Uplift modeling method. Uplift modeling contains a set of mathematical methods that allow to predict changes in the behavior of a certain segment of the target audience as a result of any targeted impact

Multi-armed bandit algorithms are one of the types of machine learning methods. The algorithm got its name from the analogy with gambling, where a player stands in front of a number of slot machines (one-armed bandits) and chooses which one to bet on to maximize his winnings [4].

Neural network algorithms for chatbots. One of the main trends in the use of artificial intelligence in the field of online marketing is the development of such software as chatbots, which are used to conduct dialogues with website users.

As a result of the review and analysis of the prospects for the use of machine learning algorithms, it can be concluded that machine learning algorithms are one of the most promising areas of artificial intelligence application in the processing of large data sets in digital economy projects. As a result of the review and research, a positive trend of a significant increase in the number of scientific papers on the successful application of mathematical methods of machine learning in various fields was identified.

The paper discusses various ML methodologies, including predictive modelling, clustering, and reinforcement learning, and their role in constructing adaptive learning systems within online education. Furthermore, it addresses the challenges encountered during implementation, such as data privacy concerns, the potential for model bias, and resource constraints that educational institutions may face when adopting these technologies. Ultimately, this review highlights the significance of adaptive learning systems in fostering effective educational experiences in online environments, emphasizing the need for continued research and development in this rapidly evolving field.

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THE IMPACT OF GAMIFICATION ON THE EDUCATIONAL PROCESS

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Every year, the number of educational services that use gamification in their processes is increasing. They are used by schools, colleges, universities, and other educational institutions around the world.

The problems of applying game technologies in education have been studied in the works of S. Kim, K. Song, B. Lockee, J. Burton [1; 2].

For example, in his book, the author Lee Sheldon tells about his experience of creating a course in an educational institution based on a multiplayer game, which became very successful and showed its viability in the form of good performance and increased interest among students [3].

The regulatory framework for the educational transformation in Ukraine is the State Educational Standard, the Laws of Ukraine «On Education», «On Higher Education», «On Amendments to Certain Laws of Ukraine on the Functioning of Integrated Information Systems in the field of education».

However, there are still many contradictions regarding the use of game technologies in the professional activities of future teachers. The pedagogical methods of using game technologies in the learning process in primary school remain uncertain.

The Ternopil Volodymyr Hnatiuk National Pedagogical University is actively researching this issue in the training of future primary school teachers. The use of game technologies in the educational process helps its participants to easily integrate into different learning systems.

With this approach to learning, students stop being afraid to make mistakes and focus solely on learning. This is because every student knows that they are on an equal footing with other classmates, regardless of their abilities, can make mistakes as many times as they want, but understand that every point they earn will lead to success.

Another positive factor of this learning format is teamwork. Often students work alone in class, and this also happens with homework, which students have to do on their own. The results of such work are not always positive, because the student becomes uninterested in doing it. Computer games, on the other hand, teach teamwork. With the same approach to organizing learning in schools and universities using gaming technology, students will be more motivated and involved in the active process of learning the material.

When it comes to gamification of the entire online learning process, there are different approaches. One of them is to introduce gamification elements into the learning management system. Another approach is the parallel gamification of the learning management system and the learning system itself [3].

Figure 1 shows the functions of gamification in the educational process.

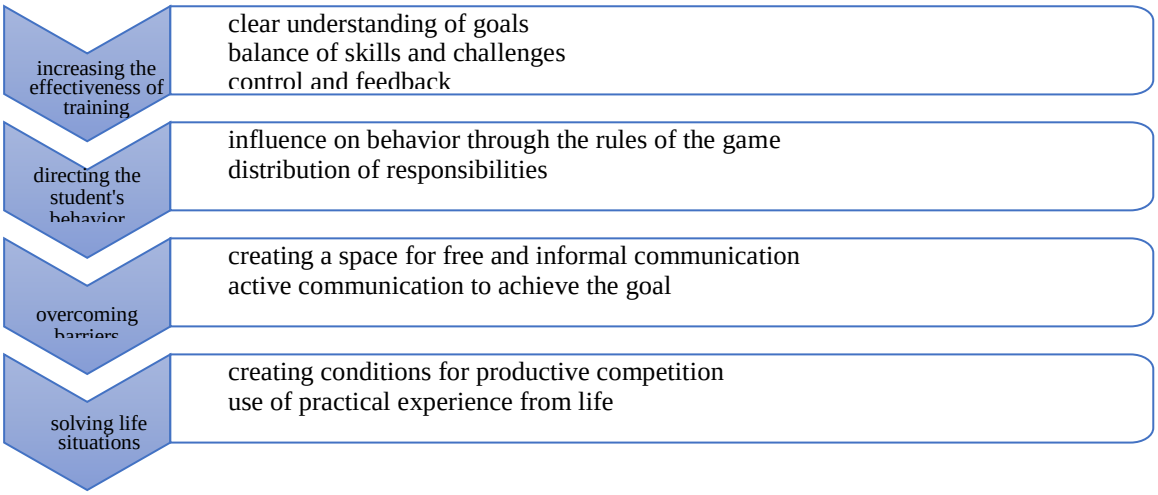

Fig. 1. Functions of gamification in the educational process

Let’s take a closer look at the function of directing human behavior. Perceptions through grades and rankings can act as a motivation to work in a given direction. To

achieve this, students change their usual, but ineffective, behavioral patterns in favor of those that increase productivity.

Therefore, the introduction of gamification is often associated with a socially interactive and constructive learning environment. Students who are involved in a gamified environment become more receptive and ready to participate in future similar learning.

Thus, gamification of lessons through the introduction of game mechanics and elements can potentially eliminate the obstacles faced by science education, increase motivation, cognitive and metacognitive achievement, and student satisfaction.

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ФОРМУВАННЯ ФАХОВИХ КОМПЕТЕНТНОСТЕЙ МАЙБУТНЬОГО ВЧИТЕЛЯ ФІЗИКИ

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Одним з головних викликів сучасної педагогічної освіти є підготовка кваліфікованих вчителів, особливо вчителів фізики, які можуть ефективно працювати в умовах змішаного навчання, дистанційного навчання. Цей процес ускладнюється багатьма факторами, пов’язаними як з об’єктивними обставинами (технологічні зміни, суспільні перетворення), так і з суб’єктивними (недостатній досвід, відсутність необхідних ресурсів).

Основним завданням під час підготовки майбутніх учителів фізики є пошук оптимальних та ефективних форм та методів формування й удосконалення фахових компетентностей здобувачів вищої освіти. Формування фахових компетентностей – це складний і багатогранний процес, який вимагає спільних зусиль освітян, науковців, роботодавців та держави. Тільки за умови системного підходу і постійного розвитку ми зможемо підготувати фахівців, які будуть успішно працювати в сучасному динамічному світі.

Проблема професійної підготовки вчителя постійно знаходиться у центрі уваги науковців, дослідників та методистів. Проблемі формування професійної підготовки вчителів фізики присвячені роботи П. Атаманчука, І. Богданова, С. Гончаренка, А. Касперського, Н. Ничкало, В. Суся, В. Сергієнка, М. Шута та ін.