Research on the Concept and Innovation Path of Science and Education Integration

Zixiong Yue

Marxism College, Nanjing University of Finance & Economics, Nanjing, Jiangsu, China
15850645793@163.com

Abstract: *With the continuous development of technology, culture and economy, higher expectations have been placed on higher education institutions by the nation. The goal of higher education is to cultivate talents with a broad knowledge base and practical abilities. Scientific research and teaching are crucial issues in the field of education, and to maximize their roles in the educational process, it is essential to promote their integration and mutual influence. However, there is currently a disconnect between research and teaching in the education sector, where higher education institutions often prioritize research outcomes over teaching quality, teachers overly focus on research projects to the detriment of their students' education, and a lack of coherence between research and teaching persists. Therefore, it is necessary to comprehensively motivate teachers, enhance students' creativity, and achieve the concurrent development of research capabilities and teaching effectiveness in higher education institutions.*

Keywords: Educational concept, Science and education integration, Innovation

1. Introduction

In the past three decades of development, scientific research in universities has undergone qualitative changes and quantitative growth in terms of level and scale. With the improvement of higher education and the enhancement of university innovation capabilities, how to promote the development of higher education through scientific research and transform the advantages of scientific research into the advantages of talent cultivation has become an important topic of concern in the education sector. In recent years, teachers, university presidents, scholars, and experts have proposed numerous reform ideas, thoughts, and concepts, but the education framework still primarily focuses on knowledge dissemination, and the research potential and advantages of universities have not been fully utilized for talent development. Therefore, in order to adapt to the development of technology and educational trends, it is necessary to enhance the innovation capabilities of universities through science and education integration, and cultivate more outstanding talents.

This is not only an effective approach to improve the talent cultivation model but also promotes breakthroughs in the educational concepts and ideas of universities. By re-adjusting the relationship between scientific research and teaching in universities and organically integrating research outcomes into the teaching process, students' practical abilities and innovation awareness can be enhanced. Simultaneously, encouraging teachers to actively participate in research activities and apply their research results to teaching practices can improve teaching quality and students' learning experiences. Universities should also strengthen cooperation with enterprises and society, transforming research outcomes into practical productivity and providing more innovative talents for the country and society. [1]

2. Importance of Cultivating the Educational Concept of Science and Education Integration

Science and education integration is an approach to talent cultivation that aims to foster innovative individuals by intertwining teaching content, teaching methods, and scientific research.

2.1. The thought of science and education integration is the need of social development

In the era of the knowledge economy, the core of global competition lies in comprehensive strength, and at its core is talent. Higher education institutions bear the responsibility of nurturing high-level,

high-quality talent. The concept of science and education integration aligns with the requirements of current economic development and offers a crucial choice for advancing societal progress.

2.2. The thought of science and education integration is the main demand of educational progress

The capacity to acquire knowledge is a vital skill for human survival and development. Progress in education is reflected in the process of socializing education, requiring the cultivation of more versatile and innovative talents. The thought of science and education integration emphasizes personal development by closely integrating practice with theory, aligning with the values of education, and possessing inherent appeal to the advancement of education.

2.3. The thought of science and education integration is the direction of education development

Higher education institutions bear multiple responsibilities, including cultural preservation, societal service, scientific research, and teaching. While research and teaching may seem superficially independent, they are fundamentally interconnected. Teaching serves as the foundation for scientific research, and scientific research drives the enhancement and elevation of teaching. Research and teaching complement each other, jointly promoting talent cultivation and technological innovation, creating a virtuous cycle. Prioritizing science and education integration can prevent the disconnect between research and teaching, achieving mutual symbiosis between education and scientific research.[2]

In summary, cultivating the educational concept of science and education integration is critically important for advancing higher education. It meets the needs of societal development, drives educational progress, and guides education towards comprehensive development. The concept of science and education integration contributes to optimizing talent cultivation models, enhancing the quality and innovative capacity of higher education, and providing society with more individuals possessing comprehensive strength and innovative abilities.

3. The Disconnect Between Education and Scientific Research in Education

In higher education institutions, teaching and research should complement each other, avoiding an overemphasis on one at the expense of the other. However, the integration of teaching and scientific research has not been effectively implemented in many universities, and the dominance of research often leads many teachers to prioritize research activities, resulting in a disconnect between teaching and research.

3.1. Emphasis on Research Output in Evaluation and Management

Globally recognized top-tier universities are typically research-intensive, where research is emphasized as a prerequisite. They have produced numerous impactful scientific achievements and Nobel laureates, nurturing world-class scientists. Currently, university rankings often consider scientific research outcomes as the key indicator for assessing university performance, with research quality typically accounting for 40% to 90% of the evaluation criteria.[3] Leading universities typically possess high academic reputations, abundant research outcomes, and strong research capabilities. To implement strategies for national development, the state and various levels of government assign major research projects to universities and gradually increase funding to promote research efforts based on their inherent advantages. In this context, universities prioritize research management, making it their primary management objective to secure research funding, publish research papers, obtain scientific awards, and acquire and use technological patents, among other factors. Teacher contributions and competency assessments are also based on these factors, influencing their eligibility for allowances, benefits, and promotions. In contrast, regarding teaching, many universities simply require teachers to conduct classes and maintain good teaching order.

3.2. Emphasis on Acquiring Research Projects over Student Teaching

Under the influence of evaluation systems and societal expectations, many university teachers prioritize research activities and the acquisition of research projects over teaching. Some even metaphorically refer to research projects as the "bosses" of university teachers, characterizing the situation where university teachers prioritize research over teaching as "first-rate teachers engage in

research, while second-rate or lower teachers focus on teaching." Simultaneously, once some teachers attain the title of professor and gain social recognition, they tend to engage in high-paying consultancy activities, with economists being particularly sought after. Some teachers are unwilling to obtain meager allowances through teaching within the university and instead choose to participate in consultancy activities, which can earn them tens of thousands of dollars. In recent years, despite the requirements of national education authorities, professors, even at the full professor level, primarily responsible for undergraduate teaching, have not allocated their primary efforts to undergraduate teaching but have merely engaged in symbolic teaching activities.

3.3. Lack of Consistency between Teaching Content and Research Content

University teachers' research should revolve around teaching and apply research outcomes to teaching practices to impart knowledge to students. However, the reality often differs. Some professors consider themselves full-time researchers, barely engaging in teaching activities. Others, while teaching a specific aspect of their research, find that their research content does not align with their teaching content, resulting in minimal relevance in their actual teaching. Some teachers only pursue research projects for the sake of securing them, with their research content having no connection to their teaching content, making it difficult to apply research outcomes to their teaching. The disconnect between teaching and research causes many teachers to view classroom teaching as a task to be reluctantly completed or simply as a means to secure compensation, with a significant portion of their energy and time directed towards research that benefits them personally.

3.4. Insufficient Focus on Student Innovation and Entrepreneurship

In university education, there is also insufficient emphasis on student innovation and entrepreneurship. Although some universities have actively promoted innovation and entrepreneurship education in recent years, there is still a disconnect between teaching and practical application. Some universities only provide theoretical instruction, lacking support for actual project cultivation and implementation. Students often lack opportunities to engage in real innovation projects and struggle to apply their acquired knowledge in practical situations. Additionally, innovation and entrepreneurship education faces shortcomings in terms of curriculum design, mentorship, and resource support.[4]

In conclusion, the disconnect between education and scientific research in higher education institutions primarily manifests in the overemphasis on research output in evaluation and management, teachers' tendency to prioritize research over teaching, a lack of consistency between teaching and research content, and insufficient attention to student innovation and entrepreneurship. To address this issue, universities should prioritize the assessment and management of teaching quality, encourage teachers to apply research outcomes to teaching to enhance its practicality and applicability. Simultaneously, support and training for student innovation and entrepreneurship should be strengthened, providing more practical opportunities and resources to nurture students' innovative spirit and practical capabilities. Only through science and education integration can comprehensive development in higher education be achieved.

4. Innovative Paths for Science and Education Integration

To achieve the goal of science and education integration in universities, it is essential to achieve a rich and diverse integration of content and forms between teaching and research, making them an inseparable whole in essence. With the assistance of policy support and collaboration between science and education, external research resources should be transformed into educational resources, sharing the important responsibility of nurturing students. This approach not only enhances the value and effectiveness of teaching but also fulfills the comprehensive goal of student development.

4.1. Formulating and Implementing Policies to Promote Science and Education Integration

Government authorities play a pivotal role as guides and founders of higher education institutions, making their role crucial in the development of universities. Therefore, when universities implement talent cultivation models based on science and education integration, it is imperative to comprehensively reflect the government's regulatory role, ensuring that policies are in place to support science and education integration. Firstly, guidelines and policies promoting science and education integration should be established to guide the work of universities. This includes the creation of

comprehensive evaluation, supervision, and management systems, with these institutional policies being fully integrated into higher education practices. Secondly, active macro-level management of universities should be conducted. The government should categorize universities, ensuring a balanced proportion of different types to avoid resource wastage and duplication. Educational plans and program offerings should be reviewed based on societal development needs and the actual circumstances of different universities to maintain the quality of talent cultivation. Appropriate allocations of research and teaching funds should be made based on university characteristics to promote the common development of research-oriented and teaching-oriented universities. Periodic assessments and evaluations of university performance should be conducted, with recommendations and incentives provided based on the assessment results. Finally, universities should be granted greater autonomy through institutional mechanisms. Science and education integration model requires universities to have more autonomy, allowing them to adjust training requirements and programs according to societal and national development needs. Therefore, the government should provide universities with more room for autonomy as the foundation and guarantee for implementing science and education integration.

4.2. Strategies for Universities to Utilize Science and Education Integration for Talent Cultivation

Universities are the primary actors in implementing the science and education integration model and should lay the foundation and provide necessary support for the realization of this concept to nurture more versatile and innovative talent for the nation. Firstly, universities should consider science and education integration as a fundamental concept in talent cultivation. Universities should align themselves according to their unique conditions, design systems to promote the implementation of higher education, and incorporate science and education integration principles into institutional structures to more effectively realize their talent cultivation function. For example, research-oriented universities should not only bear the responsibility of scientific research but also train high-level talents demanded by society and the nation. Balancing research and teaching is vital, and science and education integration should be institutionalized to prevent the utilitarian trend in university development that might arise from the influence of new research and technologies. Teaching-oriented universities should focus primarily on talent cultivation, educational research, and academic research. The responsibility of applied research should fall on research institutions and research-oriented universities. Teaching-oriented universities should establish science and education integration principles and avoid situations where research is conducted for the sake of research without fulfilling their responsibility for talent cultivation.[5]

Secondly, universities should provide guidance and training to teachers in science and education integration. Teachers are essential components of universities and play crucial roles in both research and teaching, reflecting the overall level of universities through their teaching competence and research capabilities. To survive and thrive in a competitive environment, universities must enhance the professional qualities and comprehensive abilities of their teachers. Therefore, universities should offer training and guidance to teachers on how to implement science and education integration. This training should encompass both teaching and research, covering topics such as selecting teaching methods, using curriculum theory, and designing teaching plans. It should also include the integration of teaching content with cutting-edge knowledge in their respective fields, ensuring that teachers possess the capacity to update organizational forms, teaching methods, and teaching approaches. On the research front, there should be a focus on cultivating teachers' research skills and research methods, improving practical research capabilities, and promoting the exchange of advanced research knowledge. Strategies and measures for translating research achievements into teaching outcomes should also be addressed.

Finally, universities should establish domestic and international exchange platforms to promote science and education integration. In today's evolving society, internationalization of education is continually increasing, and countries worldwide are emphasizing the internationalization of student cultivation, helping students align with the world and the times. Therefore, science and education integration model requires universities to establish domestic and international exchange channels for teachers and students according to their actual circumstances. At the domestic level, universities can facilitate student and teacher exchanges among themselves through teacher training, research presentations, academic forums, and other formats to promote mutual learning and development among universities. At the international level, there are two main approaches. First, students and teachers should be encouraged to go abroad for training or academic exchanges. Teachers can participate in training or academic exchanges at foreign universities to understand cutting-edge developments in their respective disciplines and acquire the latest scientific knowledge. Students can study abroad as

international or exchange students. Second, universities can invite foreign experts and professors to visit and communicate with their faculty and students. Universities can hire visiting professors who can interact and exchange ideas with faculty and students. Science and education integration concept and talent cultivation model require universities to pay attention to global trends and societal needs. Through mutual learning and exchange in domestic and international contexts, universities can enhance their own capabilities and levels.

4.3. Encouraging Coordination and Unity between Teaching and Research for Teachers

University teachers are the executors of both research and teaching activities and play a crucial role in implementing science and education integration. Teachers' abilities, qualities, behaviors, and attitudes all have a direct impact on the quality of talent cultivation. Therefore, teachers must enhance their capabilities and qualities, change their thought patterns, and implement the concept of science and education integration in their teaching. Firstly, teachers should establish the mindset of science and education integration. University teachers should have a correct understanding of the relationship between research and teaching, explore their interconnections, and effectively combine the two. This not only promotes the development of both research and teaching but also enhances teachers' abilities. Teachers should adopt the correct attitude toward science and education integration, making it a central task and avoiding the prioritization of self-interest that can lead to conflicts between research and teaching.

Secondly, teachers should promote the implementation of science and education integration teaching models. Universities should support teachers in proper preparation, including psychological readiness and knowledge preparation. Teachers must psychologically accept and embrace science and education integration to effectively implement it. In the process of implementing science and education integration concept, teachers should not only impart knowledge but also focus on nurturing students' critical thinking and problem-solving skills. They should guide students to develop the ability to think independently, explore the causes of problems, and handle issues effectively. In the context of science and education integration, teachers should inspire students to love research, become proficient in it, and excel in it. They should also instill good research habits in students. Teachers should influence students through their own academic behavior and perspectives, enabling students to learn resilience and rigorous scholarship, thereby laying a foundation for their future in society.

Finally, universities should prioritize the evaluation of educational quality and support teachers in applying research findings in their teaching. Evaluation indicators in universities are instrumental in regulating teachers' mental focus and time allocation and guide their professional development. Universities should place value on the time that teachers devote to their students, including preparation time, classroom teaching time, guidance time, and time spent exploring new knowledge in the classroom. The time spent on teaching and interacting with students reflects the emphasis teachers place on their mental well-being and to some extent represents the achievements they can attain. Additionally, universities should understand and share the methods teachers use to cultivate talent. Do teachers lead research, inspire and guide, or do they simply follow textbooks? Applying the methods of science and education integration in teaching not only reflects the characteristics of universities but also serves as the foundation and prerequisite for talent cultivation. Universities should enhance students' professional and cultural qualities while also developing their analytical abilities for understanding and solving problems, providing students with a comprehensive education.

4.4. Promoting the Development of Innovation and Entrepreneurship Education for University Students

Firstly, universities can provide professional mentorship teams, including industry experts and successful entrepreneurs, to guide students in their innovation and entrepreneurship projects. Mentors should offer practical experience and guidance, help students solve real-world problems, and provide industry resources and networking support.

Secondly, universities should actively collaborate with enterprises, research institutions, and other entities to provide students with opportunities to participate in real projects. Through collaboration on actual projects, students can apply their acquired knowledge in practice, nurturing their practical skills and problem-solving abilities. Establishing entrepreneurship incubation centers or innovation parks to support students with entrepreneurial intentions is essential. These platforms can offer facilities, funding, mentorship, and other support to help students turn their entrepreneurial projects into reality

and foster their development.

Finally, universities should cultivate a culture of innovation and entrepreneurship, encouraging students to innovate and venture boldly. Hosting innovation and entrepreneurship competitions, lectures, and activities and providing platforms for communication and collaboration can inspire students' innovation potential and entrepreneurial enthusiasm. It is hoped that these measures can better promote the development of innovation and entrepreneurship education for university students, enhance their practical skills and innovation and entrepreneurship awareness, and lay a solid foundation for their future careers and entrepreneurial paths.

5. Conclusion

In the evolving landscape of the knowledge economy, there is a growing demand for innovative talents from both the government and society. The concept of integrating science and education embodies a humanistic approach to education, based on individuals' innate freedom and quest for knowledge. It harnesses the inherent creative nature of individuals through self-realization. However, there is still a prevalent issue of prioritizing research over teaching in the process of educational integration. To address this, policies should be formulated and implemented to promote the integration of science and education. Universities should employ strategies that incorporate the concept of integrating science and education into talent cultivation. This includes encouraging teachers to achieve harmony and unity between teaching and research, thereby enhancing the level of integration. In conclusion, the integration of science and education is crucial in nurturing the innovative talents needed in the ever-evolving knowledge economy. It is a concept grounded in humanistic principles and self-realization, which, when effectively implemented, can bridge the gap between teaching and research. This, in turn, will contribute to the advancement of both higher education and society as a whole.

References

[1] Zhang Xiaohui. A Brief Analysis of the Path to Cultivating Educational Integration Concepts in Higher Education. Chinese Adult Education, 2016, (20): 90-91.
[2] Qu Xia, Huang Lu. An Investigation and Reflection on the Recognition and Practice of Educational Integration Concepts among University Teachers. Research on Higher Engineering Education, 2016, (04): 83-89.
[3] Lin Yanhong. Innovation and Practice of Educational Integration Concepts: A Case Study of the University of the Chinese Academy of Sciences. Graduate Education Research, 2015, (04): 27-32.
[4] Lin Yanhong. Progress in Educational Integration Concepts and Empirical Research. China Higher Education Research, 2015, (05): 26-27.
[5] Zhou Guangli, Ma Haiquan. Integration of Science and Education: A Transformation and Innovation of Higher Education Concepts. China Higher Education Research, 2012, (08): 15-23.