Peculiarities of using LearningApps Service in the Process of Developing a Motivational Component of Professional Training of Future Professionals in Terms of Adaptive Learning

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Abstract: The article considers the adaptive learning system as a system that can help each student to achieve the optimal level of intellectual development in accordance with his natural abilities and inclinations. The main advantages of using interactive exercises in the process of organizing educational activities using the technical capabilities of the LearningApps service are considered. The paper demonstrates the ways of using the appropriate service in the process of implementing a personalized approach to educational activities, presents the results of an empirical study focused on the implementation of the LearningApps service in the process of studying first-year students of psychological disciplines. Statistic data show the feasibility of using the service LearningApps in the development of the motivational component of professional training of future professionals in the conditions of adaptive learning.

1 INTRODUCTION

At the present time, information and communication technologies are becoming an integral part of the process in various subject areas and social practice. The development of modern education is inextricably linked with the informatization of society, and information and communication competence is considered as a priority. Education is one of the basic elements of the ecosystem of (digital) innovation and the digital economy in general. Creating, attracting and retaining a sufficient number of professionals with new technologies is needed to achieve a competitive advantage in the digital world. With the advent of new technologies there is a demand for new competencies (Semerikov et al., 2020).

There is a growing shortage of skilled workers, and the acquisition of digital skills is becoming a basic need. For example, the shortage of staff is currently one of the main obstacles to the development of AI: according to Bell (Bell, 2018), there are no more than 22,000 PhD professionals in this field worldwide today, and only in the United States there are more than 10,000 vacancies. According to Smit et al. (Smit et al., 2020), by the year 2030 in Europe, working time will increase by 20% with the use of innovative technological skills in any industry or social practice and by 65% with the use of basic technological competencies. According to the same study, over the next 10 years, 90% of jobs will require digital skills in professional self-realization of specialists in various industries. Demand will also increase for workers with social, emotional and motivational skills – by about 22% across all industries in Europe by the year 2030. Accordingly, the cognitive, emotional-volitional and motivational component of the implementation of information competence of a specialist in the changing conditions of professional practice development will become a key standard of professional suitability and competitiveness.

The modern process of professional training of a specialist in the context of the transformation of education and the spread of blended learning technolo-

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gies is already unthinkable without the widespread use of innovative technologies that are at the stages of revolutionary development. Their development creates the basis for the implementation of the latest educational programs at a qualitatively new level, initiates and develops the emergence of new educational practices, which, in turn, contributes to the transformation of education as a whole. The priority of higher education development is the implementation of modern computer technologies that provide access to a network of high-quality databases, expand the ability to perceive complex information, focus on individual psychological characteristics of students and rely on the principles of personification of blended learning. This is done by creating individual training programs of various levels of complexity, depending on the specific needs and features of using the Internet's capabilities. Thanks to information and communication technologies, today we have more opportunities to use the latest services in the educational process and more effectively organize individual and group work of students. Accordingly, the issue of implementing modern information technologies in the process of professional and personal development of a future specialist is important.

The use of modern information training systems contributes to the individualization of the educational process and creates conditions for differentiated learning depending on the level of training, psychological characteristics and needs of students. This makes it possible to carry out automated control of knowledge and formation of certain professionally important competencies and adapt the learning process to specific educational tasks and individual characteristics of the student. In this regard, it is important to study systems and services focused on the implementation of components of adaptive learning as one of the promising areas in the modern information system.

2 LITERATURE REVIEW

The realities of modern times that world civilization has encountered in connection with the pandemic have been particularly acute in the field of education. In a fairly short period of time, teachers and students were forced to radically change the forms, means, methods, techniques and ways of teaching. In the context of pandemic restrictions, the priority direction of the reformation of the higher education system has become an urgent transition to a blended form of education, that is, a structural-logical and holistic combination of classroom classes and distance learning us-

ing modern services, interactive and cloud technologies (Fernández Cruz et al., 2020).

Current issues of using Web 2.0 mobile applications (in particular LearningApps.org), the integration of information and communication technologies in the process of teaching students were considered in (Harmandaoğlu Baz et al., 2019; Malchenko et al., 2021; Shea et al., 2006; Ullrich et al., 2008). At the same time, the issue of optimizing the training process of future specialists, taking into account their individual psychological and typological characteristics, and introducing an adaptive learning system remained important. Thus, an important direction of education reformation in the context of the introduction of adaptive learning is the development of a constructive model for building individual learning scenarios based on the student model and maps of user knowledge gaps. The student's model shows the main parameters of their level of training and individual cognitive features. It allows to implement a number of new technologies for the formation of individual calendar plans of repetition of themes, construction of individual trajectories of forgetting processes by the student of the received knowledge, and development of individual scenarios of adaptive testing (Tomashevskiy et al., 2021).

As part of the analysis of empirical, practice-oriented research, it is quite interesting to research aims to develop an adaptive learning system using Hybrid Learning Diagnostic Approach (HLDA) to diagnose and detect learners' learning styles according to the criteria in the Index of Learning Style (ILS) into 3 dimensions (1) active-reflective, (2) visual-verbal, and (3) sequential-global (Singpant et al., 2020). Empirically, researchers prove that the Self-Evolving Adaptive Learning (SEAL) system for personalized education at scale is quite effective in the process of personalizing the educational environment (Liu et al., 2020) and highlight the key structural peculiarities of the practical implementation of the adaptive learning system, taking into account the individual characteristics of dyadic interaction between teachers and students in order to effectively organize the formation of the future specialists' professional competencies (Cavanagh et al., 2020).

As part of the practical implementation of the concept of personalized learning Valko and Osadchyi (Valko and Osadchyi, 2020) propose the introduction of elements of the theory of artificial neural networks into the educational process. Based on the network, according to the Semerikov et al. (Semerikov et al., 2019), it is possible to build a model of the educational process, which will significantly increase the teacher's control over the learning process. More-

over, Valko and Osadchyi (Valko and Osadchyi, 2020) believe that the network can adapt to a specific educational task, individual characteristics of the student and teacher. The authors constructed a mathematical model of the educational process using modern information technologies and neural networks. Their use is based on the developed criteria for successful completion of various stages of the educational process. Such criteria are intended for both the student and the teacher (Osadchyi et al., 2020a).

According to Tkachuk et al. (Tkachuk et al., 2020), the active transition of modern higher education to the digital plane encourages the processes of adapting the audience response system and mobile multimedia development tools for use in the educational environment of universities. Tkachuk et al. (Tkachuk et al., 2020) developed, tested, and confirmed the effectiveness of methods for applying audience response systems using the example of Plickers and mobile multimedia development tools using augmented reality tools.

As part of optimizing the implementation of the competence approach in the process of professional training of the future specialists in the context of digitalization of education, Vakaliuk et al. (Vakaliuk et al., 2020b) propose the implementation of game simulators in order to develop soft skills competencies. Vakaliuk et al. (Vakaliuk et al., 2020a) present the possibilities of using the Game Dev Tycoon simulator for the development of professional soft skills in future software engineers in higher educational institutions, describe in detail how students develop professional soft skills in the process of passing game simulators.

Thus, the actualization of the need of the modern educational space in the development and implementation of a comprehensive system of adaptive learning in the context of digitalization and active development of information and communication technologies, augmented reality technologies encourages further scientific research on the development of principles, methods, means of reorganizing distance and blended learning systems, taking into account the individual psychological characteristics of participants in the educational process.

In the context of actualizing the problem of introducing adaptive systems in the process of training future professionals, the issue of developing internal positive motivation and focus on professional self-realization is important, which is a key component of the future specialist's competitiveness in transforming social processes. As part of a multi-vector interdisciplinary study, the purpose of this article is to comprehensively analyze the features and effectiveness of the service LearningApps in the teaching of disciplines in adaptive learning, to develop the motivational component of professional development of future specialists in socionomic professions (for example, future psychologists).

3 METHODS

A comprehensive interdisciplinary study was conducted within the framework of scientific cooperation between the STEAM-laboratory and the Laboratory of psychophysiological research of Bogdan Khmelnitsky Melitopol State Pedagogical University (Osadchyi et al., 2020b). The methods used in the research process are: the method of analysis of theoretical sources, the study of advanced psychological and pedagogical experience of foreign and domestic scientists on the problem of implementing a competency-based and personality-oriented approach in the context of implementing a system of adaptive learning of students, empirical analysis of the impact of the LearningApps service on the development of the motivational component of professional training of future specialists in the context of adaptive learning; generalization and conceptualization to formulate the main provisions of the study; generalization and evaluation of the results of an empirical study.

4 RESULTS

4.1 Analysis of the Peculiarities of the Implementation of the System LearningApps in the Process of Training Future Professionals in the Conditions of Adaptive Start

LearningApps.org it is a Web 2.0 application to support learning and the teaching process through interactive modules. Existing modules can be directly integrated into the training content, and they can also be modified or created in the foreground mode. The goal is also to collect interactive blocks and make them publicly available. For this reason, such blocks (so-called applications or exercises) are not included in any programs or specific scenarios. They have their own value, namely interactivity. These modules can be used directly as learning resources or for independent work and self-assessment of students. The LearningApps service has a fairly user-friendly interface that allows you to easily create tasks based on

templates. A large number of templates are available on this service, which contributes to a variety of task development. It is worth noting that this service is free of charge. The LearningApps service provides the ability to get code so that interactive tasks are placed on the pages of websites or blogs of teachers and students. The advantages of using the corresponding service are a large number of languages (including Ukrainian), a large range of tasks in complexity, tasks on almost any topic, a convenient search engine, the ability to intuitively use the service, user-friendliness of the interface, free of charge, frequent updating of task templates, the ability to combine students into classes and students into groups (Nazarenko et al., 2020). One of the advantages of the LearningApps environment is the ability to download created exercises to your own computer: in SCORM format – upload them to a distance learning system or use them on a computer without the Internet, iBook Author – for using exercises on an iPad without the Internet, Developer Source – for changing exercises at the programming language level. To date, the service offers about 30 different templates, which is enough to implement many methodological ideas. All templates are divided into 5 groups: selection, division, sequence, completion, and online games (Foster and Shah, 2021). All exercises in this service are divided into categories: "Find a pair", "Classification", "Numerical straight line", "Simple ordering", "Free text answer", "Image fragments", "Quiz", "Fill in the blanks".

In the service LearningApps.org there are such tools that allow teachers to prepare high-quality electronic visual aids, audio / video materials, as well as remotely communicate with students and colleagues:

- Notebook – the simplest text editor;

- Pinboard – an application for placing multimedia content (text notes, pictures, audio, video) with imitation of attaching stationery buttons to a cork board;

- QikPad – is an online editor where multiple Internet users can work together;

- Mindmap – an easy-to-use and visual graphic editor of mental maps. It can be used both to demonstrate pre-compiled maps, and to create a mental map in a training session;

- Audio / video content – an application that allows you not only to download audio / video files, but also to build into applications. For example, on LearningApps, you can create applications where you need to guess a certain property based on sound or graphic features. It is also possible to add questions to the video that students must answer after watching it;

- Calendar – for scheduling in the form of a table;

- App grid – is an app to create a collection of multiple exercises to share with other users;

- Chat – for online communication.

In the process of filling the educational space with interactive learning components the teacher can use a particular module to solve specific problems in their subject area (Hernández-Lara et al., 2019):

- to consolidate theoretical and practical knowledge, interiorize theoretical knowledge into practical skills by solving practice-oriented and competence-oriented tasks, their verification and introspection;

- can serve as a convenient shell for organizing various competitive and project events;

- to activate the cognitive activity of students, increase the motivational component of the professional development of a future specialist;

- tasks can be created and edited online using various templates;

- application of various types of intellectual interactive tasks, taking into account the individual psychological characteristics of students, by building a psychological portrait based on the results of a psychodiagnostic examination;

- create an account for students – the teacher can create a group for which he will collect "exercises" and invite students to individual or group activities;

- ready-made exercises are easily integrated into blogs and websites, and can also be used when working off-line;

Comparing the LearningApps website with other services, it becomes obvious that it is the best choice if there is a need to develop interactive, personalized tasks for students. The analysis of existing Internet services allowed us to define LearningApps as a convenient tool for creating an interactive course from a large number of templates of various categories and complexity, which can be used for free to present, consolidate, verify and summarize the acquired professionally oriented competencies of future specialists. Considering the advantages of using the LearningApps service in the process of professional training of future specialists and in the context of the implementation of the scientific development "Adaptive system for individualization and personalization of professional training of future specialists in blended learning" by leading specialists of

the Department of Informatics and cybernetics, the Laboratory of health psychology and the Department of the Psychology of Bogdan Khmelnitsky Melitopol State Pedagogical University during 2019–2020 a set of interactive exercises, tests, and tasks was developed to increase the motivation for learning among first-year students and future psychologists. The corresponding interactive exercises were implemented from September to December 2020 as part of the teaching of the courses "Introduction to the specialty of psychology" and "Age psychology with a practical course". In this service, a "Portfolio" of the teacher was created for individual modules, filled with professionally oriented exercises, tests, games, crosswords, competence-oriented tasks, access to which the teacher provided students according to a specific lesson. Students performed tasks both individually and in a group form of work. In the context of quarantine restrictions from October to December 2020, the learning process using the LearningApps service fnd Moodle has become extremely important. In the context of increasing the role of independent work in the educational process with the help of the LearningApps service, the teacher could stimulate the development of positive motivation and interest in learning, which directly affects the formation of a positive "I concept" and professional orientation of the future specialist, the development of critical and creative thinking, media literacy, the formation of IT competence, social and communication skills, in particular the following skills:

- analysis of material, facts, comparing, comparison of facts, phenomena;

- selection of information from various sources;

- establishing associations with known facts, phenomena, establishing associations with new qualities of objects, phenomena, etc.;

- ability to use the logic of the sequence of actions performed to solve the problem, to build the logic of the decision being made, the internal logic of the problem being solved, and so on;

- ability to view the object under study, the problem in its entirety;

- systematization and generalization of the material;

- working in a team in the process of solving project tasks, mutual evaluation.

Especially popular among students in the process of completing tasks were such types of exercises as: "Find a couple", "Classification", "Simple ordering", "Free text answer", "Quiz", "Fill in the blanks", "First

million", "Puzzle", "Crossword", "Guess the word", "Horse racing", "Couples", etc. (figure 1)

As part of the corresponding service, an interactive game "The smartest" was organized and held at the final lesson in the disciplines "Age psychology with a practical course" and "Mental development of the individual with a practical course". The main goal is to integrate the acquired knowledge, update the mental potential, motivate applicants to study the material, involve them in the implementation of scientific and search activities. During the lesson, applicants participated in an exciting game. When opening tasks (problem-search, analytical-synthetic, problem situations, tests), they had to mobilize the knowledge and skills gained during training on the topic in order to successfully solve extraordinary, creative tasks, relying on the interiorization of the acquired knowledge, cohesion and creativity. Such an interactive form of conducting the lesson allowed to consolidate knowledge of the discipline, develop internal motivation for self-education, self-improvement, as important components of professional maturity, contributed to the development of cognitive interest, logical thinking, attention, sociability, activity, interest and emotional experiences of applicants.

The service also provided an opportunity for the teacher to keep statistics of exercises performed by students, to contact each student online via SMS, to assess the correctness of tasks of different levels of complexity, taking into account individual psychological characteristics of the individual.

4.2 Results of the Implementation of the Service LearningApps in the Process of Developing a Motivational Component of Professional Training of Future Professionals

In order to analyze empirical and statistical data of the study of the effectiveness of implementing the LearningApps service in the process of training future specialists and the impact of the corresponding service on the motivational component of professional training of future specialists in adaptive learning, a psychodiagnostic survey of first-year students was conducted. 40 first-year students took part in the study. In September, a psychodiagnostic study was conducted on the basis of the Laboratory of psychophysiological research in the process of implementing the "Adaptive" program of psychological support for first-year students . The second stage of the psychodiagnostic study was conducted in December using Google Forms after completing the study
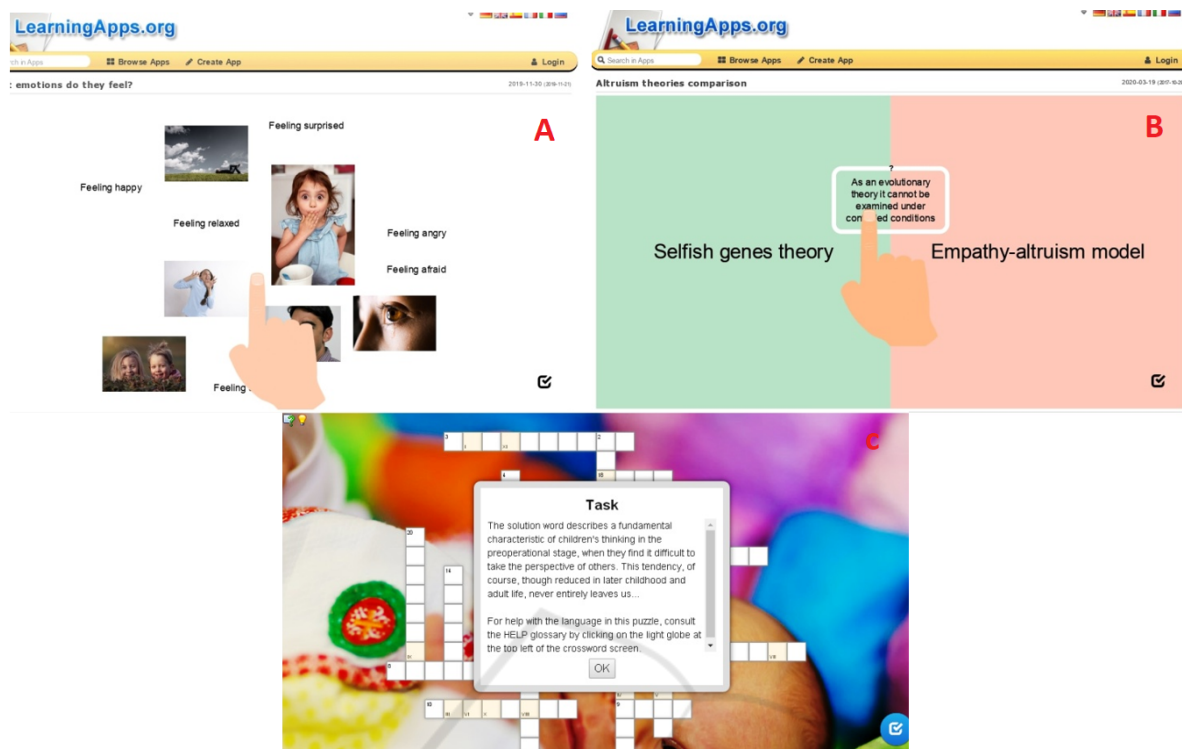
Figure 1: Examples of practice-oriented tasks that are implemented in the learning process using the LearningApps service: a) Exercise "Determination of nonverbal markers of human emotional states"; b) Exercise-QUIZ "Theories of altruism in psychological practice"; c) Exercise-crossword "Features of the development of cognitive processes of personality in ontogenesis".

Table 1: Determining the dominant motive of Higher Education.

Motives for studying at the HEI	Number of students at the beginning of studying training courses using the LearningApps service (%)	Number of students at the end of studying training courses using the LearningApps service (%)
Gaining knowledge	20.4	32.4
Mastering the profession	29.8	41.6
Getting a diploma	49.8	26

of disciplines using the LearningApps service. In order to analyze changes in the structure of the motivational component of professional training of future specialists in the context of adaptive learning, the following psychodiagnostic methods were used: "Motivation of studying at a HEI" (author T. I. Ilina) and the method "Motives for choosing a profession". To determine the significance of the changes that occurred after the introduction of the LearningApps service in the training system for future specialists, we used the G-criterion. Based on the results of statistical processing of empirical data, significant changes in the dominance of learning motives in higher education were revealed (table 1).

The table shows that at the beginning of studying training courses, the dominant motive among students is "obtaining a diploma" (49.8%), that is, the desire to

get a diploma with formal assimilation of knowledge, which is directly related to the socio-economic situation of modern Ukrainian society and acute problems of employment in the specialty. Only a small number of respondents showed a desire to acquire knowledge (20.4%) and master the profession and form professionally important qualities (29.8%), which is due to the desire for professional self-realization and self-actualization of future specialists in the field of practical psychology. The dominant motive for studying in higher education for the majority of respondents (41.6%) after completing the training course using the LearningApps service is the desire to master the profession and form professionally important qualities, which is due to the desire for professional self-realization and self-actualization. Also, according to the results of correlation analysis, it was revealed:

Table 2: Determining the dominant motive of Higher Education.

Motives for studying at the HEI	Number of students at the beginning of studying training courses using the LearningApps service (%)	Number of students at the end of studying training courses using the LearningApps service (%)
Internal individually significant	19	34.5
Internal socially significant	18	37.5
External positive	27.5	19
External negative	35.5	9

typical shift – positive, negative shifts – 13, $n = 94$.

$$G_{contr} = \left\{ \begin{array}{l} 38(p \leqslant 0,05) \\ 35(p \leqslant 0,01) \end{array} \right.$$

G_{emp} – a number of untypical shifts, so $G_{emp} = 13, G_{emp} < G_{contr}$. It means that H_0 is not proved, but H_1 is accepted.

According to the empirical data presented in table 2, it was revealed that at the beginning of training, there is a tendency for students to dominate the external negative motive (35.5%) (uncertainty, lack of internal personally significant meaning in choosing a profession). For 27.5% of the subjects studied, the main one was an external positive motive, that is, orientation to the growing social significance, and along with it attractiveness, of the profession of a practical psychologist. Only 19% of students showed a focus on self-realization of internal potential, on getting pleasure from the process of professional activity; and 18% – the desire to grow professionally, to benefit people, in order to gain social significance. After implementing interactive tasks using the LearningApps service, the dominant motive for choosing a profession was the desire to grow professionally, benefit people, in order to gain social significance (37,5%), that is, an internal socially significant motive. Using the G-criterion, we found that when $n = 74$. A typical shift is positive. Negative shifts 17.

$$G_{contr} = \left\{ \begin{array}{l} 29(p \leqslant 0,05) \\ 26(p \leqslant 0,01) \end{array} \right.$$

G_{emp} – a number of untypical shifts, so $G_{emp} = 17, G_{emp} < G_{contr}$ It means that H_0 is not proved, but H_1 is accepted.

Accordingly, it can be concluded that the organization of educational activities with the help of interactive technologies and information systems stimulates the development of cognitive motivation, the desire for professional growth and self-development.

5 CONCLUSIONS

Currently, the problem of enhancing the educational activities of students is urgent, therefore, an important role in the learning process is assigned to interactive learning technologies. At the present stage of development of society and the higher education system, when the goal of education is to create conditions for the maximum development of the personal potential of a future specialist, social services Web 2.0, the main features of which are interactivity and socialization, can help optimize the teaching process and stimulate the development of a positive motivational construct. In relation to the process of professional training, LearningApps represents a qualitatively new approach to building the educational process.

The advantage of LearningApps lies in the ability to attract all students to participate in the educational process, not only as consumers of educational content, but also as its active creators. LearningApps technologies contribute to the implementation of the student-centered principle of building the educational process, when the student is at the center of the pedagogical process, who becomes more autonomous in terms of managing the educational process and more active in creating educational information and interacting with other participants in the learning process. LearningApps is an easy-to-use online service that can be used to perform and create interactive exercises in the process of higher education. The teacher's use of interactive tasks makes it possible to significantly increase the activation of students' mental activity during the perception and assimilation of educational material. This is achieved by increasing the degree of clarity, problematic presentation of the most important provisions of theory and practice, the active position of students and their high motivation and interest in the process of completing tasks. The use of modern innovative technologies, in particular interactive learning technology, opens up broad prospects for deepening the theoretical knowledge base, strengthens the motivational orientation to the study of aca-

demic disciplines and, in particular, psychology, provides mastery of personal self-development skills, the ability to think, develop creatively, and design new things (Roodt and Ryklief, 2019). The results of the empiric study proved the expediency of using the LearningApps service in the process of developing the motivational component of professional training of future specialists in the context of adaptive training. As a result of systematic work on the use of the LearningApps.org website in the process of assimilating educational material within the framework of professionally oriented courses, students develop their own style of using them, constructing, which gives the educational process a creative character, contributes to the development of the personality of its individuality and uniqueness, interiorization of the theoretical basis and practical skills, which stimulates interest and internal involvement in the educational process. Based on the results of the implementation of the components of LearningApps in the process of professional training in the minds of the adaptive development, the development of the motivational component of the professional development of the potential faults in the empirical indicators. In the process of analyzing the middle of the respondents, a positive directness and involvement in the initial process was revealed, the readiness and preparation of the professional competence to obtain professionally important competences and active learning from the virgin problem-specific and practical training of the employees. Accordingly, the use of the LearningApps service in the context of adaptive learning makes it possible to overcome the intellectual passivity of students, makes it possible to increase the efficiency of educational activities and the positive motivational orientation of future specialists.

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