 2), in the presence of a generally favorable socio-psychological climate, with the highest indicators being obtained within the emotional component, then the cognitive and behavioral components follow (table 3). An interesting fact is that in a study comparing the emotional and psychological safety of the educational environment of schools in Russia and the USA by the same indicators, it was found that both Russian and American students put the cognitive component in the first place in terms of safety, and the behavioral component in the second, on the third - emotional. It is in the field of emotions, communication, and relationships that students in the United States and Russia see the greatest threat to their psychological safety (Berezina, 2015). However, the results of our study showed that in the 10th graders of school 1448, the emotional sphere, evaluated in the framework of the socio-psychological climate, has high rates. We suggest that this may be facilitated by the presence of favorable external and internal conditions of the educational environment.

Despite the high performance indicators of the educational environment that we obtained from the perspective of both students and experts, "deficit zones" were found (Table 5). The presence of "deficit zones" can be a factor that reduces the effectiveness of training, and therefore requires measures to reduce them, transforming them into "zones of well-being". To do this, it is necessary to analyze the approaches to managing educational activities (tutoring, lecture, coaching) and choose the one that could be used to work with the "deficit zones" of the educational environment being examined. The use of the chosen approach should be relevant in organizing the space for students' active activities, assistance for the implementation of creative activities (music, dancing), as well as maintaining discipline (Table 5).

All modern approaches to the construction of individual learning paths and their management have a number of limitations with regard to taking into account a holistic system of factors affecting the effectiveness of training. In the table 6, the main formal and substantive limitations of the selected approaches are highlighted (Table 6).

Supervision mainly affects external factors of the teaching and learning process (the joint creation of external motivation to achieve goals, the planning of collective activity, its organization and analysis), which is more typical of classical development models (Table 1). Coaching technologies are based on non-classical determination models and are aimed at "triggering" from the outside the internal determination of mental processes. Tutoring to a greater extent takes into account both groups of determination relations: external and internal. However, it is too early to say that their activities are organized based on non-classical models, since the content of determinants and the mechanisms of interaction between them are not spelled out.

Table 6. Formal and substantial limitations of the selected approaches to the psychological and pedagogical management of the learning process

Approaches to psychological and pedagogical management	Limitations	
	Substantive	Formal
Tutoring	Qualification, reduction in the level of socialization of students, categorical management	Uniformity of the staff, lack of job descriptions
Supervision	Reliance on personal qualities, the implementation of a narrow set of functions of the socio-practical aspect of the educational space	Uniformity of the staff, lack of targeted funding and methodological management
Coaching	The use of active methods and means of psychotherapy without imposing appropriate limitations	Lack of certification in psychiatry

Tutoring, as professional management for external mentoring and personal development in the modern educational space, is the most optimal approach to mentoring and acts as an element of innovative learning, the use of which helps to reduce the number of "zones of deficits" of the educational environment that affect the effectiveness of learning by building an individual learning path and student development, which means it is an appropriate type of mentoring to solve problems with moving and activity each student of school 1448, individual assistance for the realization of their creative activity. It is likely that with the successful implementation of the activity and creative potential of each student, problems with discipline, which is also an indicator that is part of the "deficit zone", can be successfully resolved. However, the uniformity of the staff, both in the case of tutoring and curating (Table 6) are significant formal constraints, since the transformation of indicators from the "deficit zone" into the "well-being zone" requires continuous implementation of the mentoring function.

Conclusion

A comparative analysis of approaches to the psycho-pedagogical management of the learning process showed that academic tutoring as a professional mentoring the implementation of ILP and personality development in the modern educational space is the most optimal and acts as an element of innovative learning.

Due to insufficient knowledge Tutoring requires further detailed structural and activity analysis. We have proposed the organization of tutorial psycho-pedagogical management based on a generalized indicative basis of activity based on the activity theory of learning by Pogozhina, Simonyan and Agasaryan (2018).

Activities to management individual learning paths, organized based on this content, are suitable for working with students of different age groups, and can form the basis of the professional training of a modern tutor:

1) Subject of activity: mental processes, behavior and activities of the student, affecting the achievement of the goals of education and development set independently or perceived "from outside".

2) The result of the activity: the formation of mental processes and actions that ensure the student's effective movement along the individual learning path built in joint activities.

3) The process (acts of transformation):

- Establishing contact with the student. Clarification of the problem situation, hypothesis about factors affecting the quality of his life (the occurrence of personal problems, difficulties in educational activities).

- Beginning of cooperation, testing hypotheses put forward at the 1st stage. Helping the student in understanding and solving personal problems. Removing anxiety.

- The construction and maintenance of ILP in joint productive activities (the formation of the necessary cognitive, metacognitive, organizational skills, ways to cope with problem situations, etc.).

- Completion of management. Managing the student's independence, assistance in mastering and transferring the functions that the mentor performed to the student's internal plan (primarily the management, reflection, and planning and control functions).

4) Means: diagnostic techniques and the formation of mental processes, behavior, activities.

Acknowledgements

References

Basilaia, G., & Kvavadze, D. (2020). Transition to Online Education in Schools during a SARS-CoV-2 Coronavirus (COVID-19) Pandemic in Georgia. *Pedagogical Research*, *5*(4). doi: https://doi.org/10.29333/pr/7937.

Baeva, I. A. (Ed.). (2006). *Ensuring psychological safety in an educational institution.* St. Petersburg: Speech.

Berezina, T. N. (2015). Formation of the emotional security of the educational environment (psychological and pedagogical aspects). *Modern Education, 1*, 53 - 68. DOI: 10.7256/2409-8736.2015.1.13912

Bergman, L. R., Magnusson, D., & El Khouri, B. M. (2003). *Studying individual Development in An interindividual Context: A Person-oriented Approach.* Mahwah, N.J.: Lawrence Erlbaum Associates.

Butenko, V., Polunin, K., Kotov, I., Sycheva, E., Stepanenko, A., Zanina, E.,… Topolskaya, E. (2017). Russia 2025. From cadres to talents. *The Boston Consulting Group (BCG).* Retrieved from https://www.bcg.com/Images/Russia-2025-report-RUS_tcm27-188275.pdf

Ebner, N., & Press, S. (2020). Pandemic Pedagogy II: Conducting Simulations and Role Plays in Online, Video-Based, Synchronous Courses. *SSRN.* Retrieved from https://ssrn.com/abstract=3557303 or http://dx.doi.org/10.2139/ssrn.3557303

Glozman, Zh. M. (2016). *Practical neuropsychology. Experience with children having difficulties in process of learning.* Moscow: Terevinf.

Harms, T., Jacobs, E., & White, D. (1996). *School Age Care Environment Rating Scale.* New York: Teachers College Press.

Iliffe-Wood, M. (2014). *Coaching Presence. Building Consciousness and Awareness in Coaching Interventions.* London: Kogan Page.

Kasitsina, N.V., & Krupskaya, N.S. (2015). *Pedagogical support in school and the system of work of personal curators.* Moscow: Shkol`naya liga.

Klarin, M. V. (2015). Innovative learning in adult's education. *Problems of modern education, 4*, 5–27.

Klarin, M. V. (2016). Method of innovative education: organizational activity pedagogy. *Continuing education: XXI century, 13*(1), 86–103.

Leontiev, A. N. (1983). *Selected psychological works: in 2 books*. Moscow: Pedagogika.

Mansvetova, M. (2017). *50 000 characters for the tutor. Practice of Tutorial Competencies*. Publishing Solutions.

Mikhalyuk, O. S., & Shalyto, A. Yu. (1983). The study of the socio-psychological climate in the workforce using the "express methodology". In E.V. Shorokhova (Ed.), *Socio-psychological problems of the production team* (187-197). Moscow: Publishing House «Science».

Obrist, H. U. (2014). *Ways of Curating.* New York: Faber & Faber.

Pogozhina, I. N. (2016a). Models of the relationship between training and the development of the psyche in the cultural-historical and activity approaches. *Psychological Science and Education: Electronic Specialized Scientific and Practical Periodical Edition, 8*(3), 16–31.

Pogozhina, I. N. (2016b). *The formation and development of cognitive structures: determinants and mechanisms. Post-non-classical model. Monograph.* Moscow: NRNU MEPhI.

Pogozhina, I. N., Simonyan, M. S., & Agasaryan, M. B. (2018). The problem of accompanying individual trajectories of education in the epoch of digital childhood. *Moscow University Psychology Bulletin, 2*, 15-34.

Shchennikov, S. A., Teslinov, A. G., & Chernyavskaya, A. G. (eds.). (2016). *Innovative processes in education. Tutoring. Part 2. Training aid.* Moscow: Yurayt.

Soldatova, G. U., & Rasskazova, E. I. (2017). Digital situation of development of intergenerational relations: the gap and interaction between adolescents and parents in the Internet. *The world of psychology, 1*(89), 134-143.

Vinogradova, I. A., & Ivanova, E. V. (2018). SACERS. *Scientific and methodical electronic journal "Concept", 4.*