

Exploration of the Maturity Evaluation of College Students' Innovation and Entrepreneurship Projects Based on Computer Database Technology

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Abstract: The college innovation and entrepreneurship program is a powerful means to enhance students' innovation and entrepreneurship skills. Evaluating the maturity of innovation and entrepreneurship projects can stimulate students' enthusiasm and initiative to participate. Utilizing computer database technology for maturity evaluation can make the process more efficient, accurate, and convenient, aligning with the needs of the information age. Exploring strategies for applying computer database technology in the maturity evaluation of innovation and entrepreneurship projects offers valuable insights and directions for developing these projects, while also providing strong support for enhancing students' innovation and entrepreneurship abilities.

Keywords: Database; Innovation and entrepreneurship projects; Maturity evaluation

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1. Introduction

In the context of “mass entrepreneurship and innovation,” college students represent a new force in this movement. Colleges and universities must guide and support students' innovation and entrepreneurship efforts. Innovation and entrepreneurship projects are powerful means to enhance the skills of college students. The projects that students typically participate in during their studies include the Innovation and Entrepreneurship Training Program, the China International College Student Innovation Competition, the “Challenge Cup” China College Student Entrepreneurship Plan Competition, the China-US Young Maker Competition, the National College Student E-commerce “Innovation, Creativity, and Entrepreneurship” Challenge, as well as other competitions and projects for which students apply for funding support.

In the implementation of innovation and entrepreneurship projects, it is essential to evaluate the project's maturity. This evaluation can provide direction for the success of students' projects and help students

understand the gap between their current status and expected outcomes, as well as their progress, thereby stimulating their enthusiasm and initiative to participate. Computer database technology offers significant advantages in information processing and data analysis, enhancing the accuracy and efficiency of maturity evaluations. This paper aims to explore the practical application of computer database technology in evaluating the maturity of innovation and entrepreneurship projects, improve the understanding of university management departments, project instructors, and project members, and enhance the vitality of campus innovation and entrepreneurship.

2. Connotation and significance of the maturity evaluation of innovation and entrepreneurship projects

2.1. Connotation

The maturity evaluation of innovation and entrepreneurship projects is a process of quantitative assessment of the maturity level shown by the project in the implementation process. Maturity evaluation mainly includes technical maturity, market maturity, management maturity, financial maturity, and other aspects of the project.

2.2. Significance

Through the evaluation of project maturity, we can identify the strong and weak points of the project in terms of technology, market, and management, so that students can make targeted improvements and optimizations, reduce project risks, and improve the success rate of the project.

The evaluation results can provide feedback for university management departments, help optimize the innovation and entrepreneurship training courses, provide directional guidance for students, and better cultivate students' innovative spirit and entrepreneurial ability. Simultaneously, students can exercise and improve their innovative thinking and problem-solving ability in practice. Students should have a clear goal throughout the project completion process and receive positive feedback at each step. This approach will stimulate their enthusiasm for participating in innovation and entrepreneurship projects and promote the project's overall progress.

The evaluation process can help to find the key resources and support needed for the project, promote the integration of resources between universities, governments, enterprises, and investors, improve the efficiency of resource utilization, and if possible, provide financial support, tax incentives and other policy support and incentives to ensure the success of the project. The evaluation system helps to identify scientific research achievements with transformation potential and promote the transformation and industrialization of scientific research achievements in colleges and universities.

3. The role of computer database technology in the maturity evaluation of innovation and entrepreneurship projects

Computer database technology can store a large amount of information related to innovation and entrepreneurship projects. In addition to simple query and call, it can adapt to a variety of different application requirements, such as multi-dimensional data analysis of innovation and entrepreneurship projects, build innovation and entrepreneurship project maturity evaluation model, and get a more accurate and objective project maturity situation.

In the database system, the data can be shared by multiple users or applications, which improves the work efficiency of the university management department. At the same time, the database technology can display the evaluation results in the form of charts, reports, etc., which is easy for managers to understand and apply.

The database technology provides a powerful security mechanism, including user authentication, access control, data encryption, etc., to ensure the security of data. Concurrently, when the data is accidentally lost or damaged, the database technology can restore the data and reduce the loss. Each innovation and entrepreneurship project needs to update the project progress in real-time. Database technology can easily add new data types and applications, which are easy to maintain and upgrade. The database provides a standardized query language (such as Structured Query Language (SQL)), which simplifies data operations, reduces the programming workload of applications, and helps to reduce storage costs and operating costs.

To sum up, computer database technology is efficient, safe, and reliable, which can play an important role in the process of maturity evaluation of innovation and entrepreneurship projects, and is an indispensable technical support in the information age.

4. The application strategy of computer database technology in the maturity evaluation of innovation and entrepreneurship projects

4.1. Evaluation system and maturity model

At present, the evaluation methods of innovation and entrepreneurship training programs commonly used in colleges and universities mainly include the Analytic Hierarchy Process (AHP), the Technique for Order Preference by Similarity to the Ideal Solution (TOPSIS), the method of combining the Analytic Hierarchy Process and Technique for Order Preference by Similarity to the Ideal Solution, fuzzy evaluation method, process analysis method, and other methods.

AHP adopts the establishment of the hierarchical model, construction of a judgement matrix, hierarchical single ranking and its consistency test, hierarchical total ranking, and consistency test of the hierarchical total ranking. However, AHP has some limitations, for example, subjective factors have a great impact on the construction of judgment matrix, so it is often used in combination with other methods to improve the scientific accuracy of decision-making.

TOPSIS is a commonly used decision-making method in systems engineering, which can evaluate multi-objective problems scientifically and effectively. It is a comprehensive evaluation method using distance as the evaluation criterion. By defining a measure in the objective space, the degree to which the targets are close to or deviate from the positive or negative ideal solution is calculated, and the big innovation projects are ranked ^[1].

The fuzzy comprehensive evaluation method can be used to evaluate the innovation, market potential, technical feasibility, team ability, and other dimensions of the project. By constructing the evaluation index system, and determining the weight of each index and the evaluation set (such as excellent, good, general, poor, etc.), the project can be comprehensively evaluated. The fuzzy comprehensive evaluation method is flexible and effective, and its application in the field of innovation and entrepreneurship can help to improve the scientificity and accuracy of project evaluation.

However, for the project maturity analysis, the above methods are not fully applicable. The determination of maturity is not a sorting of the project, nor a general rating, but more importantly is the identification of the strengths and weaknesses in the process of the project, to determine the direction of improvement, and plan

the future development path, which is a stage evaluation. Currently, some commonly used maturity evaluation models can be used, such as the Data Management Maturity Model of Syracuse University (DM3), Enterprise Data Management Council (EDM), Carnegie Mellon University proposed Data Management Maturity Model (DMM), IBM Data Governance Maturity Model, Stanford Data Governance Maturity Model, Australian National Data Service (ANDS), IBM Research Data Management Capability Maturity Model proposed by ANDS and Data Management Capability Assessment Model (DCAM) proposed by EDM [2-4].

By introducing the computer database technology into the maturity assessment model, the maturity of the project can be updated quickly. The project leader can upload the completion progress data of the project at any time, and the project instructors and university management departments can also monitor the maturity of the project in real-time and give constructive suggestions.

4.2. Build the maturity evaluation model

College innovation and entrepreneurship projects are divided into two types: innovation projects and entrepreneurship projects. The evaluation criteria of these two types are not the same, and the extracted maturity evaluation elements are also different. The extraction of maturity elements needs to be completed by reading a large number of references and using the expert survey method. Simultaneously, it needs to be able to reflect the characteristics of each stage of maturity, and finally establish each maturity element index required for the construction of the evaluation index system.

For innovation projects, the evaluation criteria include two parts: practice process and condensed results. More attention is paid to the evaluation of results, which mainly includes three indicators: the type of results, the number of results, and the final report. The types of achievements are mainly divided into papers (Science Citation Index (SCI), Engineering Index (EI), core journal, general journal), patents (invention, utility model, software copyright), finished product display and research reports, and many more [5]. The number of achievements refers to the number of papers, patents, or research reports. The concluding report mainly investigates whether the content of the concluding material is complete, whether the format is standardized, and whether the results are consistent with expectations.

Table 1. Evaluation index system of innovation project maturity

First-level indicators	Weight score	Secondary indicators	Weight score
Practice process	40	Process record book contents	14
		Interim report	13
		Use of Funds	13
Condensed results	60	Type of results	30
		Number of results	15
		Final report	15
Sum up	100	-	100

Table 2. Innovation project maturity level judgment intervals

Level of maturity	Score (percent scale)
Level 1	0–59
Level 2	60–69
Level 3	70–79
Level 4	80–89
Level 5	90–94

For entrepreneurial projects, the evaluation criteria also include both the practice process and final results, with a stronger focus on assessing the process. Using computer database technology to analyze the project maturity is particularly suitable. The main evaluation dimensions mainly include the growth stage and achievement stage.

Table 3. Evaluation index system of entrepreneurial project maturity

First-level indicators	Weight score	Secondary indicators	Weight score	Three level indicators	Weight score		
Growth stage	60	Entrepreneurial management skills	36	Resource integration	3		
				Cost control situation	6		
				Risk control status	6		
				Financial management situation	6		
				Team management situation	6		
				Marketing planning situation	6		
				Development planning situation	3		
		Operations Management	18			Project operation innovation results	10
						Whether the results are transformed	4
						Effectiveness of achievement transformation	4
Economic and social benefits	6			Economic benefits and later expected economic benefits	3		
				Economic benefits and later expected social benefits	3		
Achievement stage	40	Completion	8	Project progress and plan compliance	8		
						Value presentation	12
		Entrepreneurial management ability	12				
						Entrepreneurial team	4
		Customer reviews	4			Harmony and member growth	4
						Customer satisfaction survey	4
Total	100	-	100	-	100		

Table 4. Entrepreneurial project maturity level judgment intervals

Level of maturity	Score (percent system)
Level 1	0–59
Level 2	60–64
Level 3	65–69
Level 4	70–74
Level 5	75–79
Level 6	80–82
Level 7	83–87
Level 8	88–89
Level 9	90–91

4.3. Database selection

From the perspective of evaluation indicators, the maturity analysis of innovation and entrepreneurship projects needs to collect and process a large amount of data, including the progress of the project, financial status, market feedback, technology maturity, etc. Choosing the right database should consider the data structure, processing requirements, scalability, cost, and other factors. Commonly used databases are MySQL, PostgreSQL, InfluxDB, Prometheus, and many more.

MySQL is a widely used open-source relational database management system with stability and reliability. It supports multi-threading and multi-user, and its query statements are highly optimized to quickly execute complex queries. PostgreSQL is a powerful open-source Object-Relational Database Management System (ORDBMS) with reliability flexibility and support for standard SQL ^[6]. InfluxDB is an open-source Time Series Database (TSDB) specifically designed to process time series data. It is suitable for various application scenarios that need to collect, store, query, and analyze large amounts of time series data, such as real-time monitoring, log aggregation, event logging, and real-time analytics. Prometheus is an open-source monitoring solution that includes a Time Series Database (TSDB), a server for fetching and storing data, a rule engine, and a User Interface (UI) for visualization and alerting.

Considering data structure, data volume, real-time, cost, scalability, and other factors, PostgreSQL or InfluxDB may be more suitable for the maturity analysis of innovation and entrepreneurship projects.

4.4. Analysis and application of evaluation results

Computer database technology can be used to quickly calculate the maturity level of innovation and entrepreneurship projects at the present stage, identify the gap between the current state and the ideal stage, and identify the elements that need improvement. Based on the evaluation results, a specific improvement plan is formulated, including the goals, measures, responsible persons, and schedules for improvement. Follow the improvement plan, monitor the progress, and adjust the plan according to the actual situation. After the implementation of the improvement measures, the maturity assessment is repeated periodically to ensure the effectiveness of the improvement measures and to guide further improvement activities.

The innovation and entrepreneurship project maturity analysis is a continuous process, which helps the university management department, project instructors, and project leaders to continuously improve their

project management ability and improve the probability of project success.

5. Conclusion

To sum up, computer database technology plays an important role in the maturity evaluation of innovation and entrepreneurship projects. Through the construction of an evaluation system, data collection, and processing, construction of an evaluation model, and other links, the quantitative assessment of project maturity can be realized. However, the evaluation criteria of project maturity will evolve as time goes by, requiring adjustments and updates to the selection of elements and the grading scale. Simultaneously, with the increasing update of project data resources and the increase of users' demand for data, the application of computer database technology in the maturity evaluation of innovation and entrepreneurship projects still needs to be further studied and improved to strengthen the scientificity and systematicity of project management and provide more powerful support for the healthy development of innovation and entrepreneurship projects.

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