

The Current Situation and Development Strategies of Laboratory Teaching Staff in General Universities under the Background of Education Digitalization

Ling Hongping

School of Physical Education Science, Lingnan Normal University, Zhanjiang, Guangdong, 524048

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ABSTRACT

Currently, the lack of systematic training and narrow promotion channels for laboratory staff in ordinary universities in China are common issues. The rapid development of digital technology has completely changed the global higher education landscape. In China, the digitalization process of education has brought both opportunities and challenges to the management of university laboratories and faculty team development. The digital era demands that laboratory staff master digital skills and possess interdisciplinary collaboration abilities. To help laboratory staff meet the demands of the digital era, universities must establish a multi-dimensional development framework, which includes a digital training mechanism, promotion system, performance evaluation reform, and enhanced collaboration mechanism. This will promote the high-quality development of the laboratory faculty team under the context of digital education.

1. Introduction

The digital transformation of education is profoundly reshaping the teaching methods, research practices, and management models in universities worldwide. As an important part of curriculum teaching and experimental practice, laboratory teaching staff are significantly impacted by this transformation. In comprehensive universities in China, the role of laboratory staff is shifting from traditional technical support to multifaceted educators, researchers, and digital resource managers. However, due to institutional constraints, insufficient training mechanisms, and outdated evaluation systems, many universities face difficulties in enhancing the professional abilities of this group. This paper focuses on the role changes, challenges, and development needs of laboratory teaching staff in the

digital transformation of education, proposing strategies and recommendations based on problem identification, and attempts to integrate the development of laboratory talent into the overall digital transformation strategy of universities.

2. Current Status of Laboratory Teaching Staff in Ordinary Universities

Currently, laboratory teaching staff in ordinary universities in China mainly include laboratory technicians, laboratory managers, and laboratory course instructors. Their core responsibilities include laboratory operation management, equipment maintenance, safety management, and supporting faculty and students in experimental teaching. For a long time, this group has been on the periphery of univer-

*Corresponding Author:

Ling Hongping

Email: 1101527904@qq.com

sity management systems, lacking academic recognition, with low career mobility and narrow promotion channels. Surveys conducted in multiple ordinary universities show that they generally lack systematic digital skills training or pedagogical knowledge. More than half of laboratory staff have a bachelor's or master's degree, with most holding intermediate-level professional titles. Additionally, their job responsibilities are narrowly defined, and the current personnel management systems often exclude laboratory teaching staff from mainstream faculty development tracks, limiting their access to research funding, professional training, and promotion opportunities. This results in stagnated career development and low job satisfaction, which in turn threatens the sustainable development of experimental teaching quality. Furthermore, it fails to address the need for interdisciplinary and technically diverse capabilities in the digital era.^[1]

3. Challenges Brought by Education Digitalization

Education digitalization brings a series of complex demands and reshapes the skills and mindset required for laboratory teaching staff. These challenges can be categorized as follows:

3.1 Technical Capability

Digital laboratories require staff to operate and maintain complex software systems, such as virtual simulation platforms, AI-assisted diagnostic systems, and IoT devices. Currently, many staff lack the professional technical ability to efficiently manage these systems. While standardized digital literacy training might improve their capabilities, most universities lack the necessary training due to job positioning, training mechanisms, and funding shortages.

3.2 Role Expansion

In the digital learning environment, laboratory staff are required to engage in teaching design, digital content creation, and student guidance, among other core educational tasks. These responsibilities require not only traditional technical support skills but also expertise in course development, multimedia production, and the ability to customize online teaching strategies for diverse learning needs. Additionally, laboratory staff must quickly adapt to new educational platforms and collaborate closely with teaching teams to ensure the timeliness and effectiveness of the teaching content^[2].

3.3 Interdisciplinary Collaboration

The integration of digital technologies often requires

collaboration with faculty from fields such as information science, computer engineering, and data analytics to achieve complex experimental and teaching goals. In this context, laboratory staff play an increasingly important bridging role between technical and educational fields, becoming key links between professional knowledge and practical application. To fully leverage this role, laboratory staff need strong communication and project management skills to effectively participate in interdisciplinary research and innovation projects, especially those involving smart campus technologies or interdisciplinary experimental courses.

3.4 Institutional Inertia

Although policies have been implemented to promote the digital transformation of education, many universities still use outdated management frameworks and underestimate the contribution of laboratory staff. The resistance to change within universities has hindered substantial reforms, leaving laboratory staff in a long-standing state of insufficient support^[3].

4. Development Strategies for Laboratory Teaching Staff

To align the development of laboratory staff with the goals of digital education, universities must adopt comprehensive and forward-looking strategies. The following recommendations aim to establish a strong, professional, and adaptable laboratory teaching staff system:

4.1 Strengthening University Support Mechanisms

Universities should reclassify laboratory staff as core academic team members, ensuring their status and welfare are on par with teaching faculty. This adjustment should be accompanied by the establishment of clear career advancement ladders, incentive mechanisms, and professional title systems equivalent to those of teaching and research staff. University policies should clearly recognize the contributions of laboratory staff in digital teaching innovation and research, particularly in areas such as smart laboratories, virtual simulation, and cross-disciplinary technical support, thus enhancing their overall institutional value^[4].

4.2 Establishing a Digital Literacy Training System

Universities need to build a systematic training system to cultivate the digital capabilities of laboratory staff and enhance their ability to respond to dynamic demands. This should include mandatory training programs on virtual simulation systems, AI platforms, online experiment guid-

ance, and digital security standards. The training system should be modular, flexible, and linked to standardized certification projects. Collaboration with technology enterprises can further enrich the training content, providing real-world applications and cutting-edge resources, thereby achieving both theoretical knowledge and practical skill enhancement.

4.3 Reforming Evaluation and Promotion Systems

The career development path of laboratory teaching staff directly impacts the stability and motivation of the workforce. Historically, there has been a tendency to focus more on theoretical teaching and research output, neglecting the value of experimental teaching. To address this, universities should create a “can advance or decline, multi-track system” for career development, emphasizing evaluation based on experimental ability and job performance. The evaluation should prioritize experimental technical achievements, innovation, and practical work experience, rather than focusing solely on academic credentials, publications, or awards. Evaluation should also consider contributions to digital transformation, interdisciplinary collaboration, and online and offline teaching effectiveness^[5].

4.4 Promoting Interdisciplinary and Cross-Institutional Cooperation

In modern educational reform, interdisciplinary integration is key to fostering innovative talent. Laboratory teaching staff’s ability to integrate cross-disciplinary knowledge directly impacts the breadth and depth of teaching content and student problem-solving capabilities. Universities should encourage laboratory staff to participate in interdisciplinary research projects, particularly those involving educational technology, data science, and the integration of smart laboratory infrastructure. Universities can establish joint innovation centers or laboratory alliances to pool resources and expertise across departments, fostering creativity, knowledge exchange, and professional development opportunities. Such cooperation will drive the development of sustainable, inclusive digital laboratories.

4.5 Building a Digital Resource Development Platform

Laboratory teaching resources, such as online manuals, simulation videos, and troubleshooting databases, should be centralized into a digital platform, managed and maintained by laboratory staff. This will not only enhance their digital operation skills but also support blended learning and remote teaching environments, providing robust sup-

port for students and teachers and improving the overall quality assurance of digital education^[6].

5. Conclusion

Education digitalization presents both challenges and opportunities, prompting a redefinition of the roles and capabilities of laboratory teaching staff. Under the traditional system, their career growth was limited; however, in the digital educational ecosystem, they are entrusted with more important functions. To support this transformation, universities need to focus on institutional reforms, capacity-building, evaluation systems, and collaborative innovation. The development of laboratory teaching staff is no longer just a technical issue but a critical part of universities’ high-quality development strategies. As the digital transformation of education deepens, laboratory teaching staff will play an increasingly vital role in knowledge conversion, practical innovation, and ensuring the quality of teaching.

Future research can expand on this study by conducting regional and disciplinary comparisons, tracking the long-term career development paths of laboratory staff, and evaluating the effectiveness of digital training models to provide more actionable decision-making support.

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