Research on the Quality Management of Undergraduate Graduation Design in Application-Oriented Private Colleges in the Digital Intelligence Era

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Keywords: Application-oriented, Colleges and Universities, Graduation Project Quality

Abstract: The graduation design work is the final crucial link in the undergraduate teaching process, the first step for students to move from school to society, a manifestation of students' comprehensive abilities, and an important indicator for measuring the quality of the school and the level of talent cultivation. It is also a key stage for the comprehensive training of students' engineering practice abilities before employment, and is particularly important for improving students' employability. By analyzing the existing problems of undergraduate graduation design in current private colleges and universities, clarifying management responsibilities, strengthening the quality inspection mechanism, enhancing the role of graduation design instructors and academic integrity education, the quality management of undergraduate graduation design in private colleges and universities can be improved.

1. Introduction

The vast majority of private undergraduate colleges and universities are application-oriented institutions, and the talents they cultivate are characterized by advanced application-oriented talents. Most employers pay more attention to students' practical hands-on ability when recruiting talents. Schools should focus more on the cultivation of practical hands-on ability. With the development of AI technology and artificial intelligence, the education industry is undergoing profound changes. Employers are increasingly demanding and setting higher standards for applied talents. As an important base for cultivating applied talents[1,2], applied undergraduate education has seen higher demands from society for the quality, innovation and practicality of undergraduate graduation projects (theses). The era of artificial intelligence is accelerating the reform of application-oriented talent cultivation. With the advancement of AI technology, traditional technologies must also keep pace with technological development. The management and research of engineering graduation projects are facing new opportunities and challenges.

2. Current Situation and Existing Problems of Graduation Design Quality in Application-Oriented Private Undergraduate Colleges and Universities

At present, most private undergraduate colleges and universities have established relatively complete management systems for graduation projects (theses), including aspects such as topic selection, proposal, mid-term inspection, thesis writing, thesis review and defense. With the popularization of informatization and networking, the vast majority of colleges and universities have invested funds in building graduation project management platforms[3], that is, using network platforms for the process management of graduation projects. The establishment of the system provides a strong guarantee for the management of graduation projects. The application of the online platform, on the one hand, has improved the management efficiency of graduation projects, and on the other hand, has made the review process more open and transparent.

In recent years, many schools have achieved certain results in the management of graduation projects and summarized their own set of management models. However, there are still some problems and challenges.

(1) The implementation of the management system in some colleges and universities is not strict

  DOI: 10.25236/mepsd.2025.020

enough, resulting in uneven quality of graduation theses.

(2) The management and review of thesis topics are not strict enough, resulting in a low degree of alignment between the topics and the professional training objectives and basic teaching requirements. To reflect the basic requirements of comprehensive professional training, the topics have a low degree of integration with the actual research, production, experiments, and social practices in the related fields of various disciplines. They fail to reflect the characteristics of cultivating applied talents and cannot reflect the needs of the frontiers of the discipline, scientific and technological innovation, and social development. The innovation is not strong, which affects the overall quality.

(3) The quality and ability of the supervisors vary greatly, which affects the quality of thesis guidance and review.

(4) Academic misconduct occurs frequently, undermining the fairness and dignity of academia.

3. Countermeasures for Improving the Quality of Graduation Theses (Designs) in Applied Undergraduate Colleges and Universities

3.1. Clarify management responsibilities and formulate quality standards

To ensure the quality of graduation projects, schools must clarify the management system for graduation projects (theses), and define the respective responsibilities and obligations of the school, colleges, supervisors and students.

3.2. Strengthen the quality inspection mechanism and standardize process management

The school and secondary colleges establish a regular meeting system for the quality work of graduation projects[4], hold special training sessions on graduation project guidance, and build a multi-channel system including cross-checking among instructors, spot checks by supervisors, and spot checks by experts both inside and outside the school to carry out special evaluations of graduation projects. Through multi-faceted and multi-dimensional inspection and evaluation, strengthen the full-process management of the quality of graduation projects in school and college teaching and research sections (majors). Truly implement the quality of each link in the graduation project and effectively promote the continuous improvement of the quality work of the graduation project.

3.3. Strengthen the role of the graduation project supervisor to ensure the quality of the graduation project

The graduation project (thesis) work is subject to the responsibility system of the supervisor. Each graduation project (thesis) supervisor is fully responsible for all the work at all stages of each student's graduation project (thesis), promoting the full play of the supervisor's role, enhancing the quality of the graduation project (thesis), and ensuring that there is someone in charge of the key links of the graduation project and someone to be held accountable.

(1) The instructor should be a teacher or engineering and technical personnel with rich teaching experience, relatively high teaching level and relatively rich practical experience. It should generally be held by personnel with intermediate or higher professional titles. Among them, personnel with senior professional titles should account for more than 50%. Personnel with junior professional titles or high academic qualifications without professional titles cannot independently guide graduation projects (theses), but they can assist their supervisors in conducting guidance work.

(2) Instructors guiding engineering design in science and engineering must possess good engineering literacy, clear engineering concepts, proficient engineering methods, and rich technical and skill knowledge. Only in this way can we adapt to the objective requirements of highly developed engineering technology in the modern era where new technologies keep emerging, and guide students to acquire and master engineering knowledge.

(3) Hire experts or technicians from production and research departments with high professional standards and rich practical experience to participate in guiding the graduation design (thesis) work, so as to promote a closer integration of design and research work with actual production and research. However, there must be a second supervisor from the school to jointly guide, so as to grasp the

teaching requirements and the progress of the graduation project (thesis), etc., and ensure the quality of the graduation project (thesis).

(4) The instructor must have a comprehensive understanding of each student under their guidance, analyze their conditions, assist them in choosing a good topic, and guide them in formulating and arranging the progress plan for their graduation project (thesis), etc. Cultivate and guide students in a targeted manner. The instructor should focus on guiding the key links of the graduation project, such as carefully checking and verifying the students' design or experimental plan selection, design methods, theoretical analysis, data processing and conclusions, etc., to ensure that the submitted data is accurate and error-free.

(5) The instructor should meet with the students once a week to keep track of the progress of each student's graduation project (thesis). During the process of graduation design (thesis), provide timely guidance or conduct regular or irregular Q&A sessions and spot checks, and impose strict requirements and training on students.

(6) Instructors should attach great importance to cultivating students' abilities to independently analyze and solve problems, as well as guiding them in design thinking and design methods. Pay attention to mobilizing students' enthusiasm and inspiring their creativity.

(7) Instructors should strictly demand and manage students. They should promptly assist and educate students who do not seriously carry out their graduation projects (theses) or violate discipline, and deal with them in a timely manner to ensure the academic level and quality of the graduation projects.

3.4. Strengthen academic integrity education and effectively enhance awareness of academic misconduct

Colleges and schools should strengthen academic integrity education for students, guide them to establish correct academic concepts and values, and strictly prohibit academic misconduct such as plagiarism, piracy, forgery, tampering, trading, and ghostwriting. Guide undergraduate students to abide by academic norms and ethics, and safeguard academic justice and dignity[5].

The instructor should educate the students on academic ethics and norms, and review whether the students have independently completed their graduation projects. The instructor is responsible for supervising the academic ethics of students, promptly identifying and correcting any academic misconduct, and may, if necessary, disqualify the student from the defense.

3.5. Strictly control the quality and conduct multi-level and multi-dimensional verification

Each major (teaching and research section) should organize and carry out self-examination and self-correction work. On this basis, the college inspection team will conduct in-depth verification focusing on three major dimensions: The first is the student level. Check the matching degree between the progress of students' graduation projects (theses) and the plans in the task book and the proposal report. The scientific nature and feasibility of the research direction and design plan, and whether there are any major deviations; Whether the outline of the thesis and the format of the thesis are standardized, etc. The second is to verify the level of teachers. The instructor's qualification for guidance, the number of students guided, the number of guidance sessions, the records of guidance work, and the rationality of the guidance methods; The tracking and supervision of students lagging behind in progress, as well as the review of academic norms, etc. The third is the management level of secondary colleges. Evaluate the process supervision work of the graduation project (thesis) stage, the implementation of the plan, and the handling measures for students with slow progress and teachers who fail to fulfill their duties, etc. Only when each college attaches great importance to the graduation design work and earnestly shoulders the supervisory responsibility can the graduation design work be implemented effectively and not become a mere formality. In addition, multi-level special rectification meetings of "school - college - major - teacher - student" should be carried out to convey the problems to every link and ensure that the rectification work is effectively implemented. Each college should strengthen process management and conduct in-depth analysis and rectification of the problems identified through various means such as guidance, training, spot checks, and cross-evaluation, so as to effectively enhance the quality of graduation projects.

3.6. Adjust the common three stages of a thesis to four stages to promote the improvement of the quality of graduation projects

The draft of a thesis is usually a rather rough version and merely an outline, which requires students to review and supplement it again, etc. There may be many problems with the content, such as unclear language expression, unrigorous logical structure, and insufficient evidence. After the instructor reviews the outline without error, upload it to the VIP system. Once it is approved by the professional head, it is ready.

The first draft of the thesis is revised and improved on the basis of the original paper, making the structure of the thesis more complete, the viewpoints clearer, the evidence more sufficient, and the content more rigorous, accurate and complete. After the instructor's review and approval, upload it to the VIP system. Once approved by the professional head, it's done.

The finalization of a thesis requires students to correct the errors in the initial draft, supplement the deficiencies, and make the entire thesis more complete, ensuring its completeness, logic and accuracy, and meeting the character count requirements. After the instructor's review and approval, upload it to the VIP system for plagiarism checking. If the text copy ratio is less than 25% and the AIGC ratio is less than 35%, it will then be reviewed by the reviewer or sent for blind review. Only those who pass the review by the examiners or the blind review can participate in the defense.

The final draft of the thesis is the bound version submitted to the school after the feedback and revision from the supervisor, the review (blind review) teachers and the defense panel based on the final version. The text copy ratio is less than 25% and the AIGC ratio is less than 35%. It is the thesis manuscript that will be archived.

3.7. Strengthen integrity inspection and improve the quality of graduation projects

The school will add AIGC detection to the graduation design (thesis) management system to check the first and final drafts of graduation theses (designs). Based on the proportion of suspected AIGC risk fragments in the main text, the risks will be classified into four levels: high, medium, low, and none. For papers with medium and high risks, warnings and reminders will be given, and they will be required to make revisions to reduce the intelligent generation ratio. And recheck again. Achievements with higher AIGC risks will be disqualified from the defense. All graduation projects (theses) must undergo text copy ratio detection and format detection. Those that meet the relevant regulations of the school can participate in the defense; otherwise, the defense qualification will be cancelled.

3.8. Establish a supervision and inspection team for graduation projects

In the work of graduation design (thesis), students are the foundation, the supervisor is the key, and the supervision and inspection team can serve as the quality guarantee for the graduation design to maintain the stable operation of the graduation design work. The main task of the supervision team is to conduct full-process monitoring of the graduation design process[6]. Through spot-checking the opening report, mid-term inspection of the thesis, random inspection of the thesis, attending the thesis defense as an auditor, and rechecking the grades, they inspect and supervise the topic selection, content, format, and grades of the graduation thesis.

4. Conclusion

Undergraduate graduation design (thesis) is an important means of personal academic training for students and a significant measure of obtaining a bachelor's degree. It is a comprehensive review of the educational and teaching quality of the school over the past four years, especially the achievements in talent cultivation. It is also an indispensable observation point for the qualified assessment of undergraduate teaching work. Therefore, it requires the joint efforts of schools, colleges, majors, instructors and students, with all parties attaching importance to the process and jointly improving the quality of graduation projects.

Acknowledgement

Funding Project: 2024 University-level Teaching Management Research Project "Research on the Quality Management of Undergraduate Graduation Design in Applied Private Colleges" (JG2024YB08 (Z))

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