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Assessing the quality of e-learning with the help of two different perspectives among high school students (Case study: High schools in Jahrom, Iran)

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Abstract – With the increasing growth of information and the continuous efforts of communities to facilitate communication and the growing need of communities for learning and education, through platforms such as the Internet and cyberspace, without the need for direct contact, people can remotely learn and exchange knowledge. Many disadvantaged areas that in the past lacked proper education and learning can now access vast educational resources and add other resources themselves. The scope of these areas is expanding day by day, so that the presence of big data in any business or service where a large amount of data is produced, and the use of communities is of particular importance. E-learning management system is a virtual educational software. With the help of this system, people can enroll in training courses. In this study, two methods that examine the effect of e-learning are evaluated. Two Likert-Like methods have been selected due to the spread of Corona virus in Iran and the virtualization of school classrooms. Most of the effort of this article is based on estimating the educational quality of students. In the first phase, about 10 schools and 661 students have been selected. From the selected students, three groups of online, combined and offline were selected and the desired examinations were performed according to the results of their exams. According to the results, unfortunately, only 25% of the students had a good quality of education, which shows the cost and ineffectiveness of this education.

Keywords – E-Learning, Corona Virus, Virtual Learning Criteria, Virtual Education Software

I. INTRODUCTION

With the increasing growth of information and the continuous efforts of communities to facilitate communication and the growing need of communities for learning and education, through platforms such as the Internet and cyberspace, without the need for direct contact, people can remotely learn and exchange knowledge. Payment. In the virtual education space, teachers and students can exchange experiences and teachings, regardless of geographical location [1]. Many disadvantaged areas that in the past lacked proper education [2] and learning can now access vast educational resources and add other resources themselves. E-learning, unlike its traditional methods, provides an opportunity to spread education in the simplest possible way, which was not possible in the recent past due to the characteristics of face-to-face education. With the pervasiveness of the Internet, any environment has the potential to become a virtual learning[3] environment. Saving time and money and reducing travel is a prominent feature of this type of training so that anyone can easily teach and learn in any environment such as home or work. With the role of physical communication diminishing in the process of virtual education, this platform in order to exchange information needs to store and access data through platforms such as the Internet. The importance of big data becomes apparent. The size of this data provides an opportunity to study and review them in the process of facilitating e-learning. The speed of production of this data is such that every second a mass of new data is added to it. The important feature of this data is that it is diverse, which is produced without a specific size due to the continuous production of unlimited volume of data. The production of this data is not limited to education but is also used in many different areas such as networking, security and traffic control. Also, the scope of these areas is expanding day by day, so that the presence of big data in any business or service where a large amount of data is produced, is felt, which is due to the growth of the city. And the use of communities is of particular importance.

II. RELATED WORK

Zhu et al. Studied the challenges of education in the big data age in 2020. The advent of the big data age offers new ideas for reforming and advancing higher education [1]. In 2020, Retnawati et al. Studied the improvement of students' abilities through research-based learning innovation in the e-learning system. The current higher education curriculum has changed from a professional education and development model to an ability development model, from a work axis to a life orientation, from a teaching model to a learning model [2]. In 2019, Freizo et al. Studied the success model of e-learning based on students' perceptions. In this study, the information systems success model was used to evaluate the success of e-learning systems [3]. In 2019, Meyer et al. Studied the role of emotions in e-learning. This important topic of learning, with a special focus on emotions in college learning, examines the role of emotions in computer support (or e-learning) [4]. Cantabella et al. In 2019 on the analysis of student behavior in

management systems Learned through the big data framework studied. In recent years, learning management systems have played a key role in higher education models [5]. In 2018, Hoda et al. Worked on modern learning methods based on large amounts of data. In the new age where digital tools have access to online resources, the choice of learning area is very important given the large amount of data. [6]. In 2017, Klasena Milivich et al. The most important aspect of this research is the analysis of students' learning. In this article, the impact and importance of big data on learning is also considered. One of the most important advantages of this article is the high quality of content presented in the field of learning, which is introduced with the help of a main architectural framework [7]. In 2016, Dokenj et al. Studied large-scale educational data mining and how to enhance virtual learning environments. The increasing growth of virtual learning operating systems is reinforcing new types of big data and big data streams, which can be termed as big data e-learning [8]. In 2016, Wang studied the great opportunities and big concerns of big data in education. In this regard, given the growing influx of big data, this article examines the opportunities and concerns of big data. Great in training. In particular, this paper first presents the big data and then identifies the potential opportunities for the use of big data in education in both analytical learning and educational policy [9]. And colleagues in 2016 studied educational data mining and the big data framework for the e-learning environment. E-learning data contains a large amount of educational data and is available with a complex and hybrid data architecture [10].

III. Research Method

In the age of communication, data production is increasingly increasing, and due to the development and mass use of communication equipment in virtual platforms such as the Internet, this growth is rapidly leading to the production of new data at any time. Cyberspace such as social networks and the web are among the main platforms for mass production of online content. This data is not limited to the web, but is present in most data-related businesses today. Education-related occupations include sensor networks, city speed cameras, and natural disasters. He pointed to astronomy, radio networks, and any organization that produces massive data. Since these data are not categorized, their diversity is very high and their accuracy should be checked. These properties form data called big data, which is based on raw data. Due to the large volume, this data requires new methods for processing, and due to the variety and speed of production, by processing and reviewing this data, useful information can be collected from businesses or organizations. E-learning has a very simple definition. In the sense that educational technologies and resources can be accessed using electronic technologies. E-learning has many definitions and descriptions. Descriptions such as online education, online learning, digital education, etc. All of these descriptions are used when on the Internet. This means that defined training courses allow interaction between teachers and learners [18, 15].

E-learning management system is a virtual educational software. With the help of this system, people can enroll in training courses. He drew and designed an educational path for them. In e-learning systems, it is possible to define multiple courses. Learners of the training courses can use the modules and capabilities of the system, which are defined for them according to the level of access of each person. Some of the modules available in LMS include viewing e-learning content, practice, test, forum, forum, etc. [16, 15].

Two important articles that have worked in this field are: "Big Data in Education" by [17], and "Advantages of Implementation and Technological Challenges of Big Data in Education" by [18] have become. Virtual courses allow us to teach students skills that are applicable in the workplace [19]. The purpose of designing a virtual classroom is not simply to copy the effectiveness and features of a traditional face-to-face class, but to use computer capabilities; In a better way than what is used in traditional classes. The objectives of a virtual classroom are: (1) Improving access to advanced learning experiences by allowing educators and students to participate in distance learning environments using personal computers at home or university (2) Improving the effectiveness and quality of education Using computers to support a shared learning process [20]. Emphasizes active dialogue among those who share ideas and information [21]. Studies of the use of computer-based communication facilities, which are an essential part of a virtual classroom [22], support the view that for motivated adult learners, this learning approach can be more effective and interactive than a traditional classroom experience. Big data is described by four main characteristics: volume, speed, variability, and quantity. Volume means the size of data, while speed refers to the increasing flow of data that requires hardware and communication equipment and is able to obtain more information and software solutions for faster processing. Variety in big data leads to a combination of types of templates, unstructured and multi-structured, while this value is related to the scientific value or commercial value of big data. Big data for the e-learning process from the teacher's point of view as well Student vision has many benefits. From teachers 'point of view, an opportunity to understand the real patterns of their students, evaluate their current level of knowledge, personalize course content in terms of difficulty, humanity and measurement of improvement from students' point of view, create rich communication and provide opportunities Endless learning [15].

A. The first study

This study was conducted specifically with the aim of obtaining data and facts about the performance of student participation and perceptions of interaction in the forum. The respondents are 201 students consisting of different semesters and different departments of electronic psychology, computer science and other departments. Most of them are 14-17 years old. This study was performed using quantitative research method. The data obtained from the survey are related to the behavior of students in the forum and their perception of the discussions in the forum. Questionnaires were distributed among respondents. These indices were measured using the Likert scale with several variables. The index variable in the participation scale is measured based on the frequency level and is divided into five types, namely: never (TP), rare (P), neutral (BS), often (CS) and often (SS) of these five Perceptions are translated directly into numbers on a Likert scale:

1) TP

2) P
3) N
4) CS
5) SS

The results of this survey were evaluated using SPSS statistical software to identify validity to ensure that the questionnaires are sufficiently valid to assess the competencies. The results of this study describe and present the problem-solving ability in a team only as a general function. Statistical analysis, on the other hand, uses descriptive data processing. The results show that respondents have moderate to low characteristics for participation and perception in using the forum. Given that the answer to the questionnaire is of the positive sentence type, the most expected answers are in choosing the "most often" (SS) option, because it is measured on a scale of 5 (highest) on the Likert scale. But there was no choice in the questionnaires, and there was a slightly lower scale for selecting the "Most (S)" options.

B. The second study

The data used to analyze and match Sakai events were collected by students using three learning methods (online, college attendance, and blended) over the course of an academic year (2019-2020). As shown in Table 3, the total number of students enrolled during this period is 460.

Table 1. Number of students grouped by method

Type of method	The number of students
Online	200
hybrid	160
Presence	100

In order to increase participation in the association, a new initiative was taken during the 2019-2020 school year, using discussion forums in which the teacher challenges students, and significantly leads to Increase the use of this tool. Although similar rules apply to tools in both methods (online and hybrid), these tools are more widely used in the hybrid method (with the exception of community tools in the online method). The combined method offers similar behavior in the use of Sakai tools. This may be due to the fact that a small percentage of college meetings occur in this case, which in turn increases participation even in extracurricular activities.

IV. Experiments and Results

A. *Results based on quantitative research method*

The overall result of this research has been converted to a percentage based on the selected scale.

Table 2. Scale selection in both questionnaires

Scale	Items amount of respondent's chosen		%for Participations	%for Perceptions
	Par	Per		
1	55	37	8.32	5.60
2	281	164	42.51	24.81
3	193	256	29.20	38.73
4	106	153	16.04	23.14
5	26	51	3.93	7.72
Total	661		100	100

With the help of SPSS software, the necessary analyzes were performed and as a result, the total correlation was 0.496. This result showed that the questionnaire has validity and reliability. Percentages show us that the highest scale chosen for student participation in discussion is 43.18%, which is related to the neutral state, and the highest student perception in discussion is 51.99%.

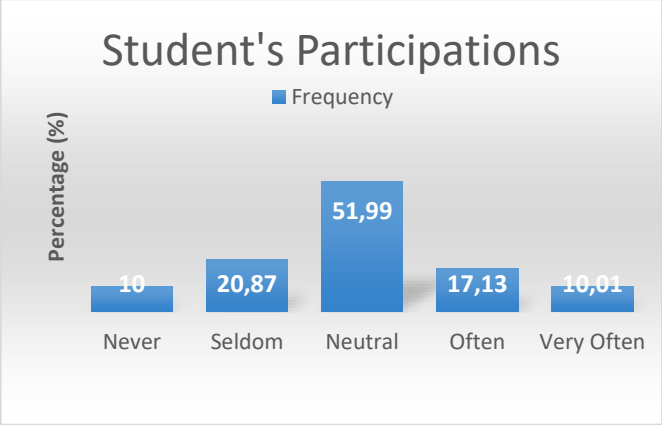

Fig. 1 Percent bar chart for student participation frequencies in the discussion forum

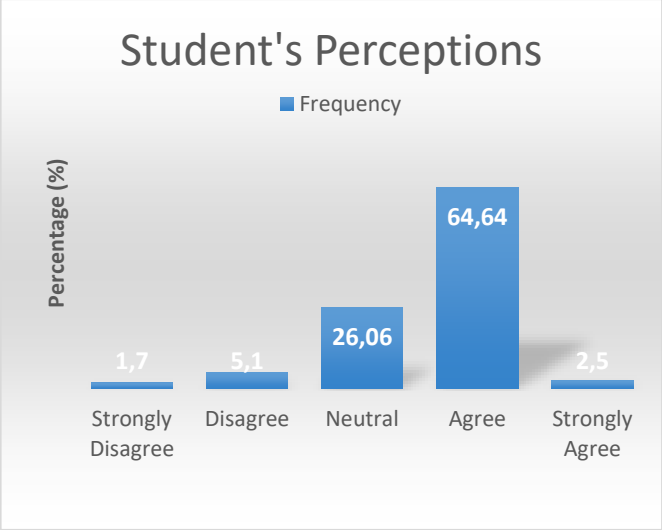

Fig. 2 Percent bar chart for the degree of agreement / disagreement of students' perceptions in the discussion forum

This result showed that the respondents of different terms, who are mainly between 18 and 23 years old, have low to moderate participation and interaction in the discussion forum, as well as their perceptions about the forum.

B. *Ranking of events*

In this section, we analyze the ranking of events independently of the tools associated with them. Figures 3, 4, and 5 below show the top 10 rankings of classified events according to their method. The y-axis represents the event;

And the x-axis shows the number of records associated with each event. These rankings are displayed using HiveQL ad-hoc queries. Comments on these rankings are as follows.

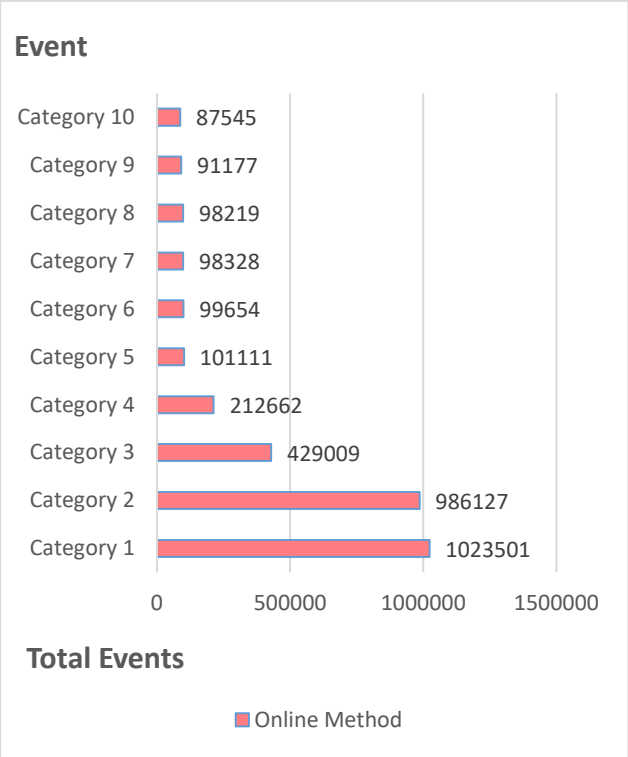

Fig. 3 Ranking events for online methods

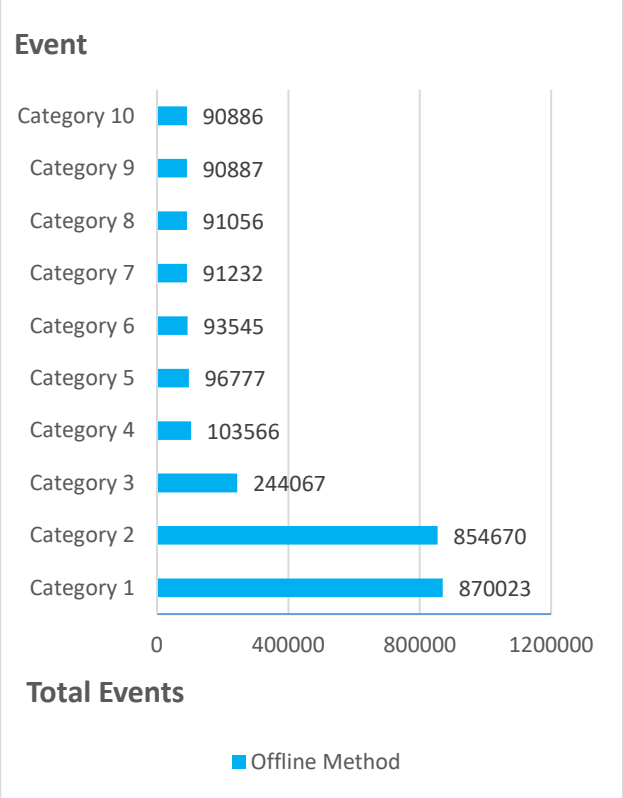

Fig. 4 Ranking events for mode Offline.

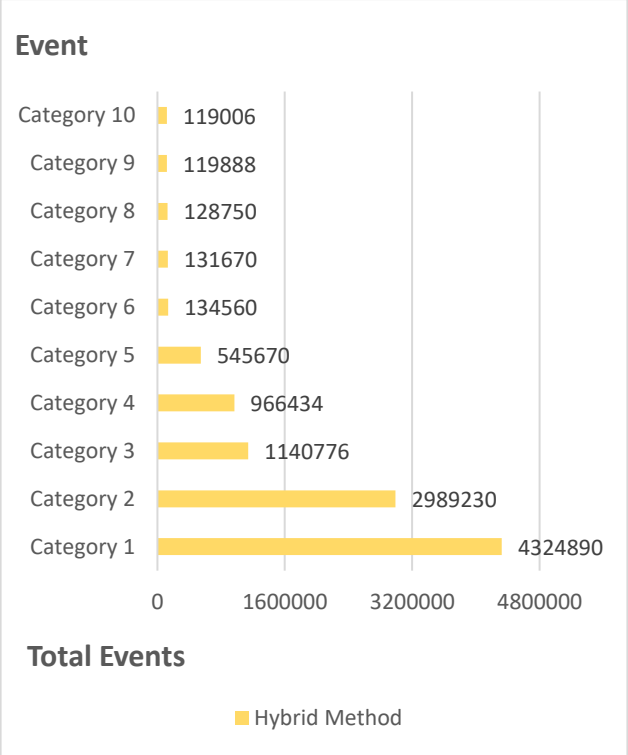

Fig. 5 Event ranking for the hybrid method.

Figure 3 shows the ranking of events for the online method. The most common event in this method is the "download source" and "visit unit (lesson builder)" event. Intermediate events include "resource creation" and "site customization", and finally, "read assignments" and "read message" events are the least active events.

Figure 4 shows the events related to the presence in the school environment. Most events are "" Download Source "and" Read Notice ". For the intermediate event, "Read Events (Forum)" and "Update Profile" are displayed. Minimally active events include "read message" and "save draft (assign and assign)".

Figure 5 refers to the hybrid method. Most events run are "Download Source" and "Visiting Unit (Lesson Builder)", while "Read Assignment Instructions" and "Read Notice" are considered average. The least active events are "reading chat" and "customizing the site".

After analyzing these rankings, we find that the event that students repeat in these three modes is the "download source" event. We must remember that Sakai is a content manager, whose main function is to provide a variety of resources for students, and this is confirmed by the collected event data.

It can be seen that online and hybrid methods exhibit similar behavior in the most widely used Sakai events, due to the use of lesson-building pattern in both methods as an access point to access the remaining tools. In addition, it should be noted that students do not read messages online from the private messaging tool integrated into Sakai. This fact is justified because these messages are related to their academic emails that they can read directly without the need for access to the operating system. However, the low activity of the "reading assignments" event in the online method is surprising.

This is because the instructions for each task are specified in an attachment. This activity corresponds to the "read

assignment instructions" event, which offers other items when assigning tasks, such as using more writing space, merging text with images, and formatting options.

C. *Connection process*

In this section, we examine the connection process according to the number of Sakai accesses for each method during the years under review. To achieve this goal, we analyzed the trends according to the number of student connections to Sakai on an annual and weekly basis, a group-based method, and the average number of visits per year and their type of method.

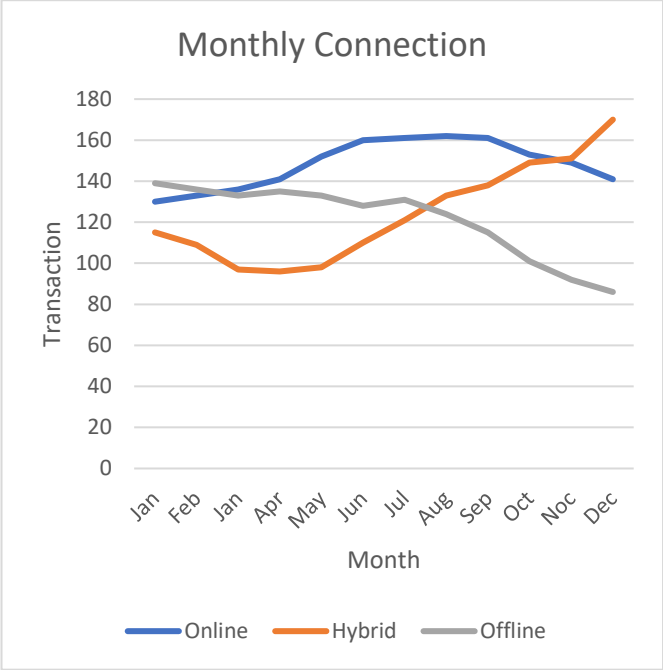

Fig. 6 Monthly connection process for each method

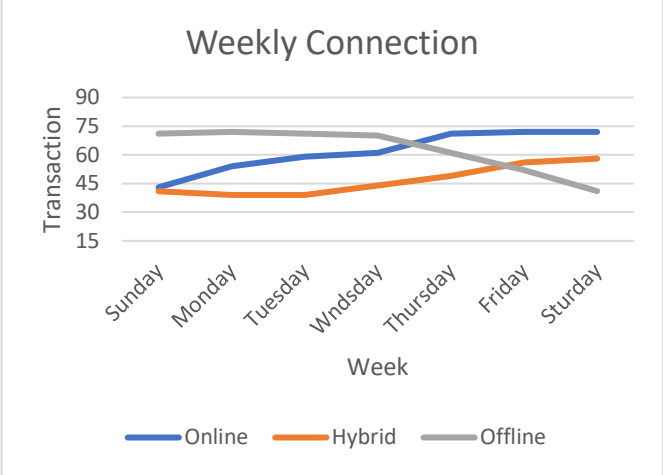

Fig. 7 Weekly connection process for each method

Figure 6 shows the trend in the number of students referring to Sakai in the study period (ie from 2019-2018 to 2020-2019). It can be seen that the period with the most activity is January and February, which coincides with the midterm exam period at the school. Note that for the final exam period in May and June there is less activity compared to the midterm. We have identified three main reasons for this difference: 1. Topics that are self-governing and independent, and require less communication with professors (for example, projects or a final master's degree) are planned in the second half. 2. People with foreign licenses (especially in health and education) are more likely to be in the second semester. 3- The number of dropouts also affects the number of visits, albeit to a small extent. In addition, Figure 7 shows the beginning months of September to November and the holiday months, including July to August.

Figure 7 shows the trends in the number of connections for each day of the week in three ways. There has been a steady decline in the number of accesses, with a marked decrease on Saturday and a small increase on Sunday during the week beginning on Monday. Unusually, this pattern is shared by three common methods, as higher weekend activities are planned for online students. However, it has been shown that students prefer to follow a traditional organizational approach with less work during the week and rest on the weekend.

Table 3. The average number of accesses to Sakai by group and academic year. Students were selected from the number of accesses per analysis to reduce standard deviation.

Modality	year	N	$Mean$	SD
Online	2019-2020	2301	1800	170.93
	2020-2021	9844	6735	359.4
Hybrid	2019-2020	2114	1350	165.6
	2020-2021	8699	5989	326.98
Offline	2019-2020	8434	7200	334.1
	2020-2021	3240	2115	155.4

Finally, Table 3 shows the average number of visits for each of the academic years studied. Due to the very high standard deviation, we filter for each analysis, students with a number of hits between 25% (Q_1) and 75% (Q_3) of the total number of hits in order to reject students with very low or high hits. we did, However, there is still a case with a very high standard deviation for the combined method in the 2020-2019 academic year.

This indicates that having a small percentage of campus sessions leads to more student engagement. Focusing on each method, online group students doubled their visits from 2020-2019. This is due to the placement of lesson building tools in the period 2021-2020, which makes online group students go to the virtual school more often. However, there has been a significant decrease in the number of visits for in-school students and combined group students in 2021-2020, which is due to changes in the increase in inactivity during that year, a decrease in the number of expired sessions and the need to connect.

V. CONCLUSION

During the research, we first discussed the necessity and importance of using virtual education, and then the criteria for a successful virtual education were assessed. Finally, by examining several systems and associations of virtual education, their efficiency and operation were examined and presented The statistical results of the strengths and weaknesses of this system were examined.

According to the cases studied in previous chapters, it is observed that the quality and structure of e-learning, especially in Iran due to the conditions of the corona virus, needs general changes to improve, so considering the benefits and disadvantages of e-learning and the need for this The educational method can maximize the efficiency and quality of education by applying the methods of exploiting and using the cloud space in virtual education. The role of e-learning becomes clear when the importance and application of its use becomes clear. Due to the ease, sustainability, significant reduction of costs and resources, this type of training is gradually being replaced by traditional and face-to-face methods of education, which indicates the importance of this discussion.

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