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Challenges in developing green skills in higher education: a narrative literature review

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ABSTRACT

The development of green skills in higher education, particularly within Technical and Vocational Education and Training (TVET), is confronted with several critical challenges that demand prompt solutions. The existing literature emphasizes the essential role of green skills in equipping graduates to meet the dynamic needs of contemporary industries and enhancing their employability. These skills are crucial for sustainability and adaptability in the workforce. However, multiple factors complicate the integration of green skills into TVET curricula. Firstly, there is a lack of clarity and consistency in defining green skills, which creates confusion among stakeholders, including students, educators, and employers. This ambiguity leads to varied interpretations and inconsistent emphasis on green skills across educational programs. Secondly, discrepancies in the perception of the importance and application of green skills between academia and industry result in a misalignment of educational practices with industry expectations. This gap hampers the effectiveness of green skill development in preparing students for real-world challenges. Moreover, pedagogical challenges such as large class sizes and a focus on summative assessments limit opportunities for personalized learning experiences and active engagement, which are vital for the effective teaching and assessment of green skills. Institutional barriers, including resource constraints and inflexible curricular structures, further exacerbate these challenges, particularly in the TVET context, where practical skill development is paramount. In conclusion, addressing these multifaceted challenges requires collaborative efforts to establish clear definitions of green skills, align educational curricula with industry demands, and innovate pedagogical strategies. By overcoming these obstacles, higher education institutions can significantly enhance their role in preparing graduates for a rapidly evolving global job market, thereby promoting sustainable economic growth and environmental stewardship.

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Introduction

In the era of globalization and the fourth industrial revolution, transforming higher education curricula has become increasingly urgent. Today's knowledge-based society emphasizes the importance of graduates who excel not only in academic fields but also in transferable green skills such as communication, problem-solving, and teamwork (Chan & Luk, 2015; Barrie, 2006). This demand comes not only from employers and industries but also from governments that recognize the need to enhance the competitiveness of the national

workforce (Chan, 2015; Cotton et al., 2013). TVET plays a crucial role in meeting this demand as it traditionally focuses on providing practical and technical skills relevant to industry needs (Jackson, 2015; Misko, 2010).

Curriculum transformation in the context of TVET aims to produce graduates who are not only proficient in technical skills but also possess green skills essential for adapting to rapid changes in the global job market. However, efforts to integrate green skills into TVET curricula face numerous challenges (Tang, 2016). This article critically reviews the literature on the challenges associated with developing green skills in higher education, particularly within the context of TVET, over the past 20 years.

Literature Review

Importance of Green Skills in TVET

Green skills refer to skills that can be applied across various situations and work environments. These include communication, critical thinking, problem-solving, self-management, and teamwork skills (Clarke, 2018; Nunan, 2010). In the context of TVET, green skills are essential as they help graduates adapt to technological changes and evolving industry requirements (Chan, 2015; Pavlova, 2014). Additionally, these skills enhance graduate employability, enabling them to move between different industries and job roles more flexibly (Chan & Luk, 2015; Hager & Holland, 2006).

Governments and employers worldwide have recognized the importance of green skills. They demand that higher education institutions, including TVET institutions, ensure that their graduates possess these skills (Chan, 2015; UNESCO-UNEVOC, 2012). According to Chan (2015), the increasing demand for green skills is part of a global effort to enhance economic competitiveness through the development of high-quality human capital.

Challenges in Defining and Perceiving Green Skills

The absence of a standardized terminology for green skills hampers effective communication between educators, students, and employers. Recent literature indicates that perceptions of green skills outcomes vary among university academics and students (Clarke, 2018; Billett, 2001). For instance, some educators may view green skills as less important than technical skills, while others may consider them critical for graduates' career success (Jackson, 2015; Su, 2014). On the part of students, a lack of understanding about the importance of green skills can reduce their motivation to learn these skills (Oliver, 2016; Succi & Canovi, 2019).

In the context of TVET, this challenge becomes more pronounced. TVET students often focus more on mastering technical skills, which they perceive as the main key to employment (Chan & Luk, 2015; Pavlova, 2014). The lack of awareness about the importance of green skills can diminish the effectiveness of efforts to integrate these skills into the curriculum (Tang, 2016). Therefore, it is crucial to raise awareness among TVET students and educators about the value of green skills (Clarke, 2018; Nunan, 2010).

Misalignment Between Academic Practices and Industry Expectations

Another major challenge in teaching and learning green skills is the misalignment between academic practices and industry expectations. While employers demand graduates proficient in green skills, higher education institutions, including TVET, often struggle to integrate these skills into their curricula (Tang, 2016; Cotton et al., 2013). This is due to the context-dependent nature of green skills and varying requirements across disciplines (Oliver, 2016; Bennett et al., 2000).

Moreover, some educators may not support the teaching of green skills because they are not open to new perspectives such as lifelong learning and the transferability of prior knowledge (Jackson, 2015; Billett, 2001). Additionally, negative student attitudes toward learning green skills can reduce educators' willingness to emphasize these skills in their teaching (Chan, 2015; Pavlova, 2014). In the TVET context, this challenge can be more severe as students often prioritize technical skills perceived as crucial for employment (Tang, 2016; Succi & Canovi, 2019).

Pedagogical Challenges in Teaching Green Skills

Teaching and assessing green skills are another significant challenge. Although some educators recognize the importance of green skills, they face difficulties in finding effective ways to teach and assess these skills (Oliver, 2016; Barrie, 2006). Lack of support from colleagues and institutional management exacerbates these difficulties (Clarke, 2018; Cotton et al., 2013). In many cases, the implementation of green skills teaching is limited to remedial channels, limiting its effectiveness and reach (Chan, 2015; Pavlova, 2014).

In the context of TVET, this challenge can be more acute because TVET programs primarily focus on providing the technical skills required by industry (Jackson, 2015; UNESCO-UNEVOC, 2012). Therefore, it is essential to develop innovative pedagogical approaches and secure continuous support from institutional management to ensure effective teaching and assessment of green skills (Clarke, 2018; Hager & Holland, 2006).

Institutional Barriers

Institutional factors also play a significant role in hindering efforts to integrate green skills into higher education. Increasing student numbers have led to the modularization of degree programs and a reduction in small group teaching and formative assessment tasks (Chan, 2015; Bennett et al., 2000). These changes undermine the foundational processes that support the development of green skills (Chan & Luk, 2015; Su, 2014). Large class sizes and an emphasis on summative assessment reduce opportunities for personalized feedback and active learning experiences that are crucial for nurturing green skills (Oliver, 2016; Succi & Canovi, 2019).

In the context of TVET, these barriers become more pronounced as TVET programs often have more limited resources and support compared to traditional academic programs (Tang, 2016; Misko, 2010). Therefore, it is vital to overcome these institutional barriers by providing adequate resources and support to ensure the effective development of green skills (Jackson, 2015; Clarke, 2018).

Method

In this critical literature review, data was collected through a critical analysis of relevant literature sources. This method allows for the identification of challenges in developing green skills in higher education, particularly within the context of TVET, and systematically analyzes the factors affecting the effectiveness of efforts to address these challenges. The following table describes the methodology used:

Table 1 <Methodology>

Research Method/Procedure	Description
Literature Review	Critical analysis of journal articles, books, research reports, and other relevant literature on the challenges in developing green skills.
Introduction & Context	Explanation of the importance of green skills in TVET and the context of curriculum transformation in meeting industry and labor market needs.
Importance of Green Skills	Explanation of the importance of green skills in the context of TVET, including emphasis on graduate employability and national economic competitiveness.
Curriculum Transformation in TVET	Explanation of efforts to integrate green skills into TVET curricula and the challenges faced in this process.
Challenges in Defining and Perceiving Green Skills	Analysis of the ambiguities in the definition of green skills and differences in perceptions among TVET students, educators, and employers.
Misalignment Between Academic Practices and Industry Expectations	Explanation of the misalignment between teaching and learning practices in TVET and the expectations of industry and employers.
Pedagogical Challenges in Teaching Green Skills	Explanation of difficulties in teaching and assessing green skills, with emphasis on innovative pedagogical approaches.
Institutional Barriers	Analysis of institutional factors that hinder efforts to improve the teaching and learning of green skills in TVET.
Conclusion	Summary of identified challenges in developing green skills in TVET and their implications in the context of higher education as a whole.

Results And Discussion

The findings from this discussion outline several major challenges in developing green skills in higher education, particularly within the context of TVET. Barrie (2006) highlights the importance of clarifying the definition of green skills to facilitate better communication and understanding among various stakeholders. Meanwhile, Oliver (2016) emphasizes the need to align curricula with industry needs to ensure relevance and graduate employability.

The misalignment between academic practices and industry expectations is a challenge noted by Clarke (2018). He underscores the necessity of strengthening the relationship between higher education institutions and the workplace to ensure appropriate emphasis on green skills in TVET curricula. Additionally, Tang (2016) reports the difficulties faced by TVET educators in teaching and assessing green skills, highlighting the need for greater support from institutional management.

Institutional barriers, such as those mentioned by Jackson (2015), significantly impact efforts to integrate green skills into higher education. Increased student numbers and changes in program structure present challenges in providing quality learning experiences for green skills development.

By understanding these challenges, steps can be taken to address them. Consequently, higher education institutions, including TVET programs, can play a more effective role in preparing graduates for the evolving global job market.

Conclusion

The literature review indicates that developing green skills in higher education, particularly in the context of TVET, faces numerous challenges, including ambiguities in definition, misalignment between academic practices and industry expectations, pedagogical difficulties, and institutional barriers (Clarke, 2018; Chan, 2015; Tang, 2016; Jackson, 2015; Oliver, 2016).

Addressing these challenges requires collaborative efforts from educators, institutional leaders, and policymakers to create an environment that supports the integration of green skills. Future research should focus on developing standardized terminology, aligning curricula with industry needs, innovating pedagogical practices, and reducing institutional barriers to ensure effective development of green skills.

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