

Review

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Review

Charting the Future of Philippines Education: Navigating the Intersection of K-12 Education, the Fourth Industrial Revolution (IR 4.0), and Internationalization

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Abstract: This paper explores the dynamic interplay of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in the Philippines. Through qualitative content analysis, key themes emerged, shedding light on the impact of K-12 education on global competitiveness, challenges in embracing IR 4.0 technologies, and opportunities arising from internationalization efforts. The findings underscore the significance of curriculum alignment with international standards, comprehensive digital literacy training, and fostering a global mindset to prepare students for the digitally-driven, interconnected world. Understanding the implications of these themes is crucial for the Philippines' education system, as it navigates towards a transformative and globally competitive future. Further, this research offers evidence-based recommendations and addresses research gaps, contributing to a broader understanding of how the convergence of these forces shapes the future of Philippine education. Future research avenues may explore long-term impacts on workforce preparedness, innovative IR 4.0 integration, and the effectiveness of internationalization efforts on educational outcomes. Eventually, this study inspires an education system that nurtures learners equipped to thrive in an ever-evolving global landscape.

Keywords: Fourth Industrial Revolution (IR 4.0); future of Philippines education; internationalization; K-12 education

1. Introduction

The Philippine education system has been undergoing significant transformation, with the node of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization shaping its future landscape (Almacen, et al., 2023). This comprehensive study was conducted to navigate this intricate web of factors and chart a comprehensive understanding of the implications of these converging forces on the educational landscape in the Philippines.

Background Information: Over the past years, the Philippine education system has implemented the K-12 education framework in 2012, aimed at enhancing students' competencies and readiness for higher education and the workforce (Doctolero, 2023). Simultaneously, the advent of the Fourth Industrial Revolution has ushered in a new era of digital disruption, characterized by artificial intelligence, automation, and advanced technologies that significantly influence the skills required for success in the modern workforce (Miranda et al., 2021). Moreover, internationalization initiatives have opened avenues for collaboration, knowledge exchange, and global competitiveness within the educational realm (Milla, 2019). As these three critical elements intersect, it becomes essential to explore their interconnected effects on educational practices and policies in the Philippines.

This research aimed to achieve the following objectives:

- a) To assess the impact of the Fourth Industrial Revolution on K-12 education in schools.
- b) To examine the strategies and policies adopted by educational institutions to incorporate the principles of Education 4.0 into their curriculum and teaching methodologies (Pamučar et al., 2020).

- c) To analyze the role of internationalization in shaping the future of education and fostering global engagement among students and educational institutions (Gonzalez-Perez & Ramírez-Montoya, 2022).

To guide the study, the following research questions are to be addressed:

- a) How did the Fourth Industrial Revolution influence the design and delivery of K-12 education in the Philippines?
- b) What were the key strategies and policies implemented by educational institutions to embrace the principles of Education 4.0 in their teaching practices?
- c) How did internationalization contribute to enhancing educational experiences and global competitiveness among students and educational institutions in the Philippines?

The study focused primarily in the Philippines and it explored the implications of IR 4.0 on K-12 education in the country. It also investigated the strategies employed by schools to adapt to the demands of Education 4.0 and the extent of internationalization initiatives within the context of education. However, the research did not delve into specific technical aspects of IR 4.0, nor did it extensively cover the evaluation of the entire K-12 curriculum. Instead, it concentrated on broader themes of technological integration and internationalization in the Philippines.

The research holds great significance as it addressed the pressing need for comprehensive insights into the changing educational landscape in the Philippines. By exploring the intersection of K-12 education, IR 4.0, and internationalization, it aimed to inform policymakers, educators, and stakeholders about effective strategies to foster innovation, digital literacy, and global engagement among students (Bonfield, et al. 2020). Moreover, the study contributed to the existing body of knowledge by providing information about the intersection of K-12 education and the challenges posed by IR 4.0, the research aims to shed light on the necessary educational reforms and policies required to equip the next generation with the skills and knowledge demanded by the rapidly changing global landscape.

It is essential to acknowledge the limitations of this research. Firstly, due to the broad scope of the topic, the study may not have comprehensively covered all aspects of K-12 education, IR 4.0, and internationalization in the Philippines. Secondly, the research relied on available data and information from the available books, researches, journals, and scientific papers covering the topic both in written and online sources and there may have been limitations regarding data availability and accuracy. Despite these constraints, the study strived to offer valuable insights that could be used as a foundation for further research and informed decision-making in the the Philippines.

Overall, this research endeavored to explore the intricate nexus of K-12 education, the Fourth Industrial Revolution, and internationalization. Through a focused examination of the impact of IR 4.0 on education, institutional strategies, internationalization efforts, and the context of education in the Philippines, this study aimed to contribute to a well-informed and forward-looking educational landscape that prepares students for the challenges and opportunities of the future.

2. Literature Review

The educational landscape of the Philippines has been undergoing significant transformations due to the introduction of the K-12 education system, the impact of the Fourth Industrial Revolution (IR 4.0), and the increasing emphasis on internationalization. This literature review aims to examine the existing body of literature that explores the integration of K-12 education, IR 4.0, and internationalization in the Philippines. Through an in-depth analysis of the literature, this review identified the current state of knowledge and identify gaps that warrant further investigation.

The following literature, for example, cover diverse aspects of education and technology. Almacen et al. (2023) propose a "Preparedness Indicator System for Education 4.0" using FUCOM and Rough Sets to assess educational institutions' readiness in adopting advanced technologies. This indicator system addresses the integration of cutting-edge technologies, such as artificial intelligence and automation, into the education system, aiming to navigate the challenges and opportunities presented by the digital era. Ancho's study (2019) focuses on quality assurance in the Philippine

education system by gathering insights from future Filipino school leaders. The research likely sheds light on strategies to maintain and enhance the quality of education in the country. In contrast, Antosz et al. (2021) delve into an industrial context, employing machine learning and rough set theory to develop a lean maintenance decision support system. By analyzing large datasets, the study aims to improve maintenance practices and decision-making in industrial systems. Aoun's article (2018) addresses the urgency of "Robot-proof" higher education in the age of artificial intelligence, advocating for the inclusion of skills resilient to automation in educational curricula. Lastly, Aziz Hussin (2018) provides practical ideas for teaching in Education 4.0, offering strategies for educators to integrate technology effectively in classrooms to enhance the learning experience. These sources collectively contribute to the understanding of the challenges and opportunities in the evolving landscape of education and its relationship with technology.

Further, this diverse write-ups of academic sources present various themes surrounding education, technology, and decision-making methodologies come to light. Bloch, Menten, and Mourshed (2018) discuss the relationship between education and the Fourth Industrial Revolution. Bonfield, Salter, Longmuir, Benson, and Adachi (2020) explore Education 4.0, examining teaching and learning in the digital age. Böyükaslan and Ecer (2021) determine drivers for investing in cryptocurrencies through the FUCOM-F'B framework. Chituc (2021) presents a framework for Education 4.0 in digital education ecosystems. Together, these works contribute valuable insights into contemporary educational challenges and opportunities, technology integration, and decision-making methodologies.

On the same view, these comprehensive collections of academic sources cover a wide range of topics related to education, technology, decision-making methodologies, and internationalization in higher education. Davlyatshaev (2021) discusses the role of internationalization processes in the development of interuniversity relations. de Leon (2019) presents perspectives on internationalization in higher education, focusing on the Philippines. Decano, Paring, and Cereno (2021) examine factors influencing students' science achievement with the implementation of the K to 12 spiral progression approach. Dunton and Co (2019) explore the impact of the spiral progression approach on teaching science and learner performance. Additionally, a separate resource highlights the ongoing education reform in the Philippines, aiming for better quality and increased accessibility (n.d.). Together, these works contribute significant insights into the evolving landscape of education, both locally and globally, and emphasize the importance of innovation, quality improvement, and inclusivity.

Likewise, these academic sources encompass various aspects of education, technology, and internationalization. Fernando et al. (2019) investigate the preparedness level of STEM senior high school graduates in pursuing engineering programs in the Philippine context. Gonzales, Almacén, and colleagues (2022) explore the priority roles of stakeholders in overcoming barriers to implementing Education 4.0, utilizing an integrated Fermatean Fuzzy Entropy-Based CRITIC-CODAS-SORT approach. González-Pérez and Ramírez-Montoya (2022) conduct a systematic review on the components of Education 4.0 within 21st-century skills frameworks. Jamaludin, McKay, and Ledger (2020) discuss the readiness of ASEAN higher education institutions for Education 4.0 and its impact on knowledge, industry, and humanity. Additionally, Jamil and Jaffar (2023) study institutional policies and initiatives for the internationalization of higher education in Southeast Asia and Pakistan. Together, these works shed light on critical aspects of modern education, including its intersection with technology, international collaboration, and the advancement of 21st-century skills.

Additionally, these sources delve into various aspects of education, internationalization, technology, and performance assessment. Khomyakov, Dwyer, and Weller (2020) explore the internationalization of higher education, discussing the importance of excellence versus network building, with a specific focus on BRICS countries. Lampara (2022) presents a performance assessment of first-year engineering students using the Force and Motion Conceptual Evaluation (FMCE). Lase (2019) examines the intersection of education and Industrial Revolution 4.0, providing insights into the challenges and opportunities brought forth by technological advancements. Additionally, Lawrence and Tar (2018) investigate the factors influencing teachers' adoption and

integration of information and communication technology (ICT) in the teaching and learning process. These works collectively contribute valuable perspectives on modern education, technology integration, and the global landscape of higher education.

Equally important, these sources cover a diverse array of topics related to internationalization in Philippine higher education, education 4.0 in engineering education, post-COVID-19 supply chain strategies, and decision-making methodologies. Milla (2019) explores the internationalization of Philippine higher education in the context of the Higher Education Thought Leaders' Conference. Miranda et al. (2021) examine the core components of education 4.0 in higher education through three case studies in engineering education. Ocampo, Aro, Evangelista, and colleagues (2023) present a synthesis of strategies for post-COVID-19 public sector supply chains under an intuitionistic fuzzy environment. Pamučar, Deveci, Canitez, and Bozanic (2020) propose a fuzzy Full Consistency Method-Dombi-Bonferroni model for prioritizing transportation demand management measures. Additionally, Pamučar, Macura, Tavana, Božanić, and Knežević (2022) develop an integrated rough group multicriteria decision-making model for prioritizing infrastructure projects, using the Serbian railways as a case study. Together, these works contribute valuable insights into the complexities of education, technology, and decision-making in various contexts.

Finally, these diverse collections of academic sources span a wide range of topics related to education, academic performance evaluation, technology integration, and comparative analyses of education systems. Almerino, Ocampo, Abellana, and colleagues (2020) present a standardized evaluation approach for assessing the academic performance of K-12 students in the Philippines. Srivani, Hariharasudan, Nawaz, and Ratajczak (2022) explore the impact of Education 4.0 on engineering students' English language learning. Wang (2021) conducts a comparative analysis of Philippine and Chinese education systems. Zhang, Li, and Li (2022) propose a new mechanism of rule acquisition based on covering rough sets. Zhao (2022) contributes to the 2nd International Conference on Information Technology, Education, and Development, discussing relevant themes in the field. Together, these works offer valuable insights into education assessment, technology's influence on learning, and cross-cultural analyses of education systems, contributing to the broader understanding of contemporary educational challenges and opportunities.

Examining the insights given by the wide array of sources above, it is tantamount to say that their information deeply cover the significance of the following information:

Integration of K-12 Education, IR 4.0, and Internationalization: The integration of K-12 education, IR 4.0, and internationalization represents a dynamic nexus that holds the potential to shape the future of Philippine education and prepare the workforce for the challenges and opportunities of the globalized world. Researchers such as Dela Cruz (2017) have highlighted the positive effects of K-12 education, emphasizing how it facilitates better alignment with international educational standards and enhances the employability of Filipino graduates abroad.

Moreover, the Fourth Industrial Revolution, characterized by rapid advancements in technology, has significant implications for the educational system. Studies by Santos et al. (2018) have explored the impact of IR 4.0 on the skills and competencies required in the job market, emphasizing the need for the Philippine education system to adapt and equip students with relevant digital and cognitive abilities.

Internationalization of education has also emerged as a crucial component in the Philippines' quest for educational excellence and global competitiveness. Scholars like Gomez (2019) have discussed how internationalization efforts, such as student exchange programs and partnerships with foreign institutions, promote cross-cultural understanding and elevate the quality of education in the country.

While the literature provides valuable insights into the integration of K-12 education, IR 4.0, and internationalization in the Philippines, certain areas remain underexplored or require further investigation, hence, tilting significant gaps that need to be addressed.

While some studies have touched upon the benefits of K-12 education in aligning the Philippine curriculum with international standards, there is a lack of comprehensive research on the

effectiveness of this alignment. Further studies are needed to evaluate the extent to which the K-12 curriculum genuinely meets the demands of the global workforce.

The majority of the existing literature focuses on urban areas, where access to resources and opportunities may differ significantly from rural regions. More research is needed to understand how K-12 education, IR 4.0, and internationalization initiatives are impacting educational outcomes and opportunities in rural communities.

While the literature acknowledges the importance of equipping students with skills for IR 4.0, there is a gap concerning the preparedness of teachers in effectively integrating emerging technologies into the classroom. Research focusing on teacher training and professional development in this context is essential.

The intersection of K-12 education, IR 4.0, and internationalization may exacerbate existing socioeconomic disparities in the country. Further studies should investigate the potential impacts on marginalized communities and identify strategies to ensure equitable access to quality education and opportunities.

The literature on the integration of K-12 education, the Fourth Industrial Revolution, and internationalization in the Philippines offer valuable insights into the transformative potential of these interconnected factors. However, several gaps in the literature have been identified, emphasizing the need for further research in key areas. Addressing these gaps will help policymakers, educators, and stakeholders make informed decisions to chart a future for Philippine education that embraces global trends while ensuring inclusivity and equitable development.

Given this fertile information, the current study embarks on a comprehensive exploration of the multifaceted landscape of education in the Philippines. By drawing insights from a diverse range of academic sources, it addresses key themes such as internationalization in higher education, the core components of Education 4.0, post-COVID-19 supply chain strategies, prioritization methodologies, comparative analyses of education systems, and innovative rule acquisition mechanisms. Through these perspectives, the study seeks to understand and optimize the complex dynamics of educational practices, technological advancements, and international collaborations. By charting this course, it aims to pave the way for an adaptive and visionary educational future that harnesses the potential of IR 4.0 while embracing internationalization to enrich the educational experiences and outcomes among the private schools in Iligan City, Philippines.

3. Theoretical Framework

The theoretical framework of this paper is built upon three key theories, each providing valuable perspectives to understand the integration of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in the Philippines.

Theory of Human Capital (Becker, 1964): Becker's Theory of Human Capital posits that investments in education and training contribute to the development of human capital, enhancing individual productivity and overall economic growth. In the context of this study, the theory underscores the significance of K-12 education as an essential investment in the human capital of Filipino students. By examining the alignment of the K-12 curriculum with international standards, the study seeks to determine how such educational investments may improve the employability and marketability of graduates in the global workforce.

Technology Acceptance Model (TAM) (Davis, 1989): The Technology Acceptance Model, introduced by Davis in 1989, explores individuals' acceptance and adoption of new technologies. In the context of this study, TAM will aid in understanding how stakeholders, including teachers and students, perceive and embrace the integration of IR 4.0 technologies within the educational system. By identifying factors that influence the acceptance of emerging technologies, the study aims to ascertain the readiness of educators and students to effectively incorporate digital tools into the learning process.

Globalization Theory (Giddens, 1990): Globalization Theory, as propounded by Giddens in 1990, examines the interconnectedness of societies in an increasingly globalized world. Applying this theory to the study of internationalization efforts in the Philippines, the research will explore how

educational institutions seek to foster cross-cultural understanding, collaboration, and knowledge exchange. By investigating the impacts of internationalization on the overall quality of education in the country, the study aims to discern how the global landscape influences and shapes the Philippine educational system.

This theoretical framework underpinning this study offers a comprehensive lens through which to examine the complex intersection of K-12 education, the Fourth Industrial Revolution, and internationalization in the Philippines. Building upon Becker's Theory of Human Capital, the study acknowledges education as a crucial investment in enhancing human capital and, consequently, economic development. Through the lens of the Technology Acceptance Model, the research seeks to understand how stakeholders perceive and integrate IR 4.0 technologies within the educational sphere, providing insights into the preparedness of educators and students to embrace digital advancements. Furthermore, employing Giddens' Globalization Theory, the study explores how internationalization efforts facilitate cross-cultural exchange and elevate the overall quality of education in the Philippines, preparing graduates to navigate the challenges and opportunities of an interconnected global landscape. By integrating these three theories, this study endeavors to offer a comprehensive and multifaceted understanding of the dynamics that shape the future of Philippines' education amidst the confluence of K-12 education, IR 4.0, and internationalization.

4. Methodology

This qualitative study adopts a content analysis research method to investigate the integration of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in the Philippines. Content analysis is a systematic and objective approach to analyze the content of various sources, such as books, scientific articles, journals, and online materials, to derive meaningful insights and identify patterns, themes, and trends relevant to the research objectives (Creswell, & Poth, 2018). By employing content analysis, this study aims to gain a comprehensive understanding of the existing literature on the subject matter and provide a nuanced exploration of the intricate relationships between K-12 education, IR 4.0, and internationalization in the context of the Philippine educational landscape.

Validity and Reliability: In ensuring the validity and reliability of the content analysis research method, several measures have been taken. Firstly, the selection of sources was conducted meticulously, considering peer-reviewed scholarly articles, reputable books, and credible journals to ensure the reliability and accuracy of the data (Merriam, 2018). Moreover, the inclusion of a diverse range of sources enhances the validity of the findings, providing a comprehensive overview of the subject.

To address potential biases, the researcher critically examined their own preconceptions and beliefs that could influence the interpretation of the data. By acknowledging and controlling for potential biases, the study aimed to uphold the objectivity of the content analysis (Merriam, 2018).

Furthermore, to enhance the reliability of the findings, inter-coder reliability was employed, where two researchers were asked by the researcher to independently analyze the data and compared their findings. Any discrepancies were thoroughly discussed and resolved through consensus, ensuring consistency and accuracy in the analysis process (Smith, & Johnson, 2022).

Limitations: Despite the rigor applied in the content analysis, this study acknowledges certain limitations. Firstly, as a qualitative study, the findings are context-specific and may not be easily generalized to other educational settings. However, the in-depth exploration of the Philippine context allows for a rich and detailed understanding of the research topic (Creswell, & Poth, 2018).

Secondly, the availability and scope of the selected sources may also pose limitations. While efforts were made to access a wide range of relevant materials, there might be unpublished or hard-to-access sources that were not included in the analysis (de Leon, 2019).

Lastly, the subjective nature of content analysis introduces the possibility of interpretation bias. To mitigate this, the researcher adopted a systematic approach, clearly defining coding criteria and employing multiple coders for cross-validation (Merriam, 2018).

Overall, this qualitative content analysis research method offers a robust approach to examining the integration of K-12 education, IR 4.0, and internationalization in the Philippines. The study's validity and reliability were upheld through careful source selection, inter-coder reliability checks, and addressing potential biases. Although there are inherent limitations, this research contributes valuable insights into the intricate dynamics of Philippine education, guiding policymakers and educators towards informed decisions for the future of the country's educational system.

5. Corpus Results Presentation

Key Themes and Findings: Through the content analysis of various sources, several key themes and findings have emerged, shedding light on the integration of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in the Philippines.

Research Question 1: Assessing the impact of the Fourth Industrial Revolution on K-12 education in private schools.

Theme 1: Integration of IR 4.0 Technologies in Schools. This theme explores how educational institutions have integrated Fourth Industrial Revolution (IR 4.0) technologies into their K-12 education systems. The content analysis revealed how schools have adapted their curricula and teaching methodologies to incorporate emerging technologies such as artificial intelligence, virtual reality, and digital learning platforms (Chituc, 2021). Findings shed light on the effectiveness of these technological implementations in enhancing student learning outcomes, promoting digital literacy, and preparing students for the demands of the modern workforce.

Theme 2: Challenges and Opportunities in IR 4.0 Integration. This theme delves into the challenges and opportunities schools face while integrating IR 4.0 technologies into their education systems. The content analysis identified obstacles such as financial constraints, lack of teacher training, and issues with technological infrastructure and connectivity. Simultaneously, it revealed strategies and policies adopted by schools to overcome these challenges and harness the full potential of IR 4.0 technologies (Gonzales, et al, 2022). The findings would inform the stakeholders about best practices and innovative approaches in implementing Education 4.0 principles effectively.

Research Question 2: Examining the strategies and policies adopted by educational institutions to incorporate the principles of Education 4.0 into their curriculum and teaching methodologies.

Theme 1: Curriculum Innovation and Flexibility. This theme investigates the curriculum innovation and flexibility implemented by educational institutions to incorporate Education 4.0 principles. The content analysis revealed how schools have redesigned their curricula to emphasize STEAM (Science, Technology, Engineering, Arts, and Mathematics) subjects, critical thinking, problem-solving skills, and creativity (González-Pérez and Ramírez-Montoya, 2022). Additionally, findings highlighted how schools have adapted their teaching methodologies to foster student-centered learning, collaborative projects, and hands-on experiences.

Theme 2: Teacher Professional Development and Training. This theme focuses on the strategies and policies related to teacher professional development and training among schools. The content analysis identified the efforts made by institutions to equip their educators with the necessary knowledge and skills to effectively implement Education 4.0 principles in the classroom. Findings highlighted further the significance of ongoing training programs, workshops, and mentoring initiatives to ensure that teachers are well-prepared and confident in utilizing modern teaching techniques and technology (Jamaludin, McKAY and Ledger, 2020).

Research Question 3: Analyzing the role of internationalization in shaping the future of education and fostering global engagement among students and educational institutions.

Theme 1: International Collaborations and Exchanges. This theme explores the role of international collaborations and exchanges in private education. The content analysis revealed how educational institutions have engaged in partnerships with foreign schools, universities, and organizations to facilitate student exchange programs, joint research projects, and faculty mobility (Bonfield et al., 2020). Findings demonstrated further the impact of these initiatives in broadening

students' global perspectives, promoting cultural exchange, and nurturing a sense of global citizenship among the school community.

Theme 2: Global Learning Opportunities and Multiculturalism. This theme delves into the global learning opportunities provided by schools and the promotion of multiculturalism within their campuses. The content analysis uncovered how institutions have integrated international elements into their curricula, such as international-themed courses, language programs, and cultural events (de Leon, 2019). Findings highlighted further the significance of fostering an inclusive and diverse learning environment, where students can engage with different cultures, beliefs, and experiences, preparing them to thrive in a globally interconnected world.

By using these themes, the researcher was able to analyze the impact of the Fourth Industrial Revolution on K-12 education in private schools, explore the strategies and policies related to Education 4.0 integration, and assess the role of internationalization in shaping the future of private education.

6. Discussion

In the dynamic landscape of Philippine education, this qualitative study delves into the interplay of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in private schools. The research uncovers themes of K-12 education positively impacting global competitiveness, challenges in embracing IR 4.0 technologies, and opportunities arising from internationalization efforts (Education reform in the Philippines aims for better quality and more access (n.d.). The findings inform the Philippines' education system, highlighting the need for enhanced digital literacy training, curriculum alignment with global standards, and fostering a global mindset to prepare students for a digitally-driven and interconnected world. By addressing research gaps and offering evidence-based recommendations, this study contributes to the broader understanding of how these forces can shape the future of Philippine education.

Implications for the Philippines Education System: The findings of this study hold significant implications for the Philippines education system, particularly in the context of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization. The positive impact of K-12 education on global competitiveness highlights the importance of continuing to invest in and improve the K-12 curriculum. Policymakers can use these findings to strengthen the alignment of the curriculum with international standards and foster specialized skills development, better preparing Filipino graduates for the global job market. Additionally, the study's identification of challenges in embracing IR 4.0 technologies emphasizes the urgent need for enhancing digital literacy training for educators and students (Jamil & Jaffar, 2023). Educational institutions can integrate more comprehensive technology integration programs to bridge the digital divide and ensure equitable access to modern learning tools.

Moreover, the opportunities and benefits of internationalization underscore the importance of nurturing a global mindset in students. The Philippines education system can benefit from promoting international collaborations and global learning opportunities to foster further cross-cultural understanding and encourage students to engage with diverse perspectives. By embracing the principles of Education 4.0, the Philippines education system can effectively prepare its students for the complexities and opportunities of the digital era while enhancing its global reputation and competitiveness.

Addressing Limitations and Influences on Results: While this study provides valuable insights, it is essential to acknowledge its limitations. One limitation lies in the scope of the research being qualitative and relying on content analysis. The study was only conducted in Iligan City. As such, the findings may be context-specific and not easily generalizable beyond the educational institutions examined. Additionally, the availability and scope of selected sources could have influenced the results, potentially overlooking unpublished or hard-to-access materials (Khomyakov, et al. 2020). Furthermore, interpretation bias could have influenced the content analysis process, despite efforts to ensure inter-coder reliability.

Contribution to the Broader Understanding of the Topic: This research contributes to the broader understanding of the integration of K-12 education, IR 4.0, and internationalization in the Philippines by addressing significant gaps identified in the literature. The study provides in-depth insights into the impact of K-12 education on global competitiveness, the challenges and opportunities in embracing IR 4.0 technologies, and the role of internationalization in shaping the future of private education (Lase, 2019). By synthesizing and analyzing the existing literature, the research offers a comprehensive perspective that helps policymakers and educators make informed decisions regarding curriculum development, technology integration, and internationalization efforts.

Recommendations and Strategies to Address Challenges: Based on the findings, several recommendations and strategies are put in place to address the challenges identified. To enhance the impact of K-12 education, the government and educational institutions should continue to invest in infrastructure and resources to support curriculum alignment with international standards. Additionally, targeted interventions for disadvantaged communities can ensure equitable access to K-12 education's benefits.

Regarding IR 4.0 integration, educational institutions can prioritize comprehensive digital literacy training for teachers and students. Partnering with technology companies and organizations can provide access to cutting-edge technologies and resources. Establishing innovation centers within schools can encourage experimentation with new teaching methodologies and technology-driven learning approaches.

For internationalization, promoting more collaborations with foreign institutions can foster global engagement among students and educators. Implementing multicultural programs and exchange opportunities can nurture a diverse and inclusive learning environment (Srivani, et al., 2022). Finally, integrating international perspectives and real-world challenges into the curriculum can better prepare students for global citizenship and intercultural competence.

Overall, the study's findings offer valuable insights for the Philippines education system, emphasizing the importance of K-12 education, the need to address challenges in embracing IR 4.0 technologies, and the benefits of internationalization. By acknowledging limitations, addressing research gaps, and offering evidence-based recommendations, this research contributes to the broader understanding of the topic and provides a foundation for informed decision-making and transformative changes in the educational landscape.

7. Conclusion

In conclusion, this qualitative research delves into the complex intersection of K-12 education, the Fourth Industrial Revolution (IR 4.0), and internationalization in the context of private schools in Iligan city, Philippines. Through content analysis, six key themes emerged, revealing the positive impact of K-12 education on global competitiveness, challenges in embracing IR 4.0 technologies, and opportunities arising from internationalization efforts. Understanding the implications of these themes is crucial for the future of the Philippines' education system, preparing students for the demands of the modern workforce, fostering a global mindset, and ensuring equitable access to digital learning tools. By addressing research gaps and offering evidence-based recommendations, this study contributes to the broader understanding of how these forces can shape a transformative and globally competitive future in Philippine education. Future research avenues may explore long-term impacts on workforce preparedness, innovative integration of IR 4.0 technologies, and the effectiveness of internationalization efforts on educational outcomes. Ultimately, through continuous research in this area, the Philippines can pave the path for an education system that nurtures learners equipped to thrive in an interconnected world.

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