GAME APPLICATIONS OF OSA LEARNING SYSTEM

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ABSTRACT

The authors present a new solution in the field of rail distance learning – learning mobile applications. The aim of the project is to increase interest and motivation in the process of education and self-education. Examples are given of constructing a gaming platform for training tasks regarding principles of operation of railway automation and telemechanics devices. A conceptually new approach to technical on-job training is presented, based on introduction of game and competitive components, promoting enhancement of the professionalism of personnel of any qualification. The OSApp application, shown in the article, serves as an additional module to the main OSA distance learning platform.

Keywords: transport, automation and telemechanics, distance learning, OSApp, OSA, technical training, neural networks, Anytime and Anywhere Learning.

Background. *In the modern world, the issue of staff professionalism is a priority in the development strategy of any organization and enterprise. For any business owner, director of the enterprise or the head of the division, it is important that his employees perform the work at a high professional level. Large companies such as JSC Russian Railways invest huge amounts of money in training their employees [1]. For this purpose, various tools are used: technical classes, advanced training courses, experience exchange programs, distance learning [2–5]. Besides global practices of development of learning systems are used [6–12].*

In the era of information technology development, and of resource mobility, there is a transition to new game forms of learning, which are called upon to involve a trainee into the learning process, to help him to acquire knowledge, get used to the role and understand completely unfamiliar material easily and without any coercion. The authors of the article fully agree with the words of Susan Aldridge of Drexel University Online, who called the teaching games a mirror image of real problems and suggested that students use the entire set of skills available to solve them [13].

The development of innovative principles and training systems is an urgent problem throughout the world. To increase the level of education of the population and the professionalism of line personnel, it is necessary to stop ignoring new trends in IT, and to use them to improve approaches to the supply of training material and the acquisition of knowledge. In our opinion, it is most accessible and interesting to learn in game form, with the help of special applications for mobile devices. Based on this idea, we developed an application to our previously developed main OSA learning platform, which introduces its game component into the learning process.

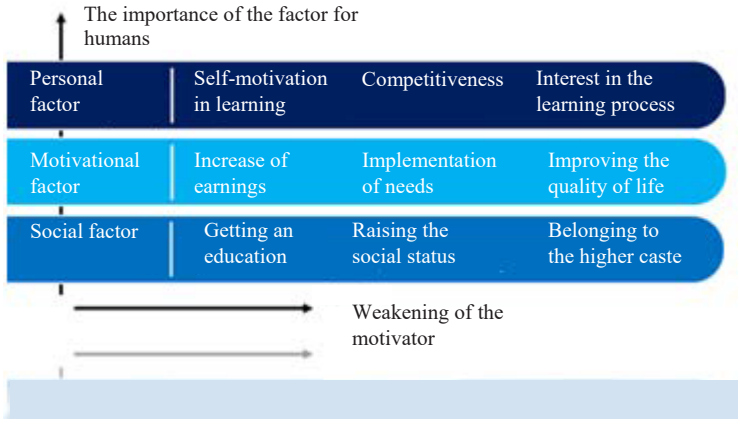
Objective. *The objective of the authors is to suggest railway specific gaming application.*

Methods. *The authors use general scientific, engineering and computer science methods, comparative analysis, evaluation approach, scientific description.*

Results.

1. Mobile learning system OSApp

We have presented earlier the architecture of hardware and software OSA distance learning system developed by us [14]. It was noted that the system is modular and easily expandable – like any modern product. To increase the motivational component the authors are constantly looking for new ways to involve trainees in the learning process – and one of these methods is found. This is training through gaming mobile applications. Such an initiative periodically occurs all over the world. So, for example, in [15] the advantages of introducing Virtual Reality technology in training are described,



Pic. 1. The diagram of the learner's priorities.

which was an excellent addition to visualization of the taught courses.

When creating the application, it was first determined what primarily affects the behavior of the learner in the process of learning new material, what is the priority. The authors identified three main factors contributing to the desire to be involved in self-education (Pic. 1).

Focusing on the priorities presented, we, in developing the mobile game application OSApp, paid maximum attention to the problem of involving the learner in the learning process itself. At the same time, the main reference point was focused on improving the professional qualities of the employees of the front line enterprises of JSC Russian Railways. As an object, a game application was chosen to train employees of signalling, centralization and interlocking distances.

OSApp is primarily aimed at working with line personnel. The system takes into account the features of the consumer and is flexible in use. In modern automated training systems, the stiff method of approach to the consumer prevails. Formation of educational material occurs by copying from books information about the object of study with a subsequent test task. This method of monitoring residual knowledge is ineffective and only shows hope for a cheat sheet or on the phenomenon of short-term memory at the examiner. There are known [16] developments on simulator applications, where the manifestation of ingenuity in solving the problem is reduced to an alternate search of possible combinations of the answer. Accordingly, each simulator can be called one-time device. A buyer of such a product may feel deceived, acquiring an inadequate technical solution.

At the core of OSA products is customer-centricity and two-way communication with the consumer. A quality product cannot be created without communication with the consumer. A great deal of work has been done with it, main guidelines have been drawn up, and a constant update of the range of products offered to the client is underway.

As the feedback received by the authors of the article showed, the main requirements of the consumer are (in descending order of importance):

- *use of modern technological and information approaches to product development;*
- *uninterrupted operation and user support;*
- *ease of use;*
- *flexibility of integration into business processes.*

The strength of the OSA product manifests also through the fact that the customer himself determines the composition of the product provided to him according to his needs.

When creating the same OSApp application, all known aspects of consumer demand were taken into account. The application is multi-platform and is provided as an additional service for free. It is available for both stationary and mobile devices (Pic. 2).

OSApp supports the paradigm «Anytime and Anywhere Learning» (ThreeA-learning) (TAL), proposed by the authors of the article in the feedback-work and analysis of the consumer market. TAL provides the opportunity to study at any time and in any place. It is not necessary to have an Internet connection, as the function of loading work units by choice is built into the application. When planning a trip, the user plans also topics to be studied or refreshed in accordance with his own wishes.

The application implements the fulfillment of the curriculum: at the first start the user can make a study

Pic. 2. Platforms supported by OSApp.

plan and schedule. The application will automatically download the course blocks in accordance with the curriculum execution schedule and delete the completed ones (provided that they have been completed). If for some reason the user does not have time to pass the planned block, then the application will not load new ones and delete unfinished ones.

The user is offered a choice of training modules in the form of such game assignments as «puzzle», «erudite», «quest». There is a test for logic, knowledge, speed. At the same time, the variants of repetitive tasks are minimized. The evaluation of the task is performed.

In the OSApp application, the competition element is implemented. In any subdivision, employees who have received special accounts for OSA have the opportunity to compete among themselves and pass assignments again with new tasks to form a high-score table, which is automatically broadcast to the employer upon request. This function in some cases allows additional interest in the learning environment and the desire to return to the game again and again. This, in turn, contributes to strengthening of information in memory and development of thinking, because a person is constantly present in a given range of tasks – an invisible stimulation to resolve.

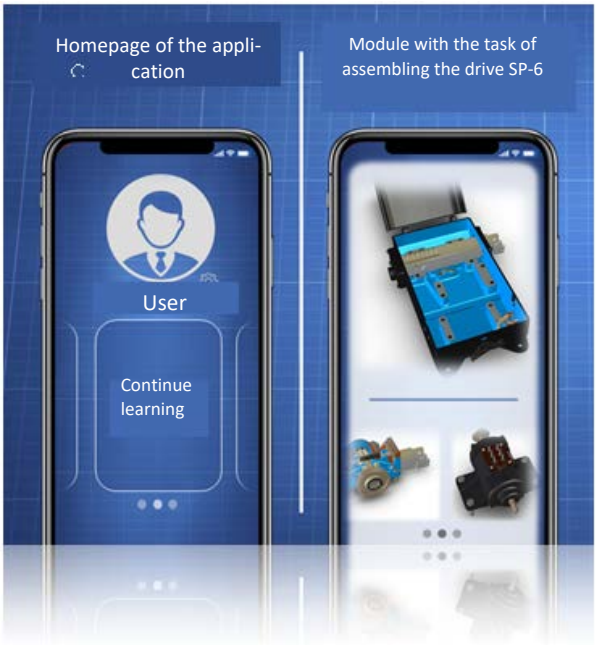
Interest in the learning process is fueled by modules that have different forms and structures. In addition, OSA has the function of rewarding employees for achievements. When this function is enabled, with the consent of the company's management, a list of enthusiastic front-row workers, a table of records and a history of occupations are formed. The leadership, for its part, creates a motivational fund, provides material incentives (monetary award) or encourages temporary resources («time off»), other types of public recognition.

The OSApp application can be used for normal learning or as a hobby.

2. Key features of the application

When developing the OSApp application, a decision was made to avoid any difficulties in installing and using it. That is why it is implemented in the most simple and convenient form without any explanatory documents and manuals. However, the support of the user is being prepared by the voice assistant.

The OSApp application is only a custom shell for the OSA platform. It is downloaded from the application store and is available for popular platforms such as IOS, Mac OS, Android and Windows.



Pic. 3. Screenshots of the drive assembly application.

Let us consider in more detail the composition of the application and its functions.

Its interface is simplified as much as possible. For example, Pic. 3 shows an application screenshot, a menu and a work item.

Let's consider the image in Pic. 3 on the left. In the application, an entry was made under the working account, and the trainee is invited to continue from the place where he stopped. If the user wants to select another module, then it can be done by swiping sideways and selecting the appropriate menu. There is also an OSA-market where the user can download other modules of training.

In Pic. 3 on the right there is an example of a task to assemble a switch electric drive SP-6. The module is available in the corporate version for JSC Russian Railways [3]. The user by dragging the parts SP-6 assembles a switch drive as a puzzle. In addition, the module has the function of checking the correctness of the assembly for launch of the finished device: if everything is assembled correctly, it functions. The developers of the application proposed the detailed assembly process up to the use of a virtual key or screwdriver while screwing the elements with the number of revolutions to check the tightening of the attachment points.

In addition to the various levels of complexity, various achievements are provided in the application. For example, when studying railway automation devices, the user starts with the title «student». Passing the training and solving the first tasks, he gets the level of «monter» and so on. Subjects with names of positions or titles for corporate clients are possible.

Pic. 4 shows another version of the task with the drive SP-6. To solve the task, some tools are implemented in the application. For example, as shown, the user is asked to select a device for measurement in an electrical circuit. All tasks are designed according to technological maps, and using the wrong device does not bring points when playing, and when starting the job, you should familiarize/repeat the technological map pertaining to the task. After that virtual measuring probes should be measured by dragging them to the required measuring points.

Depending on the level of the trainee, tips can be given. «Student» will be fully trained. When you climb the educational ladder tips will appear less often. In extreme cases, you can call them yourself, but with the loss of some points.

Pic. 4. Screenshots of the application for measuring electrical parameters in the control scheme and switch control.

As already noted, the modular principle and the variety of tasks feed the user's interest. But under the shell of the application, a complex neural evaluation system is hidden, as well as the selection of tasks of varying complexity. There is a gradual involvement of the trainee in the process and a gradual increase in the level of competences.

The database of information is consistently filled. On the basis of solution of the tasks, the training of OSA neural network also takes place. The neural network analyzes the proposed solutions at each new stage of corporate learning. Gradually a portrait of the trainee is formed and «work on mistakes» is made, and all this is naturally combined in the general process.

Conclusion. *The mobile application OSApp is focused on training of a person's desire to learn and master new knowledge. The skills are cumulative. Due to implementation of the application in the game form for mobile devices and the possibility of using them at any convenient time, it is possible to involve the learner in the process of continuous knowledge acquisition. The training system is built on a modular basis, easily expandable and designed to grow.*

The OSApp application is undoubtedly a new technical solution focused on the use of distance learning systems not only for studying automation and telemechanics of turnouts, but also for the rest of the «contents» of the railway complex.

The presented training system is a timely and logical product that meets the current level of intellectualization and informatization of technical systems, and its constant and unavoidable development allows us to talk about good prospects in improving teaching methods.

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