

**ISMGE 2020****II International Scientific and Practical Conference "Individual and Society in the Modern Geopolitical Environment"****APPLICATION OF THE GAMIFICATION PRINCIPLES IN VOCATIONAL GUIDANCE OF PUPILS**

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***Abstract***

The relevance of the research of this problem is due to the need to develop new methods of vocational guidance of modern pupils. The key issue of the research is the development of a mobile app in the digital platform system as the basis of an early vocational guidance model. This model is based on the principles of gamification. The purpose of our research is to justify and describe a mobile app on a device running the Android and iOS operating systems. The research methods included analysis of scientific publications on the problem; the analysis of experience of vocational guidance of educational organizations; the method of modeling a mobile application for early vocational guidance of schoolchildren based on the principles of gamification. The mobile app is one of the tools of the digital platform. It allows you to capture the digital footprint of each participant which is formed in the process and result of the developing vocational guidance. The mobile app is a set of tools that allow pupils to record the number of classes attended for each type of profession: human-human, human-nature, human-technology, human-sign system, human-artistic image. It also allows to track and record a qualitative indicator of the child's involvement in a particular area according to standardized assessment methods. As a result of using the mobile app, a digital footprint is formed as statistics on the areas of classes and activities that the child chose.

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## 1. Introduction

Choosing a profession is one of the most difficult and responsible tasks that a person has to solve. Vocational guidance work with pupils is an important activity of teachers and parents.

Questions of early vocational guidance of pupils are studied by Pryazhnikov (2008), Chistyakova et al. (2016) and others. The authors believe that early vocational guidance (from the pupils of primary school up to adolescence) provides an opportunity for early professional choice of pupils. Already in primary classes pupils should acquire initial ideas about the importance and correctness of choosing a future profession and the world of professions.

At this moment there are the following approaches to early career guidance: information-resource; developmental-game; activating; diagnostic. The information-resource approach includes organization of educational exhibitions, meetings in educational institutions of professional education, videos, cartoons about professions, etc. For example, the developmental game one supposes the formation and development of "Future Skills" competencies. The activating approach demands the formation and development of the pupil's internal readiness for independent and conscious construction of the future path of life. The diagnostic approach is based on the assessment of individual psychological characteristics of pupils.

## 2. Problem Statement

The theoretical foundations of professional self-determination of the individual are considered in the works of Russian scientists Vershinin & Surudina (2001), Klimov (2003), Chistyakova et al. (2016), Sergeev (2016) and others. Psychological problems of professional self-determination of the pupils' personality at different age stages are reflected in the research of Klimov (1983) and others. The works of Bozhovich (1995), Kon (1999), Shilova (2019) and others are devoted to understanding the essence of the influence of age characteristics of schoolchildren on their social and professional self-determination.

Questions of vocational guidance of primary school students are revealed in the research of Kotelnikova (1996), Plotnikova (1992), Semenova (1986) and others.

The theory and practice of organizing pre-professional training of pupils are covered in the works of Nemova (2004). Psychological and pedagogical problems of formation of different interests, of readiness of senior schoolchildren for professional self-determination are reflected in the works of Bugakova (1997), Kasatkina (1995), Lenkov and Rubtsova (2017), Polivanova and Smirnov (2017) and others.

The literature analysis revealed the dominance of traditional models of vocational guidance which are represented by thematic programs of vocational guidance in extracurricular activities. They are primarily educational in nature. The main forms of vocational guidance include thematic consultations of psychologists and social teachers for pupils of high school (grades 9-11); traditional meetings with representatives of different professions and potential employers; employees of educational organizations of secondary and higher professional education; excursions.

In the course of the research of the principles of gamification in vocational guidance of pupils, the experience of vocational guidance of pupils of different age groups in the Vologda region was studied. The sample of the empirical study was made up of 20 schools in Vologda and Cherepovets and 15

schools in municipal districts of the Vologda region. The leading methods of research includes a survey of programs and plans for vocational guidance work with pupils and a comparative research method.

The main thing that unites all schools is the presence of an annual plan or a thematic program for vocational guidance. The general goals of vocational guidance are to create conditions for the formation of sound professional plans for graduates. There are three areas of vocational guidance in all plans: professional information, professional education and professional advice.

The study of the experience of vocational guidance of students in schools of the Vologda region showed that vocational guidance is carried out at three levels: regional, municipal and educational institution level. These levels reflect the active participation of schools and pupils in regional, municipal, and school vocational guidance activities.

The experience of vocational guidance at the regional level is represented by the activities of the Regional model center for professional self-determination of pupils in the Vologda region. This center provides General approaches to the organization of vocational guidance in schools in the region. The center includes municipal coordinators (educational psychologists) responsible for supporting career guidance in municipal districts (urban districts) with all participants in the educational process. Each school has a specialist responsible for vocational guidance.

The activity of the regional center involves the inclusion of pupils from the 1<sup>st</sup> up to the 11th grades in the system of career-oriented excursions to the enterprises of the municipal district with the passage of professional tests. Of course, this technique has an effective situational influence on the professional orientation of the student. But this is a one-time experience that has no continuation in the further subjective experience of the pupil.

An important area of the work is the provision of methodological and consulting assistance to specialists responsible for career guidance in schools: organizing, conducting seminars, round tables on career guidance in each municipal district of the region.

The content of the center includes an active search, selection and annual broadcast of the best practice that ensures professional self-determination and personal development of pupils.

The center organizes a municipal competition for the best virtual career guidance office in a school to stimulate the activity of career guidance specialists. Such offices were created in 10 out of 20 surveyed urban schools and in 4 schools in municipal districts.

The center takes an active work on the organization of labor practices for high school pupils on the basis of enterprises of the municipal district in the summertime. The search, selection and annual broadcast of the best practices that ensure professional self-determination and personal-oriented development of pupils of educational organizations are carried out.

At the municipal level, the pupil vocational guidance system includes pupils' participation in targeted projects or programs. For example, the project "Youth employment Center" was successfully launched on the basis of the youth center "GOR.SOM 35 "Career guidance School" in Vologda in 2019. This is a kind of new vocational guidance program that helps young people choose their life path. The pupils learn about current vacancies in the city and region, learns to make a high-quality resume, competently pass interviews and also masters the skills of stress tolerance and goal setting.

The city forum "Working environment" which is organized by the Department of economic development of Vologda is actively positioning itself. It has been operating for two years and is a platform for discussing current personnel issues. Its venues in Vologda host both business and gaming events for young people. Classes on vocational guidance for schoolchildren; discussions with parents and teachers about the specifics of choosing a profession for children are also interesting.

A mass form of vocational guidance for pupils for eight years is the regional trade fair under the auspices of the regional Department of labor and employment and the regional Department of education. Vocational guidance platforms of the "Youth Career Day" work in Vologda, Gryazovets, Syamzha, Cherepovets and other municipal entities. There are open platforms for pupils in the format of professional tests which bring together representatives of employers, experts in industry areas and educational organizations. Professional tests will allow a specialist to involve pupils in a particular profession as much as possible.

A number of activities included in vocational guidance plans are also common for schools. For example, it is a Decade of career guidance or a Single day of career guidance. At the same time, the topics of these events differ in accordance with the interests of the school, parents and pupils. For example, secondary school No. 10 with an in-depth study of the chemical and biological group of subjects in Cherepovets includes participation in the vocational guidance competition "Shadow Man"; in the Festival of charitable and social projects "Doing good together" by the company "PhosAgro"; meetings with students of the Ivanovo State University of chemical technology and medical universities in Moscow, St. Petersburg, Yaroslavl, Arkhangelsk and other specialized events.

A specialized engineering class has been opened in the secondary school No. 12 in Cherepovets which closely works with Cherepovets State University, the company "Severstal" and the children's Technopark "Quantorium". The decade of vocational guidance includes round table sessions with representatives of the company "Severstal", the city development Agency and the children's Technopark.

In general, the set and forms of activities are unique in the organization of vocational guidance for school pupils in the Vologda region. For example, in the Chuchkovskaya comprehensive school of the Sokolsky municipal district, a Single day of vocational guidance is held annually. Its goal is to form a responsible attitude of pupils to the choice of profession by expanding the boundaries of self-knowledge and getting information about the world of professions and their features.

A Single vocational guidance day includes differentiated participation of all classes in school activities. A stand of vocational guidance materials is available for all pupils. At the same time, pupils from the 1<sup>st</sup> up to the 4<sup>th</sup> grades make fascinating excursions to the post office, to the village library, to consumer service enterprises whose employees talk about their work. They participate in the drawing contest "My future profession". Pupils of the 5<sup>th</sup> and the 6<sup>th</sup> grades watch professionally oriented educational films; participate in thematic class hours and meetings with representatives of different professions. For high school pupils, vocational guidance training is conducted using the presentation "Popular professions in the labor market" and "Where to go to study?". Pupils are introduced to information about educational institutions in Sokol, Vologda and the professions of the future.

Vocational guidance testing of students of grades 8-11 is a rather popular action in Borisovskaya secondary school of the Babaevsky municipal district.

Thus, the practical experience of schools in vocational guidance of pupils has common traditional characteristics with uncritical differences in the set of activities and their forms. Information-resource and diagnostic approaches are dominated in vocational guidance. Only fragmentary efforts to implement the activating approach are presented. At the same time when declaring early vocational guidance of student's school plans for vocational guidance focus on vocational education and professional education of high school pupils.

At the same time, a modern pupil should have a clear idea of their future direction by the 9th grade of school. This is due to the need to choose your individual educational trajectory, the choice of the profile of secondary general education, or secondary vocational education.

Currently, the professional choice is made by representatives of the "digital generation" (digital natives). Therefore, there is an objective need to update and implement new models of vocational guidance for students using modern digital resources.

One of the modern ways to involve the subject in activities through gaming processes is gamification. The issues of gamification in education have presented the works of Polyakova and Kozlov (2015), Pakhomov (2015), Varenina (2014) etc.

The main aspects of gamification are:

- dynamics - use of scenarios that require the user's attention and reaction in real-time;
- mechanics - use of scenario elements specific to the gameplay such as virtual rewards, statuses, points, and virtual goods;
- aesthetics-creating an overall gaming experience that promotes emotional engagement;
- social interaction — a wide range of techniques that provide inter-user interaction characteristic of games (Mazelis, 2013).

In vocational guidance work with schoolchildren, the use of gamification elements allows us to achieve two key goals. The first one is to increase the fun and as a result the involvement of participants in the process. The second one is to provide sufficient motivation for training and developing professional skills while maintaining a low level of stress.

### **3. Research Questions**

The key issue of our research is the development of a mobile application in a digital platform system as the basis of an early career guidance model based on the principles of gamification. It is designed to capture the digital footprint of each student.

### **4. Purpose of the Study**

The purpose of our research is to substantiate and describe a mobile application on a device running Android and iOS operating systems that allows early career guidance for pupils.

## 5. Research Methods

The research methods include analysis of scientific publications on the problem; the analysis of the experience of vocational guidance of educational organizations; the method of modeling a mobile application for early vocational guidance of schoolchildren based on the principles of gamification.

## 6. Findings

In the process of implementing the research purpose, we developed and tested a mobile application for professional orientation of children of different age groups. The development of a mobile app in the process of professional orientation of children of different age groups is based on the following basic foundations.

The development of information and communication technologies not only makes education more accessible but also makes it possible to develop and use interactive services and mobile applications to solve career-oriented tasks. The use of such services and applications can increase the motivation of pupils in solving practical problems and draw their attention to the importance of choosing an individual trajectory of development using a modern game approach (Verbach, n.d).

The purpose of using a mobile app is to attract and increase the attention of pupils to the issue of timely professional orientation. It is assumed that working with the app will allow you to form an understanding of the app users about possible areas of activity that they are predisposed to. It is very important that it is allowed to identify interest in a particular professional area at the early stages of training. We suggest using mobile games in non-gaming situations.

We can conclude that mobile apps have a lot in common with gamification the main principle of which is to ensure that you receive continuous feedback from the user. Mobile apps usually have an intuitive interface and allow you to gradually immerse the user in more subtle moments.

One of the research tasks was to select methods for career guidance, digitize them and develop a mobile application that will allow users to get an idea of the predisposition to one of the five groups of professions: man-man, man-nature, man-technology, man-sign system, man-artistic image.

Elements of gamification can appear in various forms and images. So one of the forms of gamification can be the game component of vocational guidance tests. As a result of their passage the user will receive not only recommendations but also incentive bonuses in the form of virtual awards – achievements or "achivok".

The use of mobile applications as a vocational guidance tool successfully fits into the interaction of the pupil with the psychologist. It can act as a tool for the work of a specialist responsible for the vocational guidance of pupils or parents. Then it can be used by the pupil independently. In such cases, the app acts as a source of information about a particular group of professions. Assimilation of such information is an important condition for making the right decision when choosing a learning path.

This research has shown that app development is not only a technical process but also a creative one. It much depends on the tasks and assessment methods included in the app. In the context of this study from a technical point of view, the vocational guidance system includes a mobile application

developed for the iOS and Android operating systems as well as a server with a database that stores impersonal information about the results of passing tests and techniques embedded in the application.

The app itself is developed in the Swift programming language in the Xcode development environment for mobile devices on the iOS operating system and in the Java programming language in the Android Studio development environment for mobile devices on the Android operating system. The app includes a set of tasks that are differentiated for the user by age group: children of senior preschool age, children of primary school age and high school age.

After logging in to the system the user gets access to a group of tasks offered in the app. Tasks in the form of a game are aimed at identifying the user's interest and predisposition to one of the types of professions: man-man, man-sign system, man-nature, man-technology, man-artistic image. After completing the task, the user receives an achievement in the form of a digital icon which is placed in their personal account. There are achievement icons for completing each of the tasks, for achieving high results during testing, for actively using the app and so on.

All information about user actions and results is stored anonymously on the Nginx web server that was developed using Node.js-JavaScript runtime environments. The server runs under the Ubuntu 18 operating system and uses the document-oriented database management system MondoDB.

After the user has completed the necessary tasks the results are saved and processed and information about their progress is stored on the server in tabular form as a digital footprint. In the app's personal dashboard pupils and their parents can see the results in the form of a chart with the percentage distribution of interest in a particular type of profession detected during the course of tasks as well as recommendations made based on the user's digital footprint.

The app can be updated with new tasks and methods so that the user due to progress in completing tests surveys and tasks can assess the predisposition to the type of profession or discover a hidden interest in any field.

## **7. Conclusion**

The mobile app is one of the tools of the digital platform that allows you to capture the digital footprint of each participant which is formed in the process and as a result of developing vocational guidance.

The mobile app is a set of tools that allow pupils to record the number of classes attended for each type of profession: human-human, human-nature, human-technology, human-sign system, human-artistic image. In the same way, it allows tracking and recording a qualitative indicator of the child's involvement in a particular area, according to standardized assessment methods. The mobile app is designed for devices running the Android and iOS operating systems. As a result of using the mobile app, a digital footprint is formed as statistics on the areas of classes and activities that the child chose.

We can conclude that the system of early career guidance based on the principles of gamification will be able to identify the talents and abilities of children at the early stages of their development which will create favorable conditions for vocational guidance of the younger generation.

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## References

- Bozhovich, L. I. (1995). *Problems of personality formation*. Vlados.
- Bugakova, N. Yu. (1997). *Pedagogical conditions for the formation and development of readiness of high school students to choose a profession* (Doctoral Dissertation). Kaliningrad.
- Chistyakova, S. N., Rodichev, N. F., & Sergeev, I. S. (2016). Criteria and indicators of students' readiness for professional self-determination. *Professional education. Capital*, 8, 10 – 16.
- Kasatkina, N. E. (1995). *Theory and practice of formation of professional self-determination of youth in the conditions of continuous education* (Doctoral Dissertation). Kemerovo.
- Klimov, E. A. (1983). *Psychological and pedagogical problems of professional consultation*. Moscow.
- Klimov, E. A. (2003). *Pathways to professionalism: Textbook manual*. IPSI Publishing house: Flint.
- Kon, I. S. (1999). *Psychology of youth*. Prosveschenie.
- Kotelnikovam, G. N. (1996). *Formation of interest in labor activity among younger schoolchildren in the process of performing professional tests* (Doctoral Dissertation). Moscow.
- Lenkov, S. L., & Rubtsova, N. E. (2017). Theory and practice of psychological and pedagogical support of professional formation of youth. *Pedagogy*, 1, 31-42.
- Mazelis, A. L (2013). Gamification in e-learning. *Territory of new opportunities*, 3, 139-142.
- Nemova, N. V. (2004). *Management of introduction of the system of pre-professional training of ninth-graders. Educational and methodical manual. Category: General education schools. School pedagogy. Teaching method*. Series: non-serial publication. Academia.
- Pakhomova, T. E. (2015). Gamification as a means of preparing students of a pedagogical College to solve professional problems. *Scientific notes of the TRANS-Baikal state University. Series: Professional education, theory and teaching methods*, 6(65), 31-39.
- Plotnikova, T. A. (1992). *Pedagogical conditions of continuity of work on vocational guidance of children in kindergarten and primary school* (Doctoral Dissertation). Moscow.
- Polivanova, K. N., & Smirnov, I. B. (2017). What do you see in my profile data "Vkontakte" as a tool for studying the interests of modern teenagers? *Issues of education*, 2, 134-150.
- Polyakova, V. A., & Kozlov, O. A. (2015). The Impact of gamification on the information and educational environment of schools. *Modern problems of science and education. Electron. journal*, 5.
- Pryazhnikov, N. S. (2008). *Professional self-determination: theory and practice*. Academia.
- Semenova, N. A. (1986). *Professional orientation of Junior schoolchildren* (Doctoral Dissertation). Moscow.
- Sergeev, I. S. (2016). System analysis of errors in professional orientation. *Professional education. Capital*, 3, 2 – 5.
- Shilova, N. P (2019). Research on growing up in youth. *Pedagogy*, 7, 65-71.
- Varenina, L. P. (2014). Gamification in education. *Historical and socio-educational thought*, 6-2, 314-317.
- Verbach, K. (n.d.) *The Course. "Gamification"*. Online education server Coursera. <https://www.coursera.org/learn/gamification>.
- Vershinin, S. I., & Surudina, E. A. (2001) *How to make a professional choice. Methodological recommendations*. Moscow.