Education Reform and Development, 2025, Volume 7, Issue 2
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Research on the Incentive Mechanism and Management System Construction of Experimental Technical Team under the Background of "Double First-class" Construction

Junjie Lin*, Jing Xiao

Department of Equipment and Laboratory Management, Jianghan University, Wuhan 430056, Hubei, China

Corresponding Author: Junjie Lin, ljj@jhun.edu.cn

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Under the new situation of "double first-class" construction, experimental technical team is an important force in scientific research and teaching work in universities. In view of the shortcomings of the existing incentive mechanism, this paper probes into the incentive construction, development and management system of the experimental technical team, and puts forward targeted incentive measures, such as performance reward, career development path planning. At the same time, the author introduces how to promote the sustainable development of the experimental technical team through the system construction and personnel training. Based on extensive analysis and research on the current status and challenges of the "double first-class" construction of experimental technical teams in colleges and universities, the findings in this paper will be highly valuable in optimizing the structure of these teams. They will also contribute to improving team quality, developing strategies for team construction and growth, and enhancing management systems. Additionally, the research will offer both theoretical insights and practical guidance for advancing the development of experimental technical teams in Chinese universities [1-3].

Keywords: Double first-class; Experimental technical team; Incentive mechanism; Construction and development; Management system

Online publication: February 28, 2025

1. Introduction

With the rapid development of higher education in our country, "double first-class" construction has become a great strategy in the new era of education. Among them, the role of the experimental technical team is becoming increasingly prominent, with its professional quality and innovative ability directly affecting the improvement of teaching quality and scientific research level [4]. Based on the requirements of the experimental technical team under the background of "double first-class" construction, this paper analyzes the current situation and existing problems of the incentive construction, discusses the development and management system of "double first-

class" construction, and the innovative strategies to provide reference for the construction and development of experimental technical team [5].

2. "Double first-class" construction of the experimental technical team

The experimental technical team is an important part of the experimental teaching and scientific research in colleges and universities. It is responsible for the tasks of experimental technical support, experimental equipment management and experimental curriculum construction [6-7]. The role of the experimental technical team in the construction of "double first-class" is mainly manifested in guaranteeing the quality of experimental teaching, promoting scientific research innovation, and improving the utilization rate of experimental equipment.

The experimental technical team is the necessary guarantee for the development of colleges and universities. In the teaching process, they guide and maintain the operation of experimental equipment for teachers and students to ensure the quality of experimental teaching. In the field of scientific research, they contribute to experimental design, data collection, and analysis, offering technical support for the generation of research outcomes. At the management level, they guide the experimental technical team in developing experimental protocols and safety procedures, while enhancing laboratory management standards. Especially during the "double first-class" construction process, the professional abilities and innovative spirit of the experimental technical team are crucial [9-11]. These factors play a key role in enhancing the scientific research capabilities and international competitiveness of colleges and universities, serving as a vital foundation for the development of high-quality, innovative talent.

3. Current situation and problems of the construction of experimental technical team

At present, the construction of experimental technical team in our country has achieved obvious results in the aspects of personnel quality, team structure, incentive mechanism, and management system, but some problems cannot be ignored. In terms of personnel quality, the overall level continues to improve, but the proportion of highly skilled talents is low and does meet the needs of high-end experimental technology. Take a university as an example, in terms of the age structure of the experimental technical team of the university, the proportion of older people is relatively high, and the number of people born in the five years from 1985 to 1990 is as high as 62, which does not show a uniform distribution trend, and problems such as centralized retirement fault are bound to occur in the future, as shown in **Figure 1**.

Figure 1. Age distribution of experimental technical team

In terms of incentive mechanism, the existing incentive means are single, lack of pertinence, long-term, and it is difficult to fully mobilize the enthusiasm of personnel. In the management system, the mechanism is incomplete, with a lack of effective supervision and evaluation, leading to inefficient resource allocation and low work productivity. Therefore, we should start from many aspects, deepen the reform of the construction of experimental technical team, and promote its sustainable and healthy development [12].

4. Development strategy of incentive construction of experimental technical team

4.1. Construct a diversified incentive mechanism

Building a diversified incentive mechanism primarily involves fully harnessing the enthusiasm and creativity of team members. To optimize the salary incentive system, it is necessary to link the basic income of technical personnel with their work performance and set up special bonuses to commend their achievements. The promotion mechanism for professional titles should define clear promotion standards and processes, as well as outline a clear career development path for technical personnel. Pay attention to career development incentives, and promote the improvement of self-ability through professional training and academic exchange opportunities. The establishment of an honor-based incentive mechanism to regularly commend outstanding individuals and teams will enhance their sense of honor and belonging. The formation of a comprehensive and balanced incentive mechanism will promote the continuous development and innovation of the experimental technical team.

4.2. Strengthening training and communication

It is essential to strengthen the training and communication of the professional skills of the experimental technicians. Through regular professional skills training and laboratory safety training, the technicians can master the latest experimental methods, techniques and laboratory safety management knowledge, to improve their business ability. At the same time, cross-departmental and cross-field exchanges and cooperation activities should be organized to broaden the horizon of technical personnel as well as promote knowledge sharing and team collaboration. All these will help to improve the overall quality of the experimental technical team and lay a solid foundation for scientific research and innovation.

4.3. Improve the job evaluation and promotion system

Reform the job review system and optimize the incentive construction and development strategy of the experimental technical team. First of all, a fair and just promotion system should be established. The evaluation criteria should be transparent and reasonable. A comprehensive evaluation should be carried out by multi-dimensional indicators such as technical ability, work performance, and innovation results. The following are the specific reform measures:

(1) Formulate clear evaluation standards

Refine the evaluation indicators to ensure the evaluation system is scientific and operable so that each technical personnel are clear on promotion requirements and promotion ways.

(2) Strengthen quantitative assessment

Introduce quantitative indicators, such as project completion rate, conversion rate of scientific research achievements, etc., to support the evaluation results with objective data and reduce the bias of subjective judgment.

(3) Increase professional and technical positions

According to the professional characteristics of experimental technicians, corresponding job levels will be increased to provide more promotion space for technical personnel. There are as many as 205 experimental technicians in the school, of which only 2 are senior, about 40% are associate senior, and about 58% are intermediate. Compared with full-time teachers, senior titles are seriously low, professors account for about 40% of the faculty series, and professional and technical grades cover a high proportion of second-level and third-level professors; The proportion of senior experimentalists in the experimental series is less than 1%, and all of them are professional and technical level 4, see **Figure 2** below.

(4) Implementation of classified review

Design different evaluation standards and procedures for different types of technical personnel so that each technical personnel's expertise and contribution can be fairly evaluated.

(5) Strengthen the supervision mechanism

Establish an independent review and supervision body to conduct real-time supervision of the review process to ensure the fairness and transparency of the procedure.

Through the implementation of the above measures, fair and impartial promotion channels for experimental technicians will be established, effectively mobilizing their enthusiasm and innovative spirit. This, in turn, will drive the continuous development and advancement of the experimental technical team.

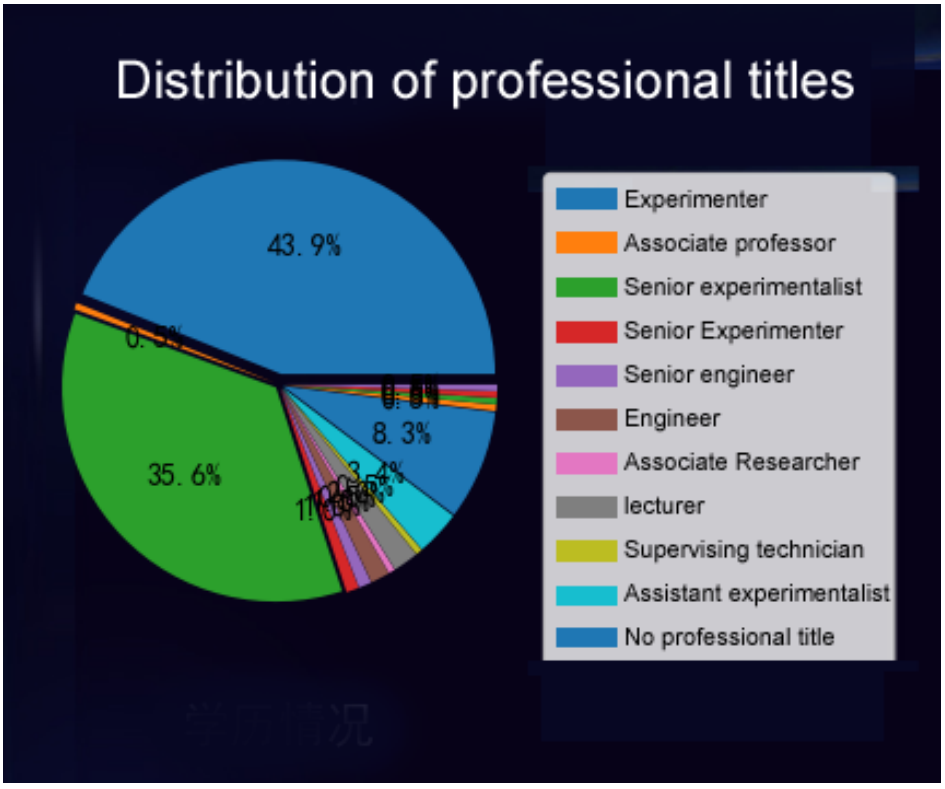

Figure 2. The title of experimental technical team

4.4. Improve the management system

In the construction of an experimental technical team, the management system is the key link. Make the duties of

the post clear, so that people are distinct and each performs their duties. This includes tasks such as experiment preparation, equipment maintenance, and technical support. Formulate reasonable assessment standards, with work quality, efficiency, innovation ability, and other core indicators to stimulate the vitality of the team [13]. At the same time, improve the professional title evaluation mechanism, with skill level, professional ability, and contribution as the main evaluation criteria to promote talent growth. Specifically speaking, the management system should include the following aspects:

(1) Job definition: Clearly delineate the scope of work and responsibilities of each post and ensure that team members have a clear understanding of their job responsibilities, to promote team collaboration and efficient operation.

(2) Performance evaluation: Formulate quantitative evaluation indicators including experiment, equipment maintenance rate, and service user satisfaction, to achieve objective evaluation of team members' work performance.

(3) Promotion of professional title: Establish a reasonable and fair professional title evaluation system, comprehensively consider personal skill level, business and contribution, and build career development ladder for outstanding talents.

Through continuous optimization and improvement of the management system, the cohesion and execution efficiency of the experimental technical team will be enhanced, thus laying a solid foundation for the efficient promotion of scientific research.

4.5. Strengthen the combination of incentives and constraints

It is very important to integrate the management structure of the experimental technical team with incentives and constraints. In the process of building the management system, we must attach importance to the integration of the dual mechanism of incentive and constraint [14]. By setting clear performance objectives and evaluation criteria, we should adopt multi-directional incentive means including material return, spiritual encouragement, and career promotion, to stimulate the enthusiasm of laboratory technicians. At the same time, an effective restraint system including responsibility attribution and fault accountability should be established to ensure that employees' behaviors are consistent with organizational goals. The management mode that integrates incentive and constraint can help improve the enthusiasm and autonomy of laboratory technicians, promote their continuous excellent work performance, and lay a solid foundation for the continuous progress and stable development of laboratory technicians.

4.6. Strengthen organizational coordination and resource integration

When constructing the management structure of the experimental technical team, strengthening the coordination ability and resource integration efficiency of the organization is crucial to improve the work efficiency of the whole team. Ensure that the functional definition and collaboration process of each position are clear as well as promote communication and cooperation within the team more smoothly by establishing the boundaries of members' rights and responsibilities. Hold regular cross-departmental consultation meetings to ensure timely exchange of information and promote the optimization of resource allocation [15]. Build a resource allocation mechanism that can be dynamically adjusted and flexibly allocate resources according to actual work needs, to improve work execution efficiency. The adoption of these strategies can effectively enhance the organization and coordination ability of the experimental technical team, maximize the efficiency of resource use, and provide solid logistics support for scientific research and innovation activities.

5. Conclusion

The development of an incentive-based experimental technical team and management system plays an important role in the improvement of scientific research strength and teaching quality. A set of scientific and reasonable incentive and management mechanism can fully mobilize the enthusiasm and creativity of the experimental technical team and promote the overall progress of the scientific research team. Facing the challenge of "double first-class" construction, it is necessary to establish and improve the incentive system of the experimental technical team, optimize the training and selection mechanism of experimental technical team, strengthen the performance management of experimental technical team, and promote the rational allocation of scientific research resources. Through these measures, we will be able to create an efficient and professional experimental technical team in the "double first-class" construction process and make contributions to the development of scientific research in our country.

This paper analyzes the important role of the experimental technical team in the construction of "double first-class", encourages the current situation and existing problems of the construction, development and management system, puts forward innovative strategies, and takes a university as an example to carry on the case analysis. The research holds that by optimizing the incentive mechanism, expanding the development path, and improving the management system, the enthusiasm of the experimental technical team can be improved, which provides strong support for the construction of "double first-class". In the future research, the problems of the team construction and personnel training of the experimental technical team can be further discussed, to provide more theoretical support for the development of the experimental technical team.

Funding

Project of Universities in Hubei Province in 2023, "Research on the Post Setting and Evaluation System of Experimental Technical Team under the Background of 'Double First-class' Construction" (Project No. HBSY2023-073)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhou Q, Zhang G, Zeng Q, et al., 2023, Construction Path of "Double First-Class" University Construction Based on Stable Experimental Technical Team Size. University Laboratory Science and Technology, 2023(1): 92–97.

[2] Ren J, Fan G, Pan S, 2018, Explore the Construction Path of Experimental Technical Team under the Background of "Double First-Class". Science and Education Literature Exchange, 2018(8): 4–7.

[3] Liang Y, 2022, Exploration and Practice of University Experimental Technical Team Construction in the New Era. Experimental Technology and Management, 2022(30): 100–105.

[4] Meng Y, Lu Z, 2023, Research on Construction of High-Level Engineering Experimental Team with Chinese Characteristics – Reform Practice Based on Construction of World-Class University. Journal of Shanghai Jiao Tong University (Philosophy and Social Sciences Edition), 31(9): 137–151.

[5] Wang Z, Li M, Zhang W, et al., 2020, Current Situation and Countermeasures of Experimental Technical Team

Construction in Universities. Higher Education Research, 2020(4): 82–89.

[6] Su M, 2003, Discussion on the Problems and Countermeasures of the Construction of Experimental Technical Team in Colleges and Universities. Journal of Fujian Economic Management Cadre Institute, Fujian Administration College, 2003(S1): 109–110.

[7] E X, Meng L, 2003, The Construction of Experimental Technical Team Is the Key to Laboratory Construction. Journal of Shenyang Institute of Education, 5(4): 119–120.

[8] Yan L, Yao Z, Shu J, 2020, Construction and Practice of Experimental Technical Team in University Test Center under the Background of "Double First-Class". Laboratory Research and Exploration, 39(5): 247–251.

[9] Jing J, Yang M, Zhao Y, 2019, Research on Incentive Mechanism of University Experimental Technical Team from the Perspective of "Double First-Class". Experimental Technology and Management, 36(2): 4–7.

[10] Liu Y, Mo J, Liu L, 2021, Discussion on the Incentive Mechanism for University Laboratory Technical Teams under the "Double First-Class" Initiative. Laboratory Research and Exploration, 2021, 40(12): 246–250.

[11] Zhang F, 2005, Research on Incentive Mechanism of Experimental Technical Team in Universities. Science and Technology Information Development and Economy, 15(16): 234–235.

[12] Zhang D, Zou J, 2019, Discussion on Improving the Incentive Mechanism of University Experimental Technical Team in the New Era. Theoretical Research and Practice of Innovation and Entrepreneurship, 3(19): 173–175.

[13] Xue Q, 2016, Analysis on the Construction Strategy of Incentive Mechanism for High-Level Experimental Technical Team. Science and Technology of Chinese Universities, 2016(10): 35–37.

[14] Huo Y, Huang A, Sun Y, et al., 2022, Innovative Job Assessment and Incentive Mechanism to Improve the Ability of Experimental Technical Team. Laboratory Research and Exploration, 2022, 41(2): 142–145, 269.

[15] Guo T, Yang S, Jiang Y, et al., 2019, Strengthening Incentive Mechanism to Stabilize High-Level Experimental Technical Team. Laboratory Research and Exploration, 39(8): 254–257.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.