Application-oriented Java Course Group

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Abstract. With the development of computer technology, the traditional computer language application training model is no longer suitable for the needs of society. In view of the current research status of curriculum group construction, the application-oriented Java curriculum group research ideas are proposed, and combined with the actual situation of the school, the main content and implementation plan of the application of Java curriculum group construction are given. Therefore, the establishment of an application-oriented Java curriculum group model has become a modern. The inevitable trend of the development of the computer age has become an important element of learning computer languages. Through tangential research on the application of Java language programming in Java courses, it is possible to merge content-based and internally related Java courses, and eliminate obstacles between courses and enhance professional capabilities. The research goal of this article is to better show the learning content, ability goals, technical challenges and implementation process in the Java course group. The purpose of this article is to learn and apply the research and design of the Java course group, to design target algorithms, reform independent practice, create experimental model support, and build a Java course group platform for scientific and technological innovation practice, so as to do the traditional computer language application training model. Innovatively developed a new application java course group model. This article starts from the relevant knowledge and theory of practice, takes the application-oriented Java course in the current computer age as the perspective, and promotes the application-oriented Java course group experiment for specific goals. In the experiment process, summarize the knowledge value, ability goals and technical goals of the implemented java course group, and implement rigorous experiments through theoretical and practical training courses to innovate and develop traditional computer language teaching application models. Experimental evidence shows that the application-oriented Java course group is a combination of student-oriented and application-oriented programming language courses, verifying a more student-friendly application-oriented teaching method, and constructing a new model of application-oriented Java course group.

Keywords: Application-Oriented, Java Course Group, Computer Age, Teaching

1. Introduction
At present, Java language is one of the most influential and most popular programming languages in the world, and it has become the first choice of many software developers. It is widely used in enterprise information systems, mobile application programming and computing programs [1]. Therefore, with high market demand, for computer graduates, the career position of Java technicians is one of the key employment directions. The application of Java technology is the main employment field of various computer majors meeting various market demands. The development and use of the Java programming language is no longer limited to the content of the programming language, so the application research of the java course group should be a systematic study of the current teaching mode of the Java course [2]. Learning application-centric Java course group should be independent of practice link reform, scientific and technological innovation practice programming platform research and the creation of Java course group application [3]. The computer programming language ideas implemented in the course are combined with the educational goals of the course. The difficulty is to make development breakthroughs for knowledge assessment, ability goals and technical keys, and implement them through the theoretical and practical learning of the Java course group, with the purpose of improving the quality of the courses Harmonize students' learning ability, learning efficiency and improve students' practical application ability [4].

Through the applied learning of the java course group, the students have grown from a layman who knows nothing about Java technology to a qualified Java software development engineer [5]. The Java course group is completely from a global perspective, according to the concept of engineering education, removing repetitive and useless knowledge, maximizing the integration of teaching resources, and optimizing the teaching structure [6]. In the course of teaching, the teacher emphasizes the scale efficiency of the course group and the group advantage, and gradually enables the learners to gradually master the basic principles and the latest technology of Java technology. Combining with the school's goal of cultivating application-oriented talents, the concept of engineering education is particularly important in the construction of Java curriculum group. In the teaching process, the college tried the engineering education model based on the CDIO concept and the discipline competition model with the goal of cultivating ability, and planned and integrated the knowledge points of the Java course group based on the ideas of engineering education. and achieved remarkable results. [7].

The application-oriented java course group is a systematic programming language learning course, these courses are closely related in content, and have strong internal logic to develop students' professional skills, and form an organic whole with the language [8]. In the course arrangement for the application of the java course group, we should start with the formulation of appropriate course categories and preliminary steps. Professional java course educators can help students better understand the course content at the training target learning level [9]. Through statements in teaching, the ability to perform and perform educational tasks is constructed reasonably and scientifically to construct a Java curriculum group to continuously train students' professional qualities and skills, and train qualified programmers with professional skills as the goal. The following five principles must be followed when creating a Java course group: the curriculum plan promotes the creation and provision of training plans; promotes teaching reform, optimizes and integrates teaching materials, in order to rapidly improve learning results; ensures that the production of teaching materials and other resources are accelerated. Mutual cooperation; must help ensure that the general quality and practical skills of students are effectively taught, and can support student employment [10].

2. Algorithm Establishment and Optimization

2.1. SVM Algorithm Evaluation
Use the SVM evaluation algorithm to evaluate the application-oriented Java course group to estimate the learning ability of students.

Define the objective function formula:
\[ f(\omega) = \min_{\omega} \frac{\lambda}{2} \| \omega \|^2 + \frac{1}{m} \sum_{i=1}^{m} l(\omega_i, (x_i, y_i)) \] (1)

The selection of samples is extremely important. Based on the research on the individual differences of the application-oriented Java course group in the student learning process based on the SVM algorithm, a large number of students are randomly selected for application-oriented Java in the student learning process. The learning differences of the curriculum group are studied through the particularity of the SVM algorithm to increase the reliability and accuracy of the results.

In order to ensure the reasonableness of the weights and compare the consistency check of the judgment matrix, the algorithm formula can be listed as follows:

\[ \frac{\lambda_{max} - k}{y_{RI}(k - 1)} < 0.1 \] (2)

In the above formula, \( y_{RI} \) is the mean value of the consistency index, and its value varies with the order of the comparison matrix. After taking the order from 3 to 7, \( y_{RI} \) the values of are 0.59, 0.90, 1.22.

2.2. Select Samples for Estimation

After passing the consistency check, the weight vector and comprehensive factors \((S, C, P)\) can be determined, that is, the algorithm formula shown below can be obtained:

\[ A_i = [a_{i1}, a_{i2}, ..., a_{ik}] \quad \sum_{r=1}^{k} a_{ir} = 1 \] (3)
\[ A = [a_1, a_2, ..., a_3] \quad \sum_{r=1}^{3} a_r = 1 \] (4)

Finally, the above formula is solved by Sub-gradients

\[ \omega_{i+1} \leq \omega_i - \beta_1 \omega_i - \beta_2 \omega_i - I[y_{i+1} \{\omega_i, x_i\} < 1]y_{i+1} x_i \] (5)

Simplified derivation:

\[ \omega_{i+1} \leq (1 - \frac{1}{t}) \omega_i + \beta_1 I[y_{i+1} \{\omega_i, x_i\} < 1]y_{i+1} x_i \] (6)

3. Model Establishment Evaluation Results

According to the principle of fuzzy comprehensive evaluation method, the evaluation model is \( N_i = M_i * R_i \), among them \( N_i \), among them \( N_i \). The result vector of fuzzy comprehensive evaluation for pre-assessment, \( M_i \) is the pre-assessment index weight vector, \( R_i \) is the pre-evaluation matrix, and * is the operator symbol. When performing fuzzy transformations, the selection of fuzzy operators also plays an important role in the scientificity of the conclusion. There are four commonly used fuzzy operators:

1. \( M(\wedge, \vee) \) Arithmetic, \( \wedge \) Means to take the smaller, \( \vee \) Means to take the larger, the operator rule is:

\[ B_k = \max_{j=1}^{n} (a_j \wedge r_{jk}) = \min_{j=1}^{n} (a_j, r_{jk}) \] (7)

2. \( M(\bullet, \vee) \) Arithmetic, \( \bullet \) Represents multiplication, and the operator rule is:

\[ B_k = \max_{j=1}^{n} (a_j \bullet r_{jk}) = \min_{j=1}^{n} (a_j \bullet r_{jk}) \] (8)
(3) $M(\wedge, \oplus)$ Arithmetic, $\oplus$ Represents addition, the rule of the operator is:

$$B_k = \sum_{j=1}^{n} \min(a_j, r_j)$$  \hspace{1cm} k=1,2,\ldots,n \hspace{1cm} (9)$$

(4) $M(\bullet, \oplus)$ The operator, the operator rule is:

$$B_k = \sum_{j=1}^{n} a_j r_j$$  \hspace{1cm} k=1,2,\ldots,n \hspace{1cm} (10)$$

The characteristics of the four operators in the comprehensive evaluation are shown in Table 1:

**Table 1.** Four fuzzy operators

| Features                           | $M(\wedge, \vee)$ | $M(\bullet, \vee)$ | $M(\wedge, \oplus)$ | $M(\bullet, \oplus)$ |
|-----------------------------------|-------------------|-------------------|---------------------|---------------------|
| Embodies the role of weight       | Not obvious       | obvious           | Not obvious         | obvious             |
| Comprehensive degree              | weak              | weak              | Strong              | Strong              |
| Use R's information               | insufficient      | insufficient      | Relatively          | full                |
| Types of                          | The main factor is prominent | Main factor | Weighted average | Weighted average |

This article's evaluation of the application-oriented Java curriculum group research is a comprehensive, scientific and objective evaluation. It should fully reflect the role of weights and use the information of R. It does not particularly emphasize the importance of a certain factor to the evaluation results. Therefore, the article adopts the first Four kinds of operators to construct the model of the influence of java course group.

4. Data Evaluation Results and Research

4.1. The Impact of the Intensity of the Applied Java Course Group of Data Evaluation on Student Learning

![Figure 1](image-url)  

Figure 1. The distribution histogram of the influence of the intensity of the applied Java course group on student learning

As shown in Figure 1, through the establishment of a bar histogram, the application-oriented Java course group evaluation data of students is analyzed, and the learning intensity of the Java course and the impact on student learning are used as the best effect of the application-oriented Java course group. Inquiry, further processing and analysis of the test data, the following information can be obtained as...
can be seen from Figure 1: The intensity of the Java course group is in the range of 195 to 200, which has the best effect on student learning. The application-oriented Java course group programming language should be the core development course for computer majors. In majors related to the java programming language, design samples, software documentation, software testing and software development internships should be provided. In the traditional java course teaching, these five courses are studied and applied separately, which leads to poor relevance and coordination between them, and they are not systematic enough, which will cause great troubles for students to learn java courses systematically.

In the application-oriented Java course group, abstract teaching is carried out on the application skills and basic and deep knowledge contained, and they are organized to a higher level according to the development process of java applications, and the adaptability of students is gradually improved so that they It can be gradually developed, deepened and expanded in the curriculum to realize the real learning of the curriculum system and educational development goals. Java course evaluation is an important way to check the teaching quality of the course. The Java course group should focus on the students' understanding and use of skills, rather than traditional memory and students' complex skills. The evaluation of the course should focus on a comprehensive scoring system that can check students' ideas of object-oriented programming, and have a deeper understanding of problem analysis functions, programming functions and program debugging functions. After mastering the basic knowledge of Java in the first step of the java course group. In the second step, master the basic content of java, software documentation process, improvement methods and means. The third step is to be familiar with the enhanced application of Java programming and master the high-level applications and methods in the Java course. At the same time, the teaching process should be based on students' programming skills, planning project creation skills, team skills and expression skills, and effective methods for the improvement of application-oriented Java courses in the current application-oriented higher education reform process.

4.2. The Comparison of Java Courses between Applied Colleges and Undergraduate Colleges

![Figure 2](image)

Figure 2. A bar graph of the comparison of java courses between applied colleges and undergraduate colleges

It can be seen from the statistics in Figure 2 that the application-oriented colleges in the "Java course basic knowledge" are lower than the undergraduate colleges. But the learning intensity of "Java course programming technology" and "Java course application" is greater than that of undergraduate colleges, which shows that there are problems in our current java course teaching. The basic
knowledge of the Java course includes basic data types and control sentence experiments, classes and objects, encapsulation, inheritance, and polymorphism, etc., integrated into basic knowledge modules, and appropriately increases the training of professional standard modules, teamwork, and post professionalism. content. Integrate the programming skills in the Java course into several technical modules, and integrate through project case studies and project case studies in related projects, such as browser design, calculator design, calendar design, personal note design, electronic menu design. The java course implements basic knowledge learning, applied learning and combined exercises to increase interest in the java programming language and further improve the development of professional qualities and skills. By strictly following the actual requirements of the enterprise project development, through the project development teaching from simple to in-depth, from simple to complex to improve the practical application of experience and the development of innovation and entrepreneurial skills, you can participate in group training Java courses. After students acquire basic knowledge, teachers should combine multiple knowledge points to provide specific skills as examples, and provide a broader vision for the development of students’ ideas. When the java course is completed, students should complete certain elements of the education project, and finally get high marks, practice training and complete the design of the entire training project. During the course, teachers can upload case studies to the middle school platform of the course group, students can link to this platform, and students can upload completed roles to the platform so that all students can refer to and understand different resource sharing ideas, and teachers should understand How do students understand the situation and put forward suggestions in time, so as to provide ideas for building an application-oriented java curriculum system.

5. Conclusion
After years of exploration and practice, the teaching process should be guided by the concept of talents, quality and education that reflect the needs of enterprises and social development requirements, and use the application-oriented as the premise to build a teaching system for java curriculum groups. In the application-oriented teaching. It is necessary to gradually form a Java course group with the application-oriented Java programming language as the core from the professional subject direction, professional structure, and curriculum system. In the teaching mode of the Java course group, students should be accumulated through programming language knowledge, programming practice, and application practice, so as to lay a solid programming foundation for students; and allow students to enhance their competitiveness, innovation and professionalism when they are employed. In the whole process of application-oriented java course group teaching, application should be the core, it should be closely integrated with the needs of current computer-related enterprises, and the teaching system should be improved targeted to send more outstanding members to the computer industry. Therefore, in the java course group system, we should pay attention to the docking with the needs of enterprises, and focus on the application-oriented as the main line to cultivate applied technical talents with strong environmental adaptability and lifelong learning.

References
[1] Kubicka M, Cela A, Mounier H, et al. Comparative Study and Application-Oriented Classification of Vehicular Map-Matching Methods. IEEE Intelligent Transportation Systems Magazine, 2018, 10(2):150-166.
[2] Jakowłuk W, Wiercz M. Application-oriented experiment design for model predictive control. Bulletin of the Polish Academy of ences, Technical ences, 2020, 68(4):883-891.
[3] Shi M, Zhang Y, Yao D , et al. Application-oriented performance comparison of 802.11p and LTE-V in a V2V communication system. Tsinghua ence and Technology, 2019, 24(002):123-133.
[4] Kubicka M, Cela A, Mounier H, et al. Comparative Study and Application-Oriented Classification of Vehicular Map-Matching Methods. IEEE Intelligent Transportation
Systems Magazine, 2018, 10(2):150-166.

[5] M, Mohammadpour, M.-A, et al. Limbal Stem Cell Deficiency in the Context of Autoimmune Polyendocrinopathy. European Journal of Ophthalmology, 2018, 16(6):870-872.

[6] Ozdamli F. ARCS motivation model adapted to gamification applications on a programming language course. International Journal of Learning Technology, 2018, 13(4):327-351.

[7] Casey M D, Cline J, Ost B , Et Al. Academic Probation, Student Performance, And Strategic Course - Taking. Economic Inquiry, 2018, 56(3):1646-1677.

[8] Delgado S. The Digital Doctor: Hope, Hype, and Harm at the Dawn of Medicine's Computer Age. Annals of Emergency Medicine, 2018, 71(4):154-155.

[9] Rose D, Joshi N. The Digital Doctor: Hope, Hype, and Harm at the Dawn of Medicine's Computer Age. Annals of Emergency Medicine, 2018, 71(1):154-155.

[10] Laura, J, Orvidas, Et Al. Pediatric Transseptal Transsphenoidal Pituitary Surgery:. American Journal of Rhinology, 2018, 14(4):265-272.