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Frameworks for Developing a 6G Communication Network to Intensify the Modern Vocational Education System

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ABSTRACT

A modern technology-supported vocational educational system significantly affects the quality of vocational training and contributes to the innovation and economic development of the regional area. The visualization literature analysis was adopted with the purpose of exploring the theoretical framework for developing a 6G-assisted network to realize the multi-party participation in the modern government-industry-education Integration system. The literature review showed the network should involve all cooperation entities into the communication system to intensify all coordination guided by the triple helix theory, should be strong enough to store all kinds of resources to support the optimized sharing, be efficient to track student training processes and learning data to provide scientific evaluation to student development in personal qualities and competencies, be supportive to develop a cooperating culture to form a healthy ecosystem in which all enterprises actively participate and invest in vocational education.

KEYWORDS

6G Technology, Communication Network, Cooperation, Regional Development, Vocational Education

INTRODUCTION

Modern technology represented by computing technology, artificial intelligence, the Internet of Things, and 5G is being extensively applied in all human activities. The emerging 6G (sixth generation) communication networks, which are characterized by higher speed, increased device connectivity, advanced spectrum use, and lower latency communication, have been drawing attention from all over the world and are expected to be applied widely to teaching and learning.

Many scholars researched learning and teaching from the perspective of psychology and cognitivism regarding the theoretical framework. Constructivism emphasis on the interaction of students' experience with the work environment provides a theory foundation for an enhanced vocational learning and how technology facilitates constructivist learning (Brown, 1998; Doolittle & Camp, 1999; Kerka, 1997; Van Bommel et al., 2012). Rojewski (2009) proposed that a conceptual framework should be based on principles and philosophies that provide schema for some critical issues

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and solutions. The application of cutting-edge 6G technology should be demand driven and user centric (Kasi et al., 2023). Singh et al. (2011) proposed the user-centric technology development in the design and construction industry across disciplines should be emphasized for designing collaboration platforms. This proposal is consistent with the proposal of Liao (2022) that cooperation platforms supported by information technology are more than document management tools. Many deficiencies and inadequacies exist in communication channels and cultural infrastructure in the current system, and the collaboration and cooperation are limited to university-university or university-industry (Demirel & Bayer, 2015). Scholars are more likely to research the information technology in a specific area rather than multiple areas. Few researchers have ever addressed the general principles or philosophies that should be followed when designing a three-sphere cooperation platform spanning multiple disciplines. Taking a literature analysis method, I delve into the conceptualization and development of frameworks tailored for establishing a 6G communication network with the purpose of enhancing the modern vocational education system. This Research elucidates the intricate interplay between 6G communication networks and the modern vocational education paradigm. The interplay comes from five relevant disciplines: triple helix theory, government administration, enterprise administration and production, 6G-assisted vocational teaching and learning, and the application of 6G technology. By exploring the comprehensive frameworks of different disciplines, I aim to enhance the dynamic vocational education ecosystem, thereby fostering an environment conducive to heightened engagement, efficiency, and relevance in the government-university-industry cooperating system directed to the sustainable regional development. This research addresses three questions:

Q1: What theoretical framework should be followed when developing a 6G technology-supported government-university-industry integrated vocational education system?
Q2: What principles should be followed when designing the functions of the vocational education system?
Q3: How can the 6G-assisted vocational education system support the sustainable regional development?

LITERATURE REVIEW

The Theory of the Triple Helix Model

Vocational education plays a decisive role in the economic and social development of a region. It mainly supports regional development by providing highly skilled human resources. Neave (1979) addressed the question of how regional development was influenced by higher educational institutions. He stated that development could not always refer to economic growth, technology progression, and industry advancement, but rather, the presence of higher education institutions accelerates the cultural and industry development, especially when higher education was directed toward higher technology related firms. Promoting vocational education and training has been extensively recognized as a key strategy aiming to accelerate economic growth at the national and regional levels (Rees, 1997). Etzkowitz (2002) created the triple helix model of government-university-industry in which he explained how transformation of knowledge took place by interacting with each other and improving innovation in each sphere. Kearns et al. (2008) proposed the double helix theory that demonstrated the relationship between vocational education and training with regional development; they suggested that vocational education and training should be integrated with the economy of the region by providing the skills needs of the region to achieve the sustainable development. The principle of meeting requirements of industry led to the training curricula, the assessment methodology, the pedagogy, and the administration of vocational education, all of which were voiced by business and industry leaders who guided the transforming of educational goals for institutions, practitioners, and students (Billett, 2004). Kearns et al. (2008) showed that a