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Research Article

Effect of Mobile Learning on the Optimization of Preschool Education Teaching Mode under the Epidemic

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Mobile learning has become an efficient way to meet the needs of work learning in the epidemic situation because of its convenience, flexibility, and freedom. This paper studies and discusses the impact of mobile learning on learning education and preschool education in the epidemic. A mobile learning community resource sharing algorithm is used to explore the speed of the online learning community to obtain learning resources. The advantages of online learning are analyzed by comparing the speed of learning resources obtained in ordinary groups. In this research, the random offloading algorithm (ROA) is proposed to analyze the student response. The results revealed that majority of the students believed that mobile learning helps in learning subjects to a greater extent.

1. Introduction

The rising usage of mobile and multimedia learning in our daily lives has had an impact on education. In recent years, the role of kindergarten and preschool education has become increasingly reliant on ICTs, mobile devices, and multimedia technologies. Educators must support critical aspects of kindergarten to help students learn and grow throughout this critical period. The COVID-19 system has made it possible to learn from the comfort of your own home over the Internet [1]. As a result of distance learning, early childhood education is being jeopardized, confusing teachers and parents about how to excite their children best. Only a small number of countries escaped the virus's devastation as it quickly spread across the globe. In recent years, mobile technology has made significant progress [2]. For many people, they have become a part of their everyday routine. Therefore, it is easy to see why so many people are interested in mobile technology in education. A few years ago, e-learning (remote learning) and ubiquitous learning were the only methods of teaching with computers (u-learning) [3]. Today, the focus is on mobile learning (m-learning), which is being developed and distributed by a slew of scientists from around the world. Research like this can be found in two, three, four, and many other places. A mobile application (e.g., a smartphone or tablet) loaded on a mobile device (e.g., a laptop or desktop) is referred to as "mobile learning" [4]. When it comes to young children's education, mobile learning implementation is not an easy task. It is not just the authors of textbooks, teachers, and students who impact how their children see the world but also their parents who have a significant effect on their children's character, interests, and social behavior. The input of parents is vital to the implementation of this new style of learning for young children. Parents and children of various ages were surveyed to appraise their views on this topic objectively. According to the results of this study, more than 90% of parents favor the use of mobile learning [5]. Each age group must meet the State Education Regulations (SER) to declare that a specific textbook is good and fulfills the standards. However, the rules governing this vary from country to country. Finally, it is essential to remember that children's safety should be a top priority when using computers that link to the Internet. Instead of focusing on the technical specifications of the software, here, the best balance between quality, user skills, and transparency, and safety will be sought in this essay [6]. The safety of the child is another crucial consideration in the adoption of mobile learning.

To be considered "safe," it is necessary to restrict their use of the Internet or other applications that could harm their health, physical, or mental development. External assaults aimed at acquiring access to personal data are possible when connected to the global network. The study examines how mobile gadgets, such as smartphones and tablets, affect children and teenagers' social interactions [7]. Their focus is on providing the most up-to-date information at all times. There is a downside to its use, however, in that it alienates children from their families. In addition to affecting young children's intellectual development, the usage of mobile devices can harm their overall health. In [8], such health concerns are discussed and investigated. There is a lot of information about the dangers young children and their parents face when using various mobile devices [9]. Social networks play a greater role in promoting products which seem to be large scale media advertisements. In addition, the study results proved that children preferred mobile devices in comparison to desktop computers [10].

As a result of widespread media coverage, COVID-19 has been referred to as "unprecedented." Since the outbreak of COVID-19, the economy and health of its victims have been significantly impacted. Because of the notion that the virus spreads mainly through direct contact between individuals, most countries have been put under lockdown in one form or another. According to [11], at the end of March 2020, approximately 1.6 billion children in 161 countries were not in school. According to Save the Children, children who miss many schools are more likely to drop out, marry young, or get pregnant as teenagers. With an eye on West and Central Africa, Save the Children expressed concern about the lack of mechanisms to ensure that children follow an education from their homes [12]. Governments are under pressure from COVID-19 to keep individuals in prison and close schools.

Parents and children alike voiced similar fears when the Ebola pandemic began, echoing those highlighted by international organizations. Students in prekindergarten in the United States are feeling bored or confused, according to a recent poll [13]. According to a new study, fifty-two percent of children and 52 percent of parents were afraid that kids had not learned enough to be ready for school. More than half of students polled said they spend two to three hours a day focusing on their online courses. Six hours a day is the typical preschool workday for most children in the United States. Seventy-two percent of children said they were excited to spend time with their families at home. Parental involvement in children's life is critical during the epidemic [14].

Even if a youngster cannot attend school physically, it is widely believed that some form of education can take place. This issue is backed by a wide range of international organizations and educational experts according to [15]. The researcher stated that the need for online education has increased throughout the world [16]. Eventually, communication through e-learning platforms and mobile communications has increased. 98% of the world's population has access to a mobile phone network, and over half of the population is online is a good sign. Furthermore, research has demonstrated that pupils can benefit from ICT-based learning approaches [17]. Instructors and educational planners get a much-needed shock in the direction of emergency instruction. Staying in touch with students is critical during times of crisis, such as natural catastrophes, to prevent them from feeling excluded due to a lack of communication from schools or teachers [18]. Many Pacific Island students may benefit from conventional teaching methods such as radio or printed materials because of their remoteness and lack of access to ICT. This pandemic has directly promoted the development of mobile learning, so students could not go to school to receive an education [19]. This epidemic has directly promoted the development of mobile learning. This online education method enables students to break through the limitations of time and space. As long as there are networks and intelligent devices such as mobile phones and computers, they can learn through online classrooms, which is called mobile learning. After the emergence of this new teaching method, all walks of life have begun to follow suit. Whether it is students' teaching or working meetings, they can be completed online [20].

As a new way of distance education, the main feature of mobile learning is that it can be learned anytime and anywhere without the limitation of time, place, and even teachers [21]. It can live broadcast teaching online and have makeup lessons for students who miss live broadcasts by watching videos. Additionally, mobile online learning can play a perfect role in multimedia teaching, using pictures, video, and other rich forms of instruction. This method of mobile online learning is desirable for children in preschool education and enables students to keep focused in class [22]. Meanwhile, mobile learning has a mainstream form of expression, that is, to build a learning community in the information-filled Internet world. While mobile learning has advantages, it also has some defects. In online teaching, teachers cannot do real-time one-to-one with students, and teachers cannot always seize the attention of each student [23]. With the increasing coverage of wireless networks, the response speed of network resources and the acquisition speed of learning resources will also affect the efficiency of students' online learning. This study is aimed at analyzing the effect of mobile learning on the optimization of preschool education teaching mode under the epidemic.

2. Methods and Data

Mobile learning is also known as m-learning, a learning method that can occur anytime and anywhere with the help of mobile devices [24]. All mobile devices used in mobile learning must have the characteristics of presenting learning content and providing communication between teachers and students. Mobile learning can digitally display the teaching content on the screen through the multimedia function of electronic equipment. With the development of science and technology, mobile learning can bring more strange and colorful visual effects. Therefore, mobile learning is called a teaching model from the future by academia. It can be said that mobile learning is an indispensable mode in the future learning process [25].

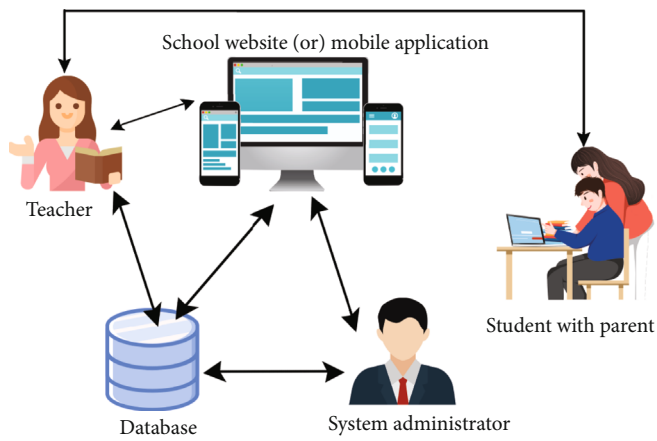

Figure 1: Architecture diagram of the proposed preschool system.

A sudden COVID-19 epidemic has disrupted the original traditional teaching and learning system in schools and colleges. To meet the Ministry of Education's necessity of "stop teaching without stopping," colleges and universities must investigate a new method of teaching restructuring that combines online and offline instruction. The goal of the study is to analyze the preschool reform process in the context of COVID-19. In preschool, online and offline education resources are used for integrating the practice and for promoting the specialized education.

Figure 1 represents the recent teaching methodology followed in the schools and the colleges during this COVID-19 epidemic circumstances. For an efficient preschool teaching and learning process, the course materials must be prepared in advance and uploaded to the database to make them available. As the preschool students are considered in this research, they are ready to download the course materials before the commencement of the scheduled classes. It will make the students follow up the online courses with ease. The students may utilize smartphones, desktops, laptops, or tablets to access the resource materials. When concerning preschool students, their first interaction will start with the teacher instead of the websites. Unless the primary teacher of a class makes announcements through mobile, the student will not be aware of the course commencement. As the preschool students are considered in this research, it would be better if their parents cooperated with the student to learn faster. If the preschool student faces difficulties getting the link for online classes or downloading the course materials, the parents can inform the teacher. An intelligent system may be created at the teacher's site to forward the already available solution. In critical circumstances, the teacher will send the details to the technical person to make necessary updates.

S represents the edge server that provides computational services to the N terminal equipment, and G denotes the collection of devices connected $G = \{g_1, g_2, \cdots . g_3\}$. We presume that each connector device h_i only wants to handle each task k_i, as well as the triple is being used to symbolise k_i as $w_i = \{o_i, q_i, \cdots p_i\}$ where m_i reflects the size of information task data and n_i refers to the size of calculating result data, but also c_i reflects the task's information technology load. R is the overall carrier frequency allotted to each device.

To exemplify the task scheduling, a collection is being used to portray task computer science offloading decisions, demonstrated as $G = \{g_1, g_2, \cdots . g_n\}$, where $g_i = 1$. If g_i is greater than one, h_i offloads k_i to an edge server to handle; alternatively, h_i processes k_i locally. The goal is to obtain a collection of task computer processing decisions for just an online preschool education process to reduce the overall assignment computer technology as well as communication latency. When performing tasks, the command line device uses both access point as well as data transfer available spectrum, and also the internet connection transmission of h_i is demonstrated as in the following equation.

$$v_i^c = \alpha_i R \log\left(1 + \frac{|h_{i,R}|^2 X_{i,R} h^{-v}}{\sigma^2}\right), \tag{1}$$

where i is the proportion of Internet connection bandwidth inhabited by terminal upload new tasks, $h_{i,R}$ is the connection recession multiplier between the access point and the terminal, $X_{i,R}$ is terminal items and services, h is the terminal-base station distance, v is the news team loss, and σ^2 is the connection noise power.

Similarly, h_i downlink data transfer efficiency is defined as in the following equation.

$$v_i^h = \beta_i R \log\left(1 + \frac{|h_{R,i}|^2 X_R h^{-v}}{\sigma^2}\right), \tag{2}$$

where β_i denotes the proportion of transmit power bandwidth inhabited by terminal receiving tasks, $h_{R,i}$ denotes the link recession correlation between access point as well as terminal, and X_R denotes the base network's transmission rate.

The goal of optimizing an online preschool education system which is based on edge devices is to acquire the task

information technology offloading system with the smallest time latency, which consists of two parts: computer technology time delay just on local and the frame server.

If task k_i is not unloaded to a network edge, it is approximated locally on the terminal. The time delay of performing tasks locally is denoted as in the following equation.

$$y_i^l = \frac{p_i}{f_i^m}, \tag{3}$$

where f_i^m denotes terminal h_i data processing ability to manage tasks locally. As a result, the overall time latency of node h_i researchers have identified at the local level is demonstrated as in the following equation.

$$Y_i^m = \sum_{m \in G} (1 - \alpha_i) y_i^m. \tag{4}$$

Unless task k_i is delegated to an edge server, it is calculated on that server. Uplink data transmission, downlink transfer time, server computation time, and high bandwidth link-time contribute to the time delay of performing tasks on edge servers. So because the workstation and web service are wired together, the high bandwidth link time is disregarded. The uplink transmission delay is proportional to the upload new data size as well as the uplink transmission capacity, which is demonstrated in the following equation.

$$y_i^c = \frac{o_i}{v_i^c}. \tag{5}$$

The bandwidth delay time is proportional to the amount of data received and the data transmission available bandwidth, which is demonstrated as in the following equation.

$$y_i^h = \frac{q_i}{v_i^h}. \tag{6}$$

The server's computation time is proportional to the size of a definite stand and also the server's computational power, which is calculated as in the following equation.

$$y_i^p = \frac{p_i}{f_i}. \tag{7}$$

As a result, the time duration associated with unloading task k_i to the edge device is communicated as in the following equation.

$$y_i^n = y_i^c + y_i^h + y_i^p. \tag{8}$$

As a consequence, the total time related to the task of offloading w_i to the edge gadget is expressed as in the following equation.

$$Y_i^n = \alpha_i y_i^n. \tag{9}$$

To minimize time latency of performing tasks in an online primary school education system texture analysis computer technology, an information technology unloading system is necessary for learning the dynamic resource. The scheme problem is expressed as an optimization process with time latency as the measure. The optimization method is written as the following equations.

$$\mathrm{m}inY = \sum_{i=1}^{Q} \left(Y_i^h + Y_i^n \right), \tag{10}$$

$$\mathrm{s.t.}P1 : \sum_{h_i \in G} f_i \leq f_m, \tag{11}$$

$$P2 : \sum_{h_i \in G} \alpha_i \leq 1, \tag{12}$$

$$P3 : \sum_{h_i \in G} \beta_i \leq 1, \tag{13}$$

$$P4 : f_i^m \geq 0, \quad \forall i \in G. \tag{14}$$

The goal is to reduce the energy system's time delay, so suitability is described in terms of time delay, and a lesser time latency relates to higher athletic ability. The strength and conditioning value is computed in the following equation.

$$Z_i = \frac{1}{Y_i}. \tag{15}$$

Following that, the algorithm recognizes individuals based on a specific strategy during the next generation process of evolution. Individuals are chosen using the wheel of fortune method, and the likelihood of being chosen is directly proportionate to their optimal solution, which is demonstrated as in the following equation.

$$X_i = \frac{Z_i}{\sum_{i \in G} Z_i}. \tag{16}$$

3. Results and Discussion

There are 395 instances and 32 attributes in total. The output sticker is G3. In other words, every one of the 32 attributes except G3 is an independent variable that predicts the dependent variable, G3. G3 has a range of [0, 20]. It would be difficult for a classification model to predict one class out of the 20 possible class labels with only 395 instances. It appears that the process should reduce the number of class labels for classification models to perform reasonably well.

The target output class initially ranges from 0 to 20, with 21 clusters (see Figure 2). Again, this is an irrational setting for classification tasks since it makes it incredibly difficult to classify—remember, we only have 395 instances. As a result, as shown in Table 1 and Figure 3, I mapped a group of groupings to a few clusters. This analysis now makes the classification task feasible.

Since Figure 3 confirms that G1 and G2 have a high correlation with G3, I hypothesized that getting an excellent

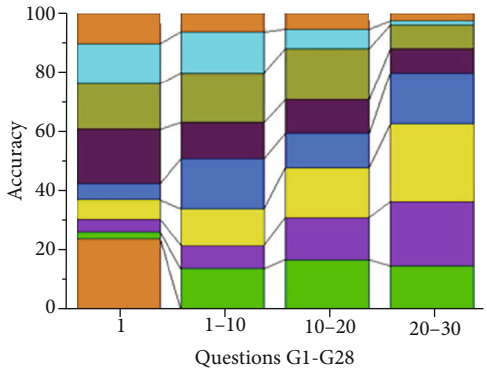

Figure 2: Performance analysis for score correlations Q1–Q28.

Table 1: Number cluster of target class.

Range of initial class	New cluster number
0~5	1
6~10	2
11~15	3

sufficient result with just G1 and G2 might be feasible. As a result, it was presumed that removing the outliers from the G1 vs. G3 graph would aid classification. However, as shown in Table 1, removing the outliers on the G1 vs. G3 graph resulted in a significant loss of accuracy. This demonstrated that G1 and G2 might not play an essential role in predicting G3. Class 1, class 2, and class 3 are representing the course in the dataset (Figure 4).

To select the optimal classifier algorithm(s) to generalize the data, this section focuses on identifying various classifiers, recognizing which work better than others, selecting the most sophisticated techniques, and further refining their parameters to improve generalization accuracy. It specifies that class 1, class 2, and class 3 are indicated for the course code in the dataset. It should be noted that precision was calculated using cross-validation (Figure 5).

The accuracy with $k = 1$ was 45.35%, and it did not improve much after $k = 4$. Because u t (at $k = 1$) is equivalent to regression models and Zero R, it is understandable that all three methods produced results in the same ballpark (i.e., accuracy within 4043%). The accuracy increased to 77.16 percent after removing all insignificant attributes and running K-nearest neighbor ($k = 1$) with the five most significant attributes. At $k = 10$, K-nearest neighbor was even higher, at 77.26% (Table 2).

Regardless of how many and which attributes were used, the system consistently performed well. The precision ranged between 81.01 and 81.77%. We increased the number of the score to see if there was room for improvement (Table 3).

At the moment, epidemic prevention and management are becoming more common, and online teaching via the Internet will be a new model of instruction. The platform learning form needs to break through the classroom restrictions, space-time, and information communication through this early evaluation of online learning. It enhances the

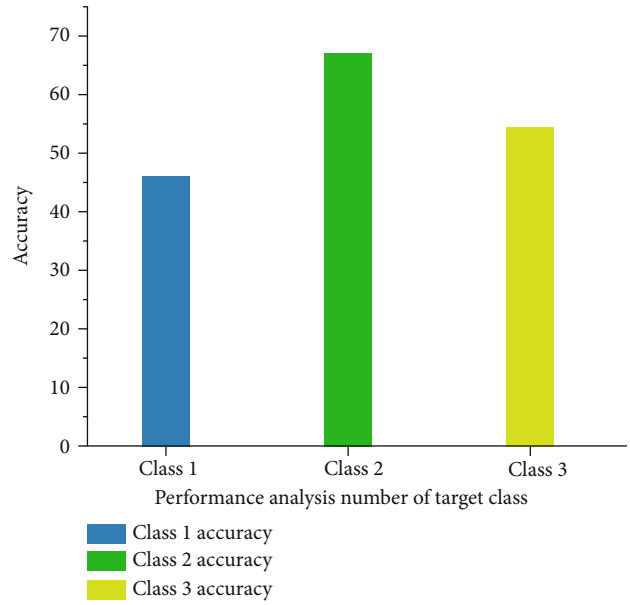

Figure 3: Performance analysis number of target class.

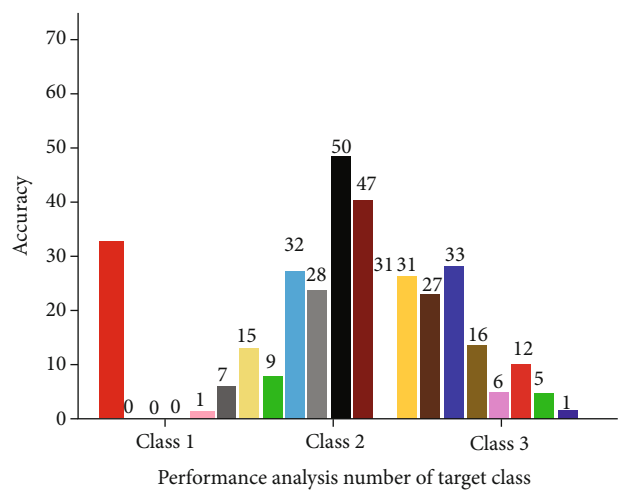

Figure 4: Performance analysis number of target class.

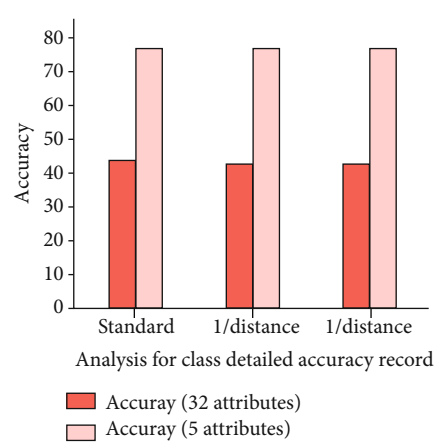

Figure 5: Analysis of class detailed accuracy record.

Table 2: Detailed accuracy analysis for attribute record.

	Accuracy analysis (32 attributes)	Accuracy analysis (5 attributes)
Standard	45.35%	77.16%
1/distance	43.73%	76.92%
1-distance	43.73%	77.26%

Table 3: The number of score and analysis for accuracy.

Score	Accuracy (%)
1	81.26
2	81.26
3	81.77
4	81.77
5	81.77
10	81.77

Table 4: Comparison analysis for the preschool education teaching.

Algorithm	Training (%)	Testing (%)	Accuracy (%)
Existing method	89.34	93.78	91.56
Random offloading algorithm (ROA)	92.67	97.89	96.98

application capacity of professional teachers to Internet data technologies and technical applications. Instructors focused on course-based materials and the web and evaluate preschool Internet-based ability mastering processes. The shown communication is additionally more multidimensional, and the understudies' class circumstance will shape information for educators to get a handle on the understudies' participation and class cooperation, from understudy participation to investment, to understudies' revenue in mastering proficient knowledge and expert abilities, all of which have been essentially improved.

It is significant that preschools must investigate a new method of teaching transformation that combines online and offline instruction. The goal of this paper is to investigate the restructure of the preschool curriculum within the frame of reference. Preschool learning and teaching mode of the single and passive school requires educational materials as well as network resources. In preschool, the learning and teaching mode requires educational materials, network resources, and highly qualified teachers. It is essential to determine the methods for promoting effective teaching methods in preschool education. The study used the random offloading algorithm for evaluating the performance and accuracy. The results revealed that the random offloading algorithm performs better than the existing algorithm. They are trying to promote the preschool education integrated teaching methods. It is significant with the existing method for training and testing and evaluating accuracy used in preschool education in the learning method is a better result for the random offloading algorithm (refer to Table 4).

4. Conclusions

The rapid popularization of mobile learning reflects the degree of social attention. It proves the advantages of this new learning model, which will be a mainstream way of learning in the future. In addition, mobile learning can also give full play to the advantages of multimedia teaching, which can show knowledge more vividly and improve the attraction of teaching. Mobile learning will be a powerful auxiliary learning method for the students who are about to face the college entrance examination, which can strengthen the communication between teachers and students and optimize students' learning habits after class online. This paper argues that mobile learning should be concerned by the academic community, and various research institutions should deepen the research level of mobile learning, put forward the scheme of optimizing mobile learning, and provide effective suggestions and results for the education sector.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this paper.

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