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Enhancing Vocational Education in Egypt: The Role of Project-Based Learning in Developing 21st-Century Skills

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ABSTRACT

In the era of globalization and technological advancements, 21st-century skills—such as critical thinking, collaboration, creativity, and problem-solving—are essential for vocational high school students. This study examines the effectiveness of Project-Based Learning (PjBL) in fostering these competencies within Egypt's vocational education system. A qualitative research approach was employed, utilizing in-depth interviews with educators and an analysis of student project outcomes. Data collection focused on assessing how PjBL influences students' skill development and the challenges associated with its implementation. Findings indicate that PJBL significantly enhances not only students' technical expertise but also their adaptability and critical thinking skills, preparing them for the evolving labor market. Additionally, institutional support and continuous professional development for educators emerged as key factors in ensuring effective PJBL integration. These results highlight the potential of PJBL as an innovative pedagogical approach aligned with Egypt's ongoing educational reforms. By fostering essential 21st-century skills, PJBL can better prepare vocational students for the workforce. However, successful implementation requires strategic institutional backing and teacher training. PjBL is a valuable instructional strategy for modernizing vocational education in Egypt. Its broader application could contribute to global educational advancements, equipping students with the competencies needed in a dynamic, interconnected world. This study adds to the discourse on enhancing vocational education through active, skill-oriented learning methodologies.

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1. INTRODUCTION

The modern work environment has undergone profound changes driven by rapid technological advancements and the increasing interconnectedness of global economies (Hassan et al., 2024). These shifts have highlighted the limitations of traditional educational systems, which have historically prioritized rote memorization and standardized testing while often overlooking the development of practical, real-world competencies. In today's labor market, such outdated approaches fail to equip students with the skills

necessary to thrive in complex and dynamic professional settings (Shen et al., 2018). Industries are evolving due to automation, digitalization, and the accelerated exchange of information, necessitating a restructuring of educational curricula to foster well-rounded individuals with critical thinking, creativity, collaboration, and problem-solving abilities. These 21st-century skills have become essential as adaptability and innovation emerge as key drivers of career success (Elkhamisy et al., 2022). Employers increasingly seek professionals who can think critically, work effectively in teams, and contribute to interdisciplinary problem-solving, pushing educational institutions to rethink traditional pedagogical models. To address these demands, there is an urgent need for experiential learning approaches, such as Project-Based Learning (PjBL), that not only enhance technical expertise but also cultivate the soft skills necessary for navigating an ever-evolving job market. By integrating such innovative teaching methods, educational systems can better prepare students for the challenges and opportunities of a rapidly transforming global economy.

In Egypt's vocational secondary education system, aligning educational practices with the demands of the modern workforce remains a significant challenge. While vocational education aims to equip students with the technical expertise required for employment, traditional teaching methods—heavily reliant on theoretical instruction and rote memorization—often fail to develop the practical, hands-on skills necessary for workplace success. This outdated approach neglects essential 21st-century competencies such as critical thinking, problem-solving, and adaptability, which are increasingly vital in today's dynamic job market. As industries rapidly evolve and new technologies emerge, the gap between vocational education and workforce expectations continues to widen. This disconnect underscores the urgent need for more student-centered, experiential learning strategies that promote active engagement and real-world application of knowledge. Project-Based Learning (PjBL) presents a viable solution by immersing students in real-world projects that not only refine their technical skills but also foster crucial soft skills such as collaboration, communication, and adaptability. By integrating innovative pedagogical approaches like PJBL, vocational education in Egypt can become more relevant, responsive, and better aligned with the evolving demands of a competitive global labor market (Nancy Mohd Al Hamad et al., 2024).

One increasingly recognized approach is Project-Based Learning. This method transforms students from passive recipients of information into active participants in their learning journey. Project Based Learning involves students working on challenging and relevant projects that encourage them to apply their knowledge and skills in real-world contexts. These projects typically involve teamwork, complex problem-solving, and the creation of innovative solutions. By adopting this approach, Project Based Learning aims to make learning more engaging and impactful, while also fostering the development of crucial 21st-century skills (Kheir et al., 2023). Integrating Project Based Learning into vocational secondary education in Egypt represents a significant departure from traditional teaching methods. Project-based Learning offers a framework that connects theoretical knowledge with practical application, which is essential for vocational education and is focused on preparing students for the workforce. By incorporating Project Based Learning, students gain not only the technical skills needed for their careers but also a broader set of abilities, including critical thinking, creativity, and collaborative skills. This approach has the potential to increase student engagement in learning and better prepare them for future challenges and opportunities (Guo et al., 2020).

Previous research on the integration of Project-Based Learning (PjBL) in vocational education highlights its growing significance as an effective teaching method. Triono Ahmad et al. (2023) suggest that PjBL is expected to remain a dominant instructional approach in vocational settings due to its effectiveness in skill development. Additionally, studies indicate that the PjBL management process in vocational education consists of five key stages: preparation, topic definition, creation and testing, presentation, and evaluation. This structured approach aligns with established educational theories, reinforcing the complementary roles of teachers and students and demonstrating its applicability as a strategic learning management tool (Nilsook et al., 2021). Furthermore, empirical findings show that students in experimental groups exposed to PJBL scored significantly higher on 4C competencies—critical thinking, communication, collaboration, and creativity—compared to those taught through traditional methods, affirming PjBL's superiority in fostering essential 21st-century skills (Lin, 2023). Research also confirms the feasibility of implementing PjBL in specialized vocational fields, such as film and television production, further expanding its applicability across diverse disciplines

(Youyou & Kit, 2023). A meta-analysis of 19 studies on PjBL in vocational high schools revealed a substantial overall effect size of 1.392, underscoring its significant impact on student learning outcomes (Choi, 2023). Collectively, these findings emphasize the effectiveness of PjBL in enhancing vocational education, preparing students with both technical and soft skills required for modern workforce demands.

This research aims to critically examine the integration of Project-Based Learning (PjBL) within vocational secondary education in Egypt and evaluate its impact on developing essential 21st-century skills such as critical thinking, problem-solving, creativity, collaboration, and adaptability. By analyzing current PjBL implementation within vocational curricula, this study will explore the pedagogical shifts it necessitates, as well as how students engage with and apply their knowledge in real-world contexts. Through case studies and practical examples, the research will assess the extent to which PjBL fosters both technical expertise and soft skills crucial for today's evolving job market.

Additionally, this study will identify key challenges in implementing PjBL, including resource constraints, teacher training deficiencies, and curriculum alignment issues, while also highlighting its potential benefits, such as increased student engagement, improved learning outcomes, and better industry preparedness. By addressing these factors, the research aims to propose actionable recommendations for educational reforms and policy enhancements that can support the wider adoption of PjBL in vocational education.

Ultimately, this study seeks to bridge the gap between education and the workforce by demonstrating how PjBL can transform vocational education into a more innovative, responsive, and effective system. The findings are expected to provide valuable insights for educators, policymakers, and institutions, contributing to the advancement of a skill-oriented and future-ready vocational education framework in Egypt.

2. METHODS

This research uses a qualitative approach to explore the integration of Project-Based Learning (PBL) in the development of 21st-century skills among vocational secondary education students in Egypt, with the aim of providing a comprehensive understanding of how this learning method enhances essential competencies such as critical thinking, creativity, collaboration, and problem-solving, which are increasingly important in the modern world of work. To ensure the collection of diverse and in-depth perspectives, the study utilised purposive sampling to select a total of 25 participants, comprising 10 educators and 15 vocational secondary education students, all of whom had direct experience in the implementation of PBL in their educational settings. Educators were selected based on certain criteria, including a minimum of three years of teaching experience in vocational education, holding professional qualifications in education and pedagogy, and direct involvement in the planning, implementation and evaluation of PBL-based projects, thus ensuring that the study involved educators with both theoretical understanding and practical experience in the implementation of PBL in vocational education settings. Meanwhile, the selection of students was systematically structured to include those who had demonstrated active participation in at least one PBL project within the last academic year, with particular attention to representation from different vocational disciplines, thus allowing for a broader analysis of how PBL is implemented in different fields and how its effectiveness may vary depending on subject matter, institutional support, as well as student engagement.

Using this rigorous sampling approach, the research was able to gain rich, deep and multidimensional insights into the extent to which PBL supports the development of 21st century skills, the specific challenges and opportunities associated with its implementation and the key factors contributing to its success. The involvement of educators and students with diverse levels of experience and engagement in PBL provides a holistic picture of the learning process, helping to identify best practices, institutional barriers and areas for improvement. Furthermore, this research highlights that institutional factors, such as administrative support, access to resources, as well as continuous professional development for educators, play an important role in the successful implementation of PBL. The findings from this study not only provide a deeper understanding of the role of PBL in vocational education in Egypt, but also offer valuable insights that can guide educational

reforms, learning strategies and policy-making aimed at fostering the development of 21st century skills among vocational students in various educational contexts around the world.

3. FINDINGS AND DISCUSSION

3.1 The Role of Project-Based Learning in Vocational Education in Egypt

In the evolving landscape of vocational secondary education in Egypt, Project-Based Learning has emerged as a significant pedagogical approach that redefines the traditional educational model. Historically, vocational education has concentrated on providing specific technical skills through rote learning and standardized teaching methods. While this approach has successfully imparted essential trade knowledge, it often lacks the broader competencies necessary for students to navigate the complexities of the modern workforce. As industries advance and the demands of the job market become increasingly dynamic, there is an urgent need to transition from conventional teaching methods to more interactive, skills-based strategies that better prepare students for real-world challenges. Project Based Learning represents a critical response to this need, offering a more holistic and practical approach to vocational education (Wu & Wu, 2020).

Table 1. Evaluation of Project-Based Learning

Aspects	Explanation	Benefit
Objectives	Learning through doing real projects	More work-ready
How to Learn	Do project work in groups	Learn to solve problems, work together
Challenging	Needs careful preparation	Better learning outcomes
Impact	Students are more active and understand	Ready to face the world of work

At the core of Project-Based Learning (PjBL) is the principle of learning through active engagement and real-world application. Unlike traditional educational models that emphasize passive knowledge absorption, PJBL immerses students in hands-on projects that require them to apply their skills in practical, interdisciplinary settings. This shift from theoretical instruction to experiential learning is particularly significant in vocational education, where students must develop not only technical expertise but also critical thinking, problem-solving, and collaboration skills to succeed in the workforce.

Through PjBL, students take an active role in their learning journey, transitioning from passive recipients of information to proactive problem-solvers and innovators (Mohammed, 2021a). One of the most significant advantages of PjBL is its ability to cultivate essential 21st-century skills. In an increasingly complex and evolving job market, competencies such as critical thinking, teamwork, adaptability, and creative problem-solving have become highly valuable across industries (Mohammed, 2021b). These so-called "soft skills" play a crucial role in ensuring long-term career success.

PjBL naturally fosters these competencies by placing students in dynamic, problem-solving environments where they must collaborate, think creatively, and adapt to new challenges as their projects evolve. This hands-on approach mirrors real-world professional settings, where employees frequently work in teams, navigate unexpected obstacles, and approach problems from multiple perspectives (El-Gabry, 2018). By bridging the gap between education and industry, PjBL prepares vocational students not only for immediate employment but also for sustained success in an ever-changing global workforce.

PjBL's focus on real-world applications helps bridge the gap between education and employment (Aly et al., 2021). In vocational secondary education, it is crucial that students not only learn the technical aspects of their trade but also understand how these skills are applied in practical settings. Project Based Learning addresses this requirement by integrating real-world problems into the curriculum, allowing students to see firsthand how their skills can be utilized to solve tangible issues. This approach not only enhances their

understanding of their chosen field but also increases their confidence in their ability to succeed in the workforce. By engaging in projects that have real-world relevance, students gain a greater appreciation for the practical value of their education, which keeps them motivated and engaged throughout their studies (Xu et al., 2019). In addition to fostering critical thinking and problem-solving skills, Project Based Learning also promotes creativity and innovation. Traditional educational settings often require students to follow a set curriculum and adhere to strict guidelines, which can limit creative exploration. In contrast, Project Based Learning offers students the freedom to experiment, take risks, and explore new ideas. This creative freedom is essential for innovation, as it enables students to think outside the box and develop unique solutions to the challenges they encounter. In today's competitive job market, the ability to innovate is a highly sought-after skill, and Project Based Learning provides students with the opportunity to cultivate this ability in a supportive and structured environment.

Project Based Learning encourages a deeper understanding of the subject matter. When students are actively engaged in solving real-world problems, they are more likely to internalize and retain the information over the long term. This is in stark contrast to traditional methods of rote learning, where students may memorize information for exams but fail to develop a deep understanding of the material. Project Based Learning emphasis on application and experience ensures that students not only acquire the necessary technical skills but also comprehend the underlying principles and concepts guiding their work. This deeper understanding is crucial for long-term success, as it enables students to adapt their knowledge to new situations and challenges (Chen et al., 2021). The impact of Project Based Learning on student motivation and engagement is also significant. In a traditional classroom setting, students may struggle to see the relevance of what they are learning, leading to disengagement and a lack of motivation. Project Based Learning addresses this issue by making learning relevant and meaningful (Okano et al., 2014). When students can see how their work relates to real-world challenges, they are more likely to be invested in the learning process. This increased engagement leads to higher levels of motivation, which in turn results in better academic performance and a greater likelihood of success in the workforce.

3.2 Curriculum Structure and Project-Based Learning Implementation

In Egyptian vocational secondary schools, the curriculum is meticulously crafted to integrate Project-Based Learning, especially during the advanced stages of education. This approach reflects a strategic shift from traditional educational practices to a more dynamic and applied methodology, aimed at better preparing students for the complexities of the modern workforce (Kumar, 2021). Students in these schools receive a comprehensive general education that encompasses fundamental subjects such as Arabic, mathematics, and science. This foundational phase is crucial as it lays the groundwork for students' intellectual and academic development.

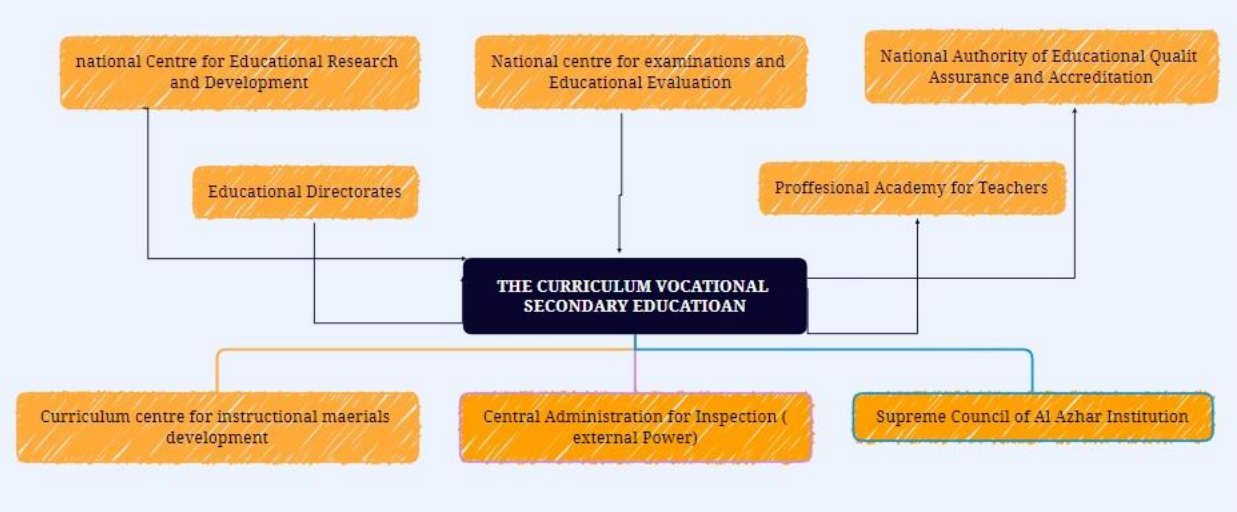

Figure 1. Vocational Education System in Egypt

During this stage of education, the primary focus is on building core competencies and ensuring that students develop a broad foundational knowledge to support their future vocational training. Instruction at this level typically follows traditional teaching methods, including lectures and structured exercises, aimed at establishing a strong understanding of fundamental concepts (Khalaf & Alshammari, 2023).

As students progress, the curriculum transitions from general academic subjects to more specialized vocational training, marking a significant shift towards practical skill application (Mohammed, 2021a). This phase introduces Project-Based Learning (PjBL) as a key instructional approach, seamlessly integrating hands-on projects that align with the technical and professional demands of various vocational fields.

By embedding PjBL within the vocational curriculum, students engage in real-world simulations and problem-solving activities that enhance both their technical expertise and critical soft skills. These projects create immersive learning experiences, bridging the gap between classroom instruction and workplace expectations, ultimately preparing students for the complexities of their chosen careers (Soliman, 2011).

The implementation of Project-Based Learning (PjBL) in vocational education is not simply an addition to the curriculum but a transformative approach that shapes the entire learning experience. Projects are intentionally designed to be field-specific, ensuring relevance to students' chosen disciplines, such as engineering, design, or information technology. For example, engineering students may work on prototype development or real-world problem-solving (Chu et al., 2017), while design students might engage in projects focused on creating functional and aesthetically appealing products. This hands-on approach ensures that students acquire not only technical skills but also practical application experience, preparing them for the demands of their industries.

One of the primary advantages of PjBL is its ability to bridge the gap between theoretical knowledge and real-world application. Traditional educational methods often rely on rote learning, which may fail to prepare students for practical workforce challenges. PjBL addresses this by engaging students in tangible, meaningful tasks that encourage problem-solving, critical thinking, and collaboration (Vogler et al., 2018). By working on authentic projects, students deepen their understanding of the subject matter while simultaneously gaining hands-on experience that mirrors professional environments.

Furthermore, PJBL fosters 21st-century skills that are crucial in today's dynamic job market. These include not only technical proficiency but also soft skills such as teamwork, communication, and adaptability. Through collaborative projects, students learn to effectively work in teams, articulate their ideas clearly, and adapt to changing circumstances—qualities highly valued by employers across industries. The experiential nature of PjBL also nurtures creativity and innovation, as students are encouraged to explore novel solutions to complex problems.

Beyond skill development, PJBL enhances student engagement and motivation. Traditional instruction can sometimes result in disengagement, particularly when students struggle to see the real-world relevance of their learning. PjBL addresses this issue by making education more meaningful and career-oriented. When students are involved in industry-relevant projects, they are more likely to be invested in their learning and driven to succeed, leading to higher academic achievement and improved workforce readiness (Sumarni & Kadarwati, 2020).

In Egyptian vocational secondary schools, the structured integration of PjBL represents a progressive and forward-thinking approach to education. By embedding PjBL into the curriculum, these schools are not only equipping students with technical competencies but also preparing them to navigate the complexities of the modern workforce with confidence and adaptability. This holistic approach ensures that graduates are well-prepared to meet industry demands and contribute meaningfully to their professional fields.

3.2 Impact of Project-Based Learning on Developing 21st-Century Skills

The adoption of Project-Based Learning in vocational education has proven to be highly effective in nurturing essential 21st-century skills among students. By engaging in collaborative, real-world projects, students not only enhance their technical skills but also develop a range of vital soft skills that are increasingly sought after in today's fast-paced job market. Project-based Learning focuses on practical application and solving real-world problems significantly boosts students' preparedness for professional environments, where adaptability, critical thinking, and creativity are crucial (Ayoub et al., 2022).

Table 1. Evaluation of Project-Based Learning

Aspects	Explanation	Benefit
Objectives	Learning through real projects	More work-ready
How to Learn	Do project work in groups	Learn to problem-solve and collaborate
Challenging	Needs careful preparation	Better learning outcomes
Impact	Students are more active and understand	Ready to face the world of work

One of the key benefits of Project Based Learning is its ability to bolster teamwork and communication skills. In a Project Based Learning framework, students frequently work in groups to complete projects, which requires consistent interaction and coordination. This collaborative setting helps students develop effective communication skills and the ability to work well with others (Sabry Abdel-Hamid Ahmed Helwa, 2021). Through this process, students learn to negotiate roles, manage conflicts, and build consensus, all of which are essential skills in any professional environment. Additionally, working in teams allows students to practice articulating their ideas clearly and giving constructive feedback, further improving their communication abilities. Project Based Learning also plays a significant role in fostering critical thinking and creativity. Unlike traditional educational methods that often focus on rote memorization, Project Based Learning encourages students to engage in deeper analysis and exploration. Students are challenged with solving complex, interdisciplinary problems that require them to apply their knowledge in innovative ways and think critically about potential solutions. This approach helps students develop the ability to analyze information from different angles, evaluate the feasibility of various solutions, and make informed decisions. By navigating these challenges, students cultivate a mindset oriented toward creative problem-solving and innovation skills that are highly valued in the evolving job market (Chang & Hwang, 2018).

The hands-on nature of Project Based Learning is also crucial in preparing students for the demands of the modern workforce. Traditional educational methods may provide students with theoretical knowledge but often fall short in offering practical application opportunities. Project Based Learning addresses this by immersing students in real-world scenarios where they can apply their skills and knowledge. This experiential learning approach helps students understand how their technical abilities and problem-solving skills translate into practical solutions. It also equips them with the adaptability needed to thrive in a rapidly changing technological and industrial landscape (Brassler & Dettmers, 2017). In addition to enhancing technical and soft skills, Project Based Learning fosters a sense of initiative and responsibility among students. Project Based Learning projects often require students to take ownership of their learning and outcomes, which promotes a greater sense of accountability and self-direction. This autonomy encourages a proactive attitude and a readiness to tackle challenges qualities essential for success in any professional setting. Through Project Based Learning, students learn to manage their time efficiently, set and achieve goals, and assess their progress, all of which contribute to their overall professional growth (Wiewiora et al., 2020).

Project Based Learning's emphasis on real-world applications helps bridge the gap between academic learning and practical experience. By working on projects that simulate real-world problems, students gain valuable insights into their chosen fields and develop a better understanding of industry practices (Almulla, 2020). This practical experience not only enhances their technical skills but also boosts their confidence in their ability to succeed in their future careers. Connecting academic concepts with real-world applications ensures that students are well-prepared to address the challenges they will encounter in the workforce (Aerts et al., 2017). Project Based Learning also has a significant impact on student motivation and engagement. Traditional educational approaches can sometimes lead to disengagement, particularly if students struggle to see the relevance of their learning. Project-based Learning, however, makes learning more engaging and meaningful by involving students in projects that have practical significance. When students can see how their work applies to real-world challenges, they are more likely to be motivated and invested in their learning. This increased motivation often leads to improved academic performance and a stronger commitment to achieving career goals.

The integration of Project-Based Learning (PjBL) into vocational education marks a transformative shift, significantly enhancing students' ability to develop 21st-century skills. Unlike traditional theoretical instruction, PjBL immerses students in real-world, hands-on projects, promoting active engagement and deeper learning. Through collaborative projects, students cultivate essential teamwork and communication skills, learning to share ideas, negotiate, and collaborate effectively within diverse groups.

Additionally, the problem-solving nature of PjBL fosters critical thinking and creativity, as students tackle complex challenges that mirror real-life workforce scenarios. This experiential learning approach also enhances adaptability, teaching students how to navigate uncertainties, make informed decisions, and refine their strategies in response to evolving project needs (You et al., 2020). By fostering self-reliance and initiative, PjBL encourages students to take ownership of their learning and career development, instilling confidence and competence—both crucial traits in today's fast-paced, technology-driven job market.

Beyond technical skill acquisition, PjBL provides students with a deep understanding of how their expertise applies in professional contexts. This holistic learning model equips vocational students with a balanced combination of hard and soft skills, ensuring they are well-prepared to meet the evolving demands of the global workforce. As industries increasingly prioritize innovation, collaboration, and problem-solving, PjBL serves as a powerful bridge between education and employment, empowering students to become versatile, adaptable, and highly effective professionals in their respective fields.

3.3 Challenges and Opportunities in Project-Based Learning Implementation

The incorporation of Project-Based Learning into vocational education has emerged as a transformative strategy, significantly influencing the development of key 21st-century skills among students. As the job market rapidly changes, the competencies required for success are shifting from traditional rote learning to a more dynamic skill set. Project Based Learning, with its focus on real-world application and collaborative efforts, addresses these evolving demands by equipping students with a comprehensive array of skills essential for today's professional environment (Abdel Wahed Shaalan, 2020).

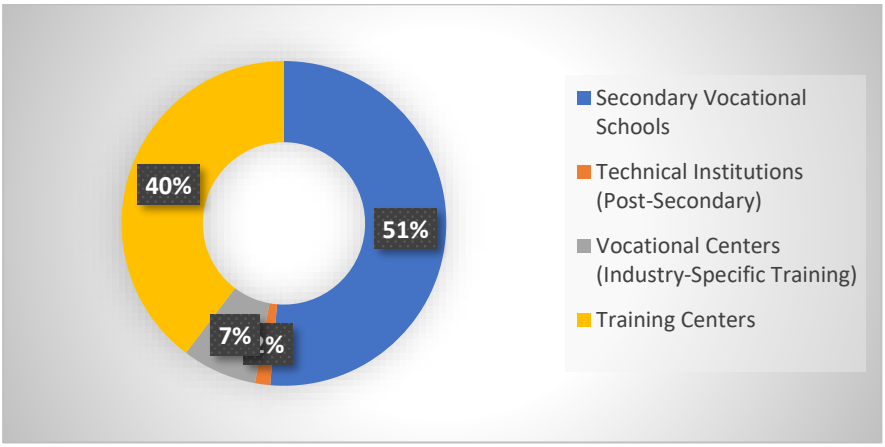

Figure.2. Vocational Education Institutions

One of the most impactful aspects of Project Based Learning is its capacity to improve teamwork and communication skills. Within a Project Based Learning framework, students are frequently involved in group projects that require them to collaborate towards common objectives. This collaborative model demands effective communication and coordination between team members. Through this process, students learn to negotiate responsibilities, resolve conflicts, and build consensus, all of which are crucial for success in any professional setting. By engaging in collaborative projects, students enhance their ability to clearly express their ideas, actively listen to others, and provide constructive feedback. This hands-on experience in teamwork prepares students for the collaborative nature of contemporary workplaces, where effective interaction is key to achieving successful outcomes (Anazifa & Djukri, 2017).

In addition to improving teamwork, Project Based Learning is essential for developing critical thinking and creativity. Traditional educational approaches often emphasize memorization and rote learning, which may not fully prepare students for real-world problem-solving. Project-based Learning encourages students to delve deeper into analysis and exploration by addressing complex, interdisciplinary issues (MacLeod & Van Der Veen, 2020). Students are tasked with applying their knowledge in creative and innovative ways and critically evaluating potential solutions. This approach fosters the ability to analyze information from various angles, assess different solutions, and make well-informed decisions. By navigating these challenges, students cultivate a mindset oriented towards innovative problem-solving and creative thinking skills that are increasingly valuable in a rapidly evolving job market.

The practical, hands-on nature of Project Based Learning is crucial for bridging the gap between theoretical knowledge and practical application. While traditional educational settings may offer a strong theoretical foundation, they often lack opportunities for real-world application. Project Based Learning addresses this by immersing students in authentic scenarios where they can apply their skills and knowledge in practical contexts. This experiential learning helps students see how their technical skills translate into real-world solutions. By engaging in projects that mimic real-world problems, students gain valuable insights into their fields and develop a better understanding of industry practices. This practical experience not only enhances their technical skills but also boosts their confidence in their ability to succeed professionally (Usher & Barak, 2018).

Project Based Learning also promotes adaptability and resilience, qualities that are crucial in today's fast-paced and ever-changing job market. In a Project-based Learning environment, students often face unexpected challenges and setbacks that require them to adapt and find alternative solutions. This process helps students develop a flexible mindset and learn how to handle uncertainties effectively. By dealing with real-world problems and adjusting their approaches based on new information and feedback, students become more resilient and better equipped to manage the complexities of modern professional settings. This adaptability is essential for thriving in a job market

characterized by rapid technological changes and evolving industry trends (Shih & Tsai, 2016). Project Based Learning fosters a sense of initiative and responsibility in students. Project Based Learning program often require students to take ownership of their learning and outcomes, which promotes a proactive attitude and a readiness to face challenges (Spikol et al., 2018). Students learn to manage their time effectively, set goals, and assess their progress, all of which contribute to their overall professional growth. This sense of responsibility and initiative is vital for career success, as it encourages students to take charge of their learning and career development (Zheng et al., 2017).

Another significant impact of Project Based Learning is its effect on student motivation and engagement. Traditional teaching methods can sometimes lead to disengagement, especially if students struggle to see the relevance of their learning. Project Based Learning addresses this issue by making learning more engaging and meaningful. When students can directly relate their work to real-world challenges, they are more likely to be motivated and invested in their learning process. This increased motivation often leads to better academic performance and a stronger commitment to achieving career goals (Beier et al., 2019). By linking academic concepts with practical applications, Project Based Learning helps students appreciate the value of their education and sustain their enthusiasm for learning. Overall, the integration of Project Based Learning in vocational education profoundly influences the development of 21st-century skills. By enhancing teamwork, communication, critical thinking, creativity, adaptability, and resilience, Project Based Learning prepares students to navigate the complexities of the modern workforce with confidence and competence. This hands-on, experiential approach not only strengthens students' technical and soft skills but also provides them with the practical experience necessary for success in their future careers. As the job market continues to evolve, Project Based Learning offers a valuable framework for equipping students to meet these challenges and excel in their professional endeavours.

4. CONCLUSION

This study highlights the positive impact of Project-Based Learning (PjBL) on vocational secondary education in Egypt, offering a practical, skills-focused approach that better prepares students for the modern workforce. Unlike traditional rote learning, PjBL actively engages students in real-world problem-solving, enhancing critical thinking, creativity, collaboration, and adaptability—skills highly valued by employers. By working on hands-on projects, students bridge the gap between theoretical knowledge and practical application, making learning more meaningful and relevant. Additionally, PjBL fosters essential soft skills, such as teamwork, communication, and leadership, which are crucial for professional success. However, this study has some limitations, including limited sample size, potential bias in participant selection, and challenges in measuring long-term skill retention. Future research should explore longitudinal studies to assess the long-term effects of PjBL on career success, examine scalable models for implementation in different vocational fields, and investigate the role of digital tools in enhancing PjBL effectiveness. Expanding research in these areas will provide deeper insights into how PjBL can be further optimized to meet the evolving demands of the global job market.

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