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Implementation of the Theory of Gradual Formation of Mental Actions in the Format of a Distance Lecture

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Abstract

Introduction. The article deals with methodological and conceptual issues of the implementation of the theory of gradual formation of mental actions by P. Ya. Galperin in the conditions of distance learning in higher education. We have analyzed for the first time the potential of P. Ya. Galperin's theory of the gradual formation of mental actions for methodological support of distance university lectures and described the vectors of its transformation in connection with the electronic learning format. **Methods.** The study material was lectures conducted on the YouTube platform. The study participants were students and teachers from Bunin Yelets State University who gave them batch lectures using the YouTube service. The method of active interviews with students and teachers was applied as a research tool. The results were processed using a meaningful content analysis. **Results.** It was found that both the advantages and disadvantages of distance lectures reflect the psychology of assimilation of mental actions described in P. Ya. Galperin theory. Thus, to meet the quality standards of education, the content of the educational materials presented in the lecture must meet the requirements of the third type of learning, according to P. Ya. Galperin. The generality and completeness of the educational material should be ensured, subject to the condition that the volume of the educational material does not exceed the traditional lecture's volume. **Discussion.** The results obtained indicate that the distance learning form does not exclude the successful application of the fundamental provisions of the theory of the gradual formation of mental actions, which once again proves the importance of this theory for building successful learning technologies regardless of the learning format. In the context of the development of this theory, the opinion is expressed about the need to teach students the technique of processing the written form of a distance lecture, translating it into a mini-abstract format.

Keywords

gradual formation of mental actions, higher education, distance lectures, educational content, learning motivation, mental effort, presentations, paper notes, active interview, learning theory

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Introduction

Theoretical and methodological issues of distance learning in higher education institutions have been the subject of teachers' and psychologists' studies for several decades. However, before the COVID-19 pandemic, the advantages of distance learning and its technological aspects were mainly considered (Titova, Talmo, 2015). The global transition to the distance learning format has caused organizational and methodological shock almost all over the world. The term "crisis learning" appeared in the scientific literature, which actually meant the requirement to rethink the new format of learning not so much in terms of advantages as in terms of disadvantages. One of the significant obstacles to achieving distance learning quality in many countries has become the technical inadequacy of the educational process, low internet speed, and information illiteracy of both separate students and some teachers. It is not surprising that most of the articles on higher education problems during the COVID-19 period are devoted to the technical aspect of distance learning organisation (Bataineh, 2021; Cristóvão & Massinga, 2021; Essel, 2021).

However, the impendency of the distance learning format under conditions of coronavirus pandemic contributed to the revision of the organization demands of education and the improvement of computer literacy, which required a reassessment or refinement of scientific theories in the field of education and upbringing, taking into account modern realities. Thus, when studying the educational aspect of learning, the limitations of the distance format were revealed concerning the peculiarities of the impact on the student's personality. In particular, attention is focused on the problems of socialization and personal development since distance learning contributes to the isolation of students and teachers (Garanina et al., 2021).

Many works note the problem of remote content quality, including university lectures. This problem has not been solved meaningfully for a long time and facilitates the use of formal recommendations that are not based on scientific knowledge. For example, recommendations on the use of individual achievements of particular teachers were obtained by trial and error (Hollweck & Doucet, 2020; Johnson et al., 2021; Trombly, 2020). Part of the research focuses on secondary aspects of the educational process, for example, gender differences in the perception of content broadcast in a remote format (Hsiao, 2021). It does not fundamentally solve either the methodological or theoretical problems of modern distance learning. However, the part of scientific research contains mainly general messages about the freedom of teaching and the greater possibility of teachers' creativity in the distance learning format, not supported by scientific ideas (Trends in Digital Education, 2021).

Meanwhile, works are of interest in which questions are raised about the application of long-known learning concepts - the concepts of Bruner and Vygotsky - in the organization of distance learning at a university (Garg, Dhariyal & Newlands, 2022).

In Russian psychology, the theory of the gradual formation of mental actions has long been recognized and implemented not only in school, as it was at the initial stage of testing this theory (Galperin, 1985; Talyzina, Volodarskaya, Butkin, 2019; Talyzina, 1990; Selevko, 2005), but also in higher education (Golovanova, 2020; Potorochin, 2018). Thus, B. I. Khoziev reveals the potential

of the theory of phased formation in higher military education (Khoziev, 2012), and A. Podolskij considers this concept more globally, in the long term, as a basis for the development of learning competencies of the XXI century (Podolskij, 2020). In Western psychology, it is argued that the legacy of Galperin represents an invaluable potential for educational research and practice as an analytical resource. The theory provides an understanding of how students and teachers participate in the processes of learning, teaching, and development (Engeness & Lund, 2020; Lund & Engeness, 2020).

However, the problems of distance education in the context of the implementation of gradual formation theory at the university are considered meantime only in the field of correcting students' learning motivation (Ilyasov, Aslanova, Anerzhanova, 2020). It makes the problem of applying the theory of P. Ya Galperin in the course of distance learning relevant.

We have identified the following research objectives:

1. Identification of the significance of the provisions of the gradual formation of mental actions theory of P. Ya. Galperin for methodological support of distance university lectures.

2. Identification of ways to transform the theory of gradual formation of mental actions in connection with the distance learning format.

Methods

The study methods were an active interview and a meaningful content analysis of the responses received during the interview. An active interview differs from a regular interview in the possibility of clarifying the answers of the respondents in the direct communication process.

We used the following active interview questions:

1. What, in your opinion, is the advantage of distance lectures?
2. What, in your opinion, is the disadvantage of distance lectures?

Sample group

The study involved 2 groups of respondents.

The first group consisted of 100 second-year students aged 19-20 years. Among them were 81 girls and 19 boys from different educational fields at Bunin Yelets State University, who listened to batch lectures on the YouTube platform.

The second group included 14 teachers of Bunin Yelets State University, who gave batch lectures on the YouTube platform.

The peculiarity of remote lectures on the YouTube platform is that they are as public as possible. Almost anyone who has followed the link on the university website in open access can be a listener. At any time, any employee of the university, including those performing control functions (the head of the department, an employee of the educational department, a delegate of the rector's office, or even the Ministry and Federal Education and Science Supervision Service, and also teachers from other universities) can join the students. It carries a great responsibility on lecturers. They should realize their own scientific and methodological potential at a high level in each lecture. As it turned out during our pilot survey, unlike teachers who used other communication systems, for example, the Zoom programme, lecturers who conducted classes on the YouTube platform reflected more reflexively not only the technical and ethical aspects of distance learning but, first of all, its methodological and conceptual problems. Because of this, as experts in assessing the advantages and disadvantages of distance lectures as an educational product, we selected teachers who gave lectures using YouTube.

The study was conducted from May 2021 to June 2021.

Results

When processing the survey results, we did not consider arguments concerning the technical and organizational aspects of remote lectures – situations of communication blocking, the ability to attend online lectures even during illness, features of academic ethics, the possibility of imitation of participation in classes, and protection from coronavirus infection, although they were reflected in the reports of students.

We were interested in aspects related to the specifics of the learning methodology. In addition, when processing interview materials, our goal was not so much to identify the statistically most important advantages and disadvantages of distance lectures from the students' point of view, but also to identify as many **elements** of their advantages and disadvantages as possible. We proceeded from the fact that not all students will be able to reflect some psychological and pedagogical features of distance learning due to differences in the level of psychological and pedagogical qualification. Therefore, we analyzed and considered even individual opinions that did not fit the general context.

The analysis of students' responses to the interview questions is presented in the tables below. Table 1 records the arguments of students in favour of distance lectures.

Table 1

The advantages of a remote lecture (content analysis of student interviewing)

Content of the argument	Positive responses, %
The presence of a display that makes the material visual	100
The presence of visual examples in the form of pictures, videos, etc.	100
Effective use of study time: there are almost no deviations from the work programme, only the material that is needed to prepare for the exam or test is given	32
More visual information: since the visual analyzer is the leading one, this contributes to better assimilation of the material	42
The ability to technically record a lecture for revisiting	73
Ability to copy a presentation	65
Save time, as you do not need to draw diagrams and tables on the board	31
The names of scientists and scientific terms are sometimes worse comprehended, and with the advent of visual presentations, there are fewer such errors	18
The quality of the lecture is better if the teacher comments on the text of the presentation that appears on the screen	89

The most obvious advantage for most of the respondents was the presence of visual presentations (100%). Furthermore, the quality of the presentations has become one of the criteria for a high-quality lecture. It is not surprising that the lack of presentation material was observed as a distinct lack of distance lectures (72%) (Table 2).

Table 2

Disadvantages of Distance Learning (content analysis of student interviewing)

Content of the argument	Positive responses, %
The style of the lecture, when the teacher simply reads the text without comments	72
If the material is unclear, the teacher refers to the textbook	38
The volume of material given in lectures has increased	12
Screenshots of lectures are not enough to prepare for an exam or a test, then you need to rewrite them, and it takes more time	34
Tougher ethical framework for asking clarifying questions immediately during the lecture, because they do not want to distract the teacher	68
The lack of live communication, the teacher is perceived more as a translator of knowledge, not an interlocutor.	100
Since the teacher does not see the students, he cannot control the pace of the lecture, so there are problems with taking notes	15
In a situation where one teacher gives lectures and another conducts seminars, problems arise when interviewing material that was not presented at the lecture. In this case, the motivation to listen and inscribe lectures disappears	8
In the absence of self-motivation to study, there is a temptation to get distracted	42
The moment was not clear at the beginning: What to focus on - the teacher's speech or the text of the presentation?	23
The technique of working with a remote lecture was unclear: What is better: screenshot or notes?	33

In the context of the theory of gradual formation of mental actions, visual presentations can be considered as a way of organizing an indicative basis for action and even as a materialized stage of assimilation of action. In this regard, a lecture with well-structured visual material, of course, contributes more to primary orientation and primary assimilation of the material than just a verbal text or a verbal text illustrated on a blackboard during a lecture in the classroom. Lectures on the YouTube platform according to the teachers participating in the survey, required more work in this aspect than classes in the Zoom programme since they were public. They should have been understandable to both students and other persons accessing this content.

Meanwhile, according to the theory of gradual formation, the orienting basis of action appears to be more productive if general knowledge is presented in it. This point was reflected in the interviews with the students (Table 2). Lectures that focused on memorization of the material or reference to the textbook in case of uncertainty (the first orientation type according to P. Ya. Galperin) were defined as "difficult to perceive" by 38% of the students in the study (Table 2). We found that understandable and effective lectures were those that first presented students with general knowledge for study, then with cases illustrating it (the fourth orientation type). Alternatively, the solution of cases can be discussed at the seminar (the third orientation type). Contrariwise, the students noted the difficulty in perceiving lectures on subjects where this technique was not used, and mostly specific knowledge was given instead. Specific knowledge tends to be hard to generalize on one's own. As an example, we can take legal disciplines, where there were many references to specific regulations.

A slightly different perspective compared to the students' interviews was also revealed in the problem of learning, which piqued our interest in the context of Galperin's theory. The results of the survey of this part are presented in Tables 3 and 4.

Table 3

Strengths of a distance lecture (interviews with teachers' content analysis results)

Argument content	Positive responses, %
More structured study material	50
Greater demonstrativeness of study material	71
Opportunity to provide more study material	78
Flexibility (everyone can study as much as they personally needs to master a course)	14
The responsibility and significance of professional activity in a situation of greater external control increased the teacher's self-esteem	42
To repeat the previous material required for a new lecture, it is enough to include files from previous presentations	42

Table 4

Weaknesses of a distance lecture (interviews with teachers' content analysis results)

Argument content	Positive responses, %
The absence of a teacher's control; the absence of dialogue between the teacher and students, the lack of the opportunity to discuss the issues under consideration	100
Inability to determine the level of primary assimilation of new material	100
Students take screenshots of the presentation, which contains the main material on the lecture' topic, but they do not listen to a teacher's explanations	42
Methods of preparing and conducting distance lectures require additional costs from a teacher	71
A student themselves must have great self-organization and diligence	50
The difficulty of motivating the listeners of a lecture	64
The increased load on working memory and attention	21

The main strength of online lectures on the YouTube platform was recognized as a teacher's special responsibility for selecting the content of lectures. Furthermore, as noted by the participants, an increase in the responsibility and importance of professional activity in a situation of greater external control caused the teacher's self-respect to grow. It can be claimed that addressing this feature of a distance lecture can serve as an incentive in the development of the theory of gradual formation. It can cause the emergence of new arguments to support the motivational component of learning. Self-respect required from the teacher a presentation of study material that could motivate the student to attend distance lectures, regardless of attendance control.

Meanwhile, teachers' opinions were divided on the amount of material allowed in the format of a distance lecture. That is, the majority of teachers (78%) viewed the increase in the amount of content of study material that can be read remotely as a strength. In principle, that position corresponds to the provisions of the theory of gradual formation of mental actions, since a larger amount of material ensures the action completeness. 32% of the teachers considered this feature as a weakness, since there was actually an increase in the amount of information by approximately 25–30% in a distance lecture, which caused a load on working memory and attention. From the theory of gradual formation point of view, the arguments of this group of teachers correspond to the characteristics of mental action, such as awareness and reasonableness. These characteristics are easier to implement with a smaller amount of lecture material. Therefore, a certain balance must be observed between the desire to give detailed material in a lecture and the ability of students to comprehend it within the lecture time.

In general, the analysis of interviews with teachers highlighted the problem of distance lectures from the other side, from the educator's perspective. Furthermore, the problem of copyright compliance for intellectual property, which is an author's lectures, was raised. Emphasis was placed on the problem of protecting the right to one's own image in the form of permission or prohibition to use it during the broadcast of lectures. These problems are actively discussed in the scientific community (Barbierato et al., 2021).

Discussion

The subject matter in the students' answers to the interview questions was the question of the need to take notes of the lecture material if they already have a presentation. This question has already been raised by other authors, but no science-based answer was received, although the researchers drew attention to the fact that the paper notes, in particular compiled by the student personally, are essential for mastering study material (Macedo-Rouet et al., 2009; Rensaa, 2014). In our study, some of the students wrote the presentation text into a notebook, some of the students printed the presentations or stored them on their smartphones. In fact, from the point of view of the Galperin theory of gradual formation of mental actions, we were talking about the organization of the external speech stage in the form of written speech. The external speech stage and the stage of written speech corresponding to it ensure the development of mental action, when none of the elements that require the transition to the internal plane disappears. Ultimately, it determines the completeness of mastering knowledge. It turned out that those students who rewrote the text of presentations (of course, except for examples) showed higher results in mastering the material. Russian researchers have already mentioned this on the example of laboratory classes: skipping the external speech stage in university education affected the quality of assimilation of the material (Katashev, Ulrikh, 2012).

However, the students noted that the rewriting process made the lecture work more laborious and time-consuming. At this point, one of the problems of distance lecture appeared as a marker. On the one hand, its text can be 'downloaded' in full format, on the other hand, simply reading a 'downloaded' lecture does not ensure the completeness of mastering knowledge. This fact allows us to recall the instructive speech of the outstanding Soviet psychologist A. R. Luria on the rules for a student to work with the text of a lecture. Obviously, in distance learning, students need to work with the typed text of a lecture or presentation in a certain way. The way

that they can, having highlighted the main, translate it into a model (short summary) format, as A. R. Luria had been doing it, studying at the medical institute. This model allowed him to graduate successfully in three years instead of six. He traditionally told first-year students about this at their first lecture at the Faculty of Psychology of Lomonosov Moscow State University and demonstrated his scheme models, accumulated from detailed lecture notes (according to the personal experience of the authors). From the theory of gradual formation viewpoint, here the wrapping knowledge mechanism is manifested, which is necessary for the knowledge to pass into the plane of consciousness systematically, with the least losses.

As far as is known, the weak point of the theory of the gradual formation of mental actions is the conceptual defect of the first stage – the motivational stage. In psychology, types of learning motives are traditionally studied, including those that consider them in relation to different developmental ages (Budyakova, Pronina, 2020). However, the problem of motivation in distance learning remains relevant, as evidenced by the work of Russian scientists, adherents of the Galperin theory of gradual formation (Ilyasov, Aslanova, Anderzhanova, 2020). In our study, ambivalence was revealed in the assessment of this component of learning: some of the students indicated that being focused is better precisely on distance lectures, since home conditions are more comfortable, and others noted that when studying at home, motivation for perseverance during a lecture decreases. The proportional ratio is approximately the same: 38% of the students were for the home version, 62% for the classroom. This aspect requires special analysis and needs to be studied further.

The motivational aspect was also relevant to teachers. The technology of conducting lectures on the YouTube platform does not allow to see the students, which, especially at the beginning of the course, stimulated the lecturers to look for techniques that would increase interest to the lecture. This was reflected in the selection and demonstration of visual material in the form of pictures, photographs, videos, its presentation in a problematic form and inclusion of special mini tasks and cases in the texts of lectures for further processing at seminars. In that case, the advantage of the remote format, which includes the presentation of study material as a mandatory component that has a greater stimulating power, was clearly expressed, in contrast to lectures in the usual mode, when one can simply dictate the text without showing a presentation.

Meanwhile, the fact of dispersion of students' attention when using online learning was stated in the literature, but its causes were not analyzed (Liao, Wu, 2022; Al-Mamary, 2022).

Our study made it possible to determine some of the reasons for attention dispersion, based on the provisions of the theory of gradual formation of mental actions. As a rule, the absence of direct contact did not allow one to identify aspects of the topic content that were difficult to understand. In this case, as it turned out, it is better not to artificially increase the amount of theoretical material. In this sense, the desire of some teachers not to increase the amount of theoretical material, filling the excess time of online lectures with illustrations and learning cases instead, can be considered one of the options for a deeper provision of mastering the orientation basis of action at the materialized stage or at the stage of perceptual action. This is important in the absence of normal contact with students, which provides in the format of a regular lecture, with included problematic issues, the level of primary assimilation of the material, sometimes even at the stage of loud speech.

Conclusion

Therefore, the following conclusions can be drawn:

1. The distance learning format not only does not reduce the importance of the theoretical postulates of the concept of P. Ya. Galperin, developed for traditional teaching methods but, on the contrary, shows its undiscovered potential;
2. The psychological meaning of paper lecture notes lies in an easier transition from the materialized form of the orientation basis of action to the external speech and mental forms;
3. An increase in the amount of study material during a distance lecture can contribute to dispersion of student attention.

Therefore, the theory of gradual formation of mental actions reflects the mechanisms of assimilation of scientific knowledge so well that it is also in demand in modern distance learning technologies. It was perfectly applicable under the conditions of 2021–2022, and it can also be successfully applied now (in 2023) if a distance lecture is needed. At the same time, there are certain methodological aspects of the implementation of the theory of P. Ya Galperin on modern technological platforms that require further study.

In conclusion, we can state that the theory of P. Ya Galperin has already been called a theory that is ahead of its time (Stepanova, 2006), and in the age of complete informatization, this definition once again confirms its accuracy and relevance.

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Author Contributions

Angelica Nikolaevna Pronina formulated the concepts, prepared the theoretical justification of the study; summarized the results; finalized the text.

Tatyana Petrovna Budyakova conducted a theoretical analysis of the sources; prepared the theoretical justification of the study; analyzed and summarized the data.

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THEORY AND METHODS OF TRAINING AND EDUCATION

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Conflict of interest information

The authors have no conflicts of interest to declare.