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Retraction

Retracted: A Diversified Integration Method of IPE Teaching Resources Based on Ant Colony Algorithm

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] S. Shan and S. Li, "A Diversified Integration Method of IPE Teaching Resources Based on Ant Colony Algorithm," *Mobile Information Systems*, vol. 2022, Article ID 6938811, 8 pages, 2022.

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Research Article

A Diversified Integration Method of IPE Teaching Resources Based on Ant Colony Algorithm

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In the era of big data, cloud computing, and machine learning, this has become essential to promote the better development of ideological and political education (IPE) in institutions and universities. In fact, we must pay close devotion to the integration and utilization of online teaching resources, take full benefits of the assistances of big data, machine learning, and continuously collect and sort resources that are conducive to IPE in higher vocational academies, so as to optimize the educational process. In fact, the resource allocation within the context of the IPE is not well-addressed in the existing literature; and the allocation of resources is quite unreasonable. In higher vocational education, the form and content of the IPE will enhance its effectiveness. In this paper, we use the ant colony algorithm to efficiently obtain the solution set for resource allocation, thereby addressing the issues of unreasonable allocation of IPE resources and inefficient testing. In addition, the local search method is incorporated into the ant colony optimization technique to perform a local search on the solution set of the obtained resource allocation in order to increase the algorithm's performance. On the standard test set, algorithm comparison experimentations are carried out to validate the efficacy and efficiency of the suggested algorithm.

1. Introduction

The speedy growth of the network technology over the preceding few years has contributed to an upsurge in the significance of large amounts of data. The prioritization and improvement of online teaching resources in IPE can help to improve the content of that education, as well as improve the screening, mining, and integration of online IPE resources, which can lead to the development of new models of that education [1–3]. This can be accomplished by improving the screening, mining, and integration of online IPE resources. Students in higher education will have more opportunities to learn about politics and ideology, as well as the current state of affairs, political climate, and important issues facing the nation if big data technology is used to establish and improve an online resource sharing platform for higher education. This platform can be created using the technology of big data and using excellent moral, ideological, and political qualities at the same time [4, 5].

The current IPE teaching in colleges and universities is characterized by the phenomenon of emphasizing theoretical teaching while ignoring practical teaching. Additionally, the dearth of practical teaching resources has had an effect on the role of teaching [6], as can be seen through the summary of a number of classroom teaching experiences. In higher education, there is a growing consensus that IPE studies should be taught in a hands-on manner. This is the primary method for cultivating students' practical application ability, so it makes sense that this should be the case. As a consequence of this, how are educational institutions like colleges and universities supposed to promote IPE programs? The integration of practical teaching resources and the improvement of the practical teaching effect of IPE courses should remain a primary focus at colleges and

universities for a considerable amount of time to come [7–11].

The proliferation of uses for big data technology has been made possible by the continuous advancements that have been made in the Internet information technology. It is imperative that in this period of big data, cloud computing, deep learning, the integration of network education resources be strengthened in order to provide students with the most up-to-date, interesting, and comprehensive IPE that is possible. Taking into consideration the current situation, it is imperative that the integration of network education resources be strengthened [12–14]. The utilization of educational cases can be incorporated into the curriculum and activities of an IPE program in order to make it more effective and engaging for the students. While this is going on, a number of schools of higher learning offer dull classes on IPE that are confined to classrooms and textbooks. IPE in higher educational institutions will be restricted and hampered as a result of this issue because students will not be able to focus on specialized teaching while the instructor is speaking [15].

The artificial ant colony optimization (ACO) procedure has been the subject of a great deal of research and has been put to use in a diverse range of industries, such as the scheduling of manufacturing and the distribution of logistics. A significant portion of the potential of ACO's extension to project scheduling has not yet been explored, particularly in the domain of resource planning for IPE. It is a common knowledge that ACO possesses global parallelism, robustness, and efficient search capabilities. In this paper, an ACO is presented as a potential solution to this problem. In order to further increase the performance of the suggested ACO procedure, an Insert and Swap neighborhood search that is based on logical constraints has been integrated into it. The efficiency of the method has been demonstrated through experimentation. The IPE teaching resources are integrated with one another and can be configured in a variety of different ways.

The key contributions of this research can be summarized as follows. (i) We use the ant colony algorithm to efficiently obtain the solution set for resource allocation, and addressing the issues of unreasonable allocation of IPE resources and inefficient testing. (ii) The local search method is incorporated in order to perform a local search on the solution set of the obtained resource allocation in order to increase the algorithm's efficiency. (iii) Similarly, in order to further advance the performance of the algorithm, an Insert and Swap neighborhood search that is based on logical constraints has been integrated into it.

The remaining paper is organized as follows. In Section 2, the background study has been completed. In Section 3, an ant colony optimization algorithm is suggested. Results and simulations study is presented in Section 4. Section 5 discusses the state-of-the-art related works. Section 6 summarizes the research and offer guidelines for future investigations.

2. Background

2.1. Status of Resource Integration. In this section, we investigate and analyze the up-to-date state of efficient integration of the IPE resources, and put forward several relevant recommendations for the shortcomings.

Because of the singular and time-honored mode of education, many educational institutions, including academies and universities, do not pay sufficient consideration to the application of big data, and they do not have the mining and integration of network education resources that are necessary at the present time. Higher vocational education suffers from a deficit of IPE because its content and form are overly simplistic and uninteresting. This deficit can be attributed to the lack of diversity in the curriculum.

2.1.1. Single Education Model. They place an excessive amount of emphasis on the application of mechanized education concepts and models in their IPE programs, despite the fact that many of the educational ideas and models used by college and university teachers are relatively straightforward and traditional. Students have a difficult time learning because they lack the self-motivation and enthusiasm necessary for learning new things and expanding their knowledge base. If there is a lack of motivation and passion to learn new things and broaden one's horizons, then IPE will suffer as a consequence. There is a lack of capability to use information technology (IT), computing, and big data technology to assist in IPE, and many academies and universities have not paid consideration to carrying out targeted training activities for the educators. In addition, the model of IPE that the teachers receive is mechanized. Due to the low average educational attainment of IPE professors, it is difficult for various institutions and universities to increase the quality of the IPE they provide their students.

2.1.2. Insufficient Integration of Resources. Because educators are not paying adequate consideration to the integration of online educational resources, and because they lack a certain amount of initiative and creativity in the use of Internet teaching technology, IPE in colleges and universities is lacking in color and spirituality. This is due to the fact that the educators are not able to use the Internet to its full potential to teach the students. Education that is both IPE and that is well-developed and carried out to a high standard. As a consequence of this, some educators hold antiquated teaching ideas and single concepts, lack a certain understanding regarding the mining and integration of online education, and fail to recognize or make use of the vast IPE resources available on the network. As a consequence of all of these factors, the degree to which online education is integrated is limited. Even though there is a large quantity and variety of online educational resources, it is possible that educators will not be able to extract the information that is both pertinent and comprehensive from them. Your assistance is needed to improve the IPE at colleges and universities.

2.1.3. Difficult to Utilize Resources. In this day and age of big data, one of the most common problems that arise is an inefficiency in data mining, acquisition, and integration

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caused by the use of standard software or technologies. When students are looking for educational resources online, if they come across information or materials that are unfavorable, it will have a detrimental effect on their way of thinking as well as the values they hold. This is especially the case if the information or materials include pornography, violent content, or supernatural beliefs. The education of students in political and ideological perspectives may become more challenging as a result of the failure of many educators to identify and eliminate inaccurate or misleading information in a timely manner. For the purpose of elevating the level of IPE instruction received by students, classroom instructors must become more discriminating in the materials they choose and the ways in which they incorporate them.

2.2. Resource Integration Measures

2.2.1. Mining of Teaching Resources. At the college and university level, IPE is a complex field that involves many different aspects of both theory and practice. Take note that this particular aspect of the content is not fixed and is closely related to the progression of time, to put it another way, the content needs to follow the development of time. Make adjustments in order to keep up with the rapidly shifting times. As a result, educational institutions such as colleges and universities ought to institutionalize the idea of keeping up with the times, actively explore the practical instructional resources that are available both inside and outside the institution, and make effective use of these resources. The practical teaching activities of IPE courses should be integrated with the resources found off campus. This should be your primary focus. In conclusion, make use of the current circumstances to develop a cooperative linkage mechanism for the practical teaching of IPE courses, with the goal of promoting the role that each subject plays.

2.2.2. Reasonably Divide the Priority of Resources. The only way to successfully improve the multiple integration of ideologies and politics in college classrooms is for the administrators of schools that provide ideological or political education to devise reasonable plans for the existing practical resources, differentiate between primary divisions and secondary divisions of teaching resources, and finally combine problems with the existing IPE practices. Increase the overall standard and quality of classroom instruction by making effective use of the various teaching resources that are at your disposal. Teachers at IPE colleges and universities need to constantly coordinate their responsibilities and obligations, fully utilize the teaching resources of their colleagues, actively innovate classroom teaching models, and provide students with a high-quality classroom experience. This is in addition to recognizing the positive role that their own resources play in practical teaching and the resources for educators.

We can begin to rationally standardize practical teaching resources for IPE courses in colleges and universities by dividing them up according to a thorough understanding of the students' level of IPE construction. This will allow us to dig deeply into the spirit and characteristics of our time while also beginning to rationally standardize practical teaching resources. It is actively looking for new ways to teach in the hopes of achieving its ultimate objective, which is to improve the effectiveness with which universities' IPE classes make use of practical teaching resources. In addition to this, it helps to increase the proportion of time that the practical teaching resources are put to use.

2.2.3. Carry Out Practical Teaching. Theorizing is the foundational activity upon which all other activities are constructed. If you acknowledge the significance of applying what you learn in IPE courses to real-world scenarios in the classroom, you can help IPE studies at colleges and universities to become more effective. Teaching in the classroom is hampered to a large extent by the use of IPE textbooks, which make it difficult for teachers to convey advanced and scientific IPE content to students. Students are not particularly interested in IPE teaching courses offered at colleges and universities. IPE teaching textbooks are a major barrier to effective classroom teaching. Educators in higher education must therefore acknowledge the significance of IPE instruction, alter their traditional approaches to teaching that are based on theory and practice, acknowledge the students' predominance in classroom instruction, and develop curriculum that is constantly tailored to the students' individual IPE learning needs. All of these things must be done in order to ensure that the students receive an education that is effective.

In addition, administrators of IPE in colleges and universities need to clarify the primary position of IPE, actively integrate the idea of quality education into classroom instruction, and comprehend the effective amalgamation of theoretical teaching and practical teaching in order to fulfill their responsibilities. It is essential for college IPE instructors to acquire a deeper comprehension of how to instruct students in a classroom environment. Time allotted in the classroom for the study of ideology and politics should be distributed in a manner that not only captures the attention of the students present but also helps students become more capable practically and makes the most of the time allotted for IPE instruction.

2.2.4. Using Multimedia Teaching Technology. The traditional classroom teaching model has been significantly rethought as a result of today's modern information technology, which has resulted in the development of multimedia educational facilities that are centered on the Internet. The network currently has widespread adoption across a diverse range of sectors and domains. The departments of politics and ideologies in colleges and universities are obligated to make use of multimedia technology in order to increase the overall superiority of classroom instruction, encourage and motivate students to learn, and enhance classroom instruction. This is an essential component of ensuring that the students graduate with the appropriate perspective on the meaning and values of life.

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Because of the current issues with teaching IPE practice in colleges and universities, these institutions need to continue to innovate and reform the content that is taught in classrooms, introduce contemporary multimedia teaching facilities, and integrate and optimize the various teaching resources.

This is an additional issue to the ones that have already been present. On the other hand, the availability of open access to and the free exchange of multimedia resources make the classroom instruction easier. This makes it possible for students to have more complex theoretical information intuitively presented in front of them, which in turn satisfies their requirements. On the other hand, in order for schools to cater to the varied educational requirements of their students, they should focus more on the development of multimedia teaching platforms, establish network-based WeChat and Weibo accounts, organize ongoing events, produce periodic publications, and make a subtle effort to influence these platforms.

3. The Proposed Ant Colony Algorithm

This paper divides IPE resources into four parts: human resources (H), material resources (M), cultural resources (C), and information resources (I), as shown in Figure 1. The core of the integration of IPE resources is the rational allocation of four parts of resources to IPE teaching. The goal of the algorithm is to search for the optimal solution of the four resources.

The method that is proposed in this paper primarily makes use of parallel search among each population in accordance with the set conditions in order to discover the best and optimum solution independently. Additionally, the method communicates information with each other through the use of information entropy. The following formulas (1) and (2) is an explanation of the formula used to calculate the information entropy:

$$E = -k \sum_{i}^{n} p_i \ln p_i, \tag{1}$$

$$\sum_{i=1}^{n} p_i = 1. \tag{2}$$

where p_i is the probability of state i and the ln characterizes the natural logarithm.

The Ant Colony algorithm is a bionic heuristic optimization technique that, in fact, models the way in which ant colonies go about their search for food. This system uses a mechanism known as positive feedback parallel autocatalysis. When the ants reach the crossroads that they have never been to before, they will pick a direction to travel through at random out of the available options. And release pheromone, the amount of pheromone released is inversely proportional to the length of the path taken by the pheromone. The ants that then make their way to this intersection will choose the route that leads to a larger pheromone, thereby creating a positive feedback mechanism. On the path that leads to the best solution, the quantity

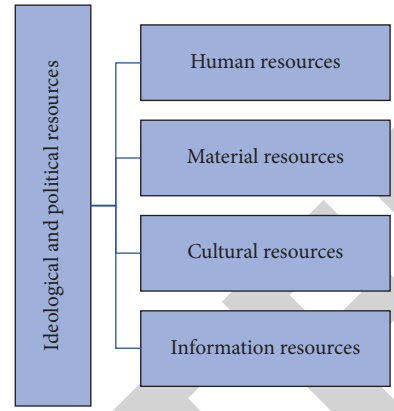

Figure 1: Components of an IPE.

of information will continue to increase while it is being accumulated. The longer the amount of information is collected along the nonoptimal path, the more the pheromone that is present along the path will gradually decrease, and eventually, through the movement of the entire ant colony, the optimal path will be found.

Ant k selects tuple s for pathfinding as follows in formula (3):

$$s = \begin{cases} \arg\max q \in T_k \{\alpha_u \cdot \beta_u\}^{\theta}, \\ q \le q_0, \\ S, q > q_0, \end{cases} \tag{3}$$

where T_k are the remaining tuples, α represents the number of pheromones, β is the heuristic value, and θ is the influence factor of β on the number of pheromones. Furthermore, $q \in [0.1]$ is a uniformly distributed random variable.

The probability that the ant k randomly selects s for the next pathfinding is given by the formula (4):

$$p_u = \frac{(\alpha_u \cdot \beta_s)^{\theta}}{\sum_{u \in T_k} (\alpha_u \cdot \beta_u)^{\theta}}. \tag{4}$$

The calculation formula of β_s is mathematically illustrated in the following equation:

$$\beta_s = (R_1 - R_2 + R_s)^{-1}. \tag{5}$$

where R_1 is the total teaching resources, R_2 is the used teaching resources, and R_s is the used of capacity value.

The global pheromone update rule is stated in formula (6):

$$\beta_s = (1 - \delta) \cdot \beta_s + \delta \cdot \Delta_{\beta_s}^{'}. \tag{6}$$

where $\Delta_{\beta_s}^{'}$ is the amount of superfluous pheromones, which is calculated as given by formula (7):

$$\Delta_{\beta_s}^{'} = f(L^*). \tag{7}$$

where L^* is the optimal global migration route.

Given the global pheromone, we give the calculation method of the local pheromone given as follows:

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$$\beta_s' = (1-\varepsilon)\cdot\beta_s^* + \varepsilon\cdot\beta', \tag{8}$$

$$\beta^* = (|L|\cdot|P|)^{-1}. \tag{9}$$

This time interval is not permanent, nevertheless is estimated according to the information of all of the populations, in other words, it changes with the convergence of all of the populations. The algorithm requires that the communication of the population takes place at a certain time interval. The following conditions are met by the time interval for population communication that is mathematically estimated by formula (10):

$$G = e^{\sum E_i/h}\cdot\gamma. \tag{10}$$

where γ is a parameter.

4. Results and Discussion

The first thing that should be taken into consideration when integrating and assigning ideological and political education resources is the energy consumption of resource allocation. This includes things like the consumption of CPU and memory as well as resource waste. When determining the total quantity of energy (measured in KWh) that is spent by the data center's physical resources, the workload of the application is taken into consideration.

In some studies, the evaluation index for determining the level of resource integration is comprised of the amount of software and hardware data consumed in addition to the amount of educational resources that are wasted. This indicator is also used to evaluate the degree of resource integration in the same article as previously mentioned.

In order to more effectively establish and validate the actual consistency of the simulation outcomes, we carried out the simulation experiment a total of five times, each time with a different set of parameters. Figures 2 and 3 show a comparison of the total amount of energy used and the average amount of energy used from the first iteration through the fifth iteration, respectively. This should be noted that RI1 and PRI are the algorithms being compared, and it can be plainly comprehended that the energy consumption of the suggested method, presented in this paper, is significantly lower than that of the RI1 and PRI algorithms being compared. The energy consumption of RI1 is as high as more than 5.0 kW sec, the energy consumption of PRI procedure is approximately 4.9 kW-sec, and the energy consumption of the algorithm proposed in this paper is only less than 4.8 kW-sec. Subsequently, we noted that the energy consumption of this algorithm is more stable. The RI1 has the highest energy consumption of the three algorithms.

We simulate the ideological and political teaching resources under different parameters γ, as shown in Figure 4.

The experiment with simulation is primarily based on the process of resource fragmentation, and a method for simulating the resource allocation of system load has been designed. More specifically, in order to simulate the resource allocation in the actual environment, multiple resource allocation models are used for the same load. This study uses

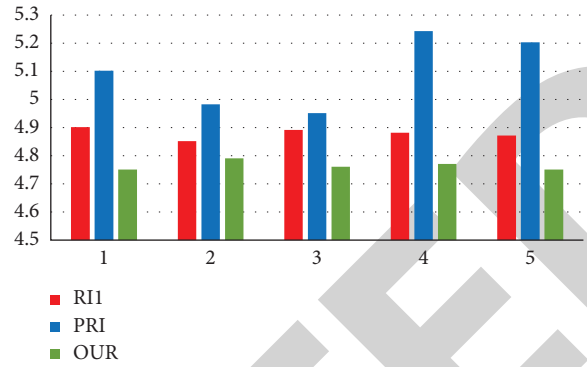

Figure 2: Energy consumption comparison of five experiments.

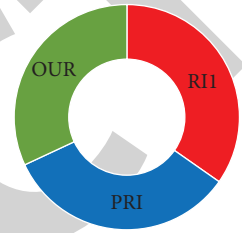

Figure 3: Comparison of the average energy consumption of the three algorithms.

the MATLAB software to simulate and analyze the experimental data, and it simulates the resource usage in the ideological and political (IPE) teaching system over a long period of time. Figure 4 depicts the actual distribution of the available resources.

The process of integrating ideological and political resources in educational institutions like colleges and universities is one that requires a lot of resources. It will make the source physical host use more of its CPU resources, it will make the source physical host and the destination host use more of their bandwidth resources, and it will pause the services that are running on the virtual machine that is being migrated. Lengthened amount of time is required for integration and migration. As a consequence of this, one of the objectives of the algorithm that is described in this paper is to decrease the number of migrations to the extreme degree conceivable. The duration of the migration is approximately equal to the amount of time necessary to allocate memory during the migration amongst the network bandwidth link of the source physical machine and the network bandwidth link of the destination physical machine.

As can be comprehended in Figure 5, the migration times of the procedure proposed in this paper are approximately 4 times, which indicates that they are relatively stable throughout each iterative experiment. The RI1 algorithm is capable of accomplishing a maximum of thirty times the migration of a virtual machine and a minimum of eight times this number. The PRI algorithm's migration times can also reach approximately 30 times at the most, and more than 10 times at the least, however, unlike the two algorithms discussed previously, there are no rules to be found in the PRI algorithm. It should come as no surprise that the

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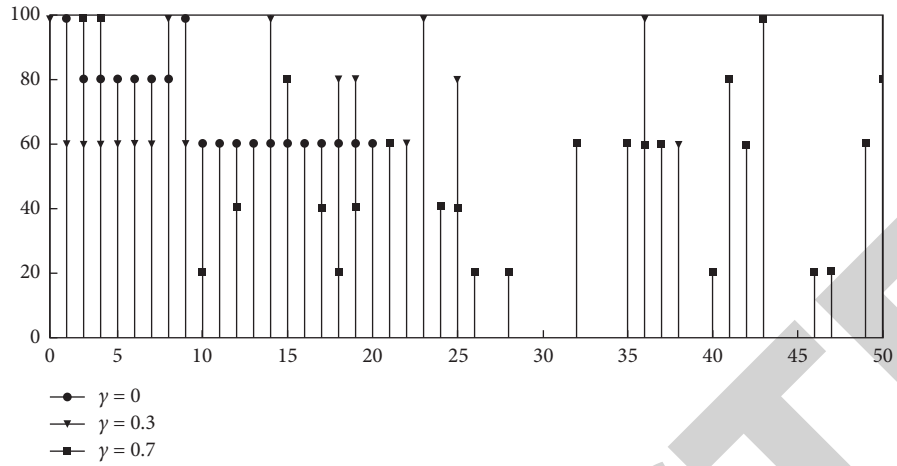

Figure 4: Simulation map of resource integration.

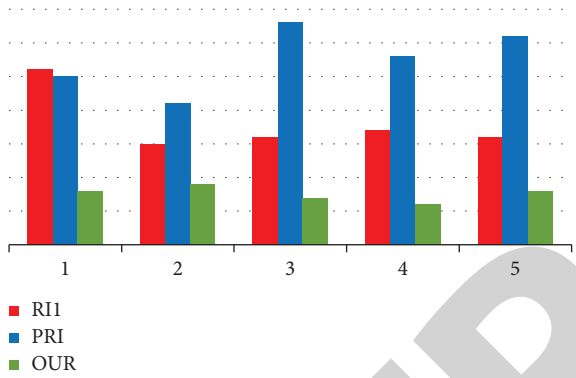

Figure 5: Comparison of migration times of the three algorithms.

algorithm presented in this paper has a significantly lower number of migrations than the other two algorithms.

5. Related Work

Many networked and information-based educational concepts have gradually had an impact on traditional teaching methods and concepts, and some modern teaching methods have become widely used. In addition, many online educational resources are also easily integrated and utilized [16–20]. If teachers are confined to classrooms or books, it will be difficult to carry out IPE work as well as improve the educational effect. It is therefore imperative that the educational institutions focus on and strengthen the integration of online educational resources that are in line with the development trend of the big data era and also match the direction of ideological education reform in my country. Utilizing these online educational resources makes it possible to carry out educational activities pertaining to ideology and politics in a more manageable manner.

Because we live in an information age, therefore the way that college students think is more innovative and current, and they have a strong working knowledge of the resources that can be found on the Internet. If teachers' pay significant consideration to the incorporation of online education resources and provide students with the appropriate guidance, it will have a multiplier effect on the IPE that the students receive [21–23]. One can observe the trend toward, as well as the inevitability of, the incorporation of online educational resources into the IPE programs of colleges and universities.

Research into scheduling optimization under the constraints of limited IPE resources is of great value. The goal of this research is to maximize the performance indicators like cost while adhering to IPE constraints. It is possible to boil down many real-world manufacturing and service issues into resource-constrained project scheduling issues. The practical application of engineering frequently involves dealing with factors such as large scale, stringent constraints, multiple objectives, and uncertainty. The development of effective optimization algorithms for solving resource-constrained project scheduling issues is currently a popular research topic in academic circles as well as in a variety of application industries [24–26].

Over the progression of the historical few ages, there has been a mounting importance in the field of MORCPSP research among academics (multi-objective resource-constrained project scheduling problem). It is a reasonable approach that has been proposed by some researchers to solve the problem of two resource constraints. The enumeration interaction algorithm is what has been proposed as the solution. When planning the completion of the project, both the amount of time and the resources that will be needed are taken into account. Some researchers have proposed a two-stage algorithm as a solution to the problem of multi-objective project scheduling. This algorithm takes into account the optimization objectives of minimizing the total cost, duration, and net present value of the project. In the first stage, the Pareto algorithm is used to produce a set of nondominated solutions. In the second stage, the solution produced in the first stage is improved through the use of the speed of light search. An efficient optimization algorithm for MORCPSP has been developed with the help of the simulated annealing and tabu search mechanisms [3, 27]. This algorithm takes into account the length of the project, the investment resources, and the activity delays. Some researchers have proposed a tabu search algorithm that would

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add robustness to the dual-objective resource-constrained project scheduling problem. This problem would involve scheduling projects. In order to investigate issues relating to time, quality, and money, the horizontal form of mixed integer programming is utilized [28, 29].

6. Conclusions and Future Research

In higher vocational education, the effect of IPE will be amplified if the form and content of IPE are both strengthened. In this paper, we implemented the ant colony procedure to efficiently obtain the solution set of resource allocation in an effort to combat the issues of unreasonable allocation of IPE resources as well as low test efficiency. Both of these issues are addressed in the introduction. In addition, the local search method is incorporated into the algorithm in order to advance and increase the performance of the suggested technique by performing local search operations on the solution set of the obtained resource allocation. In conclusion, the algorithm comparison experiments are performed on the standard test set in order to authenticate the usefulness and productivity of the anticipated algorithm.

In the future, we will continue inventing more effective strategies for the IPE-related research problems. In order to further advance the performance of the suggested method, an Insert and Swap neighborhood search that is based on logical constraints can be integrated into the proposed ant colony algorithm. Moreover, we will further look into the applicability of particle swarm optimization (PSO) method, as well as, other evolutionary techniques due to the fact that the resource allocation issues are potentially multi-objective optimization issues. For example, we will take into account various other optimization objectives, i.e., minimizing the total cost, duration, and net present value of the project. In fact, we will think over how the Pareto algorithm can be integrated to the suggested ant colony method in order to produce a set of nondominated solutions.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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