



The Impact of Virtual Teaching and Learning on Skill and Knowledge Acquisition in the Training of Health Professionals: The Ghanaian Health Sector in focus

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Abstract

This paper aims to examine how virtual teaching and learning affect the acquisition of skills and knowledge among healthcare professionals in Ghana using the SWOT framework and socio ecological model. The findings indicate that virtual teaching offers benefits such as improved accessibility, flexibility, cost effectiveness and opportunities for expanding training using technologies. However challenges were noted in skill development and digital disparities. Threats included declines in competency and sustainability issues. The socio ecological perspective emphasized how factors across levels are interconnected. In conclusion the combined analysis using SWOT and socio ecological models provides an understanding of how virtual teaching impacts healthcare education in Ghana. Recommendations include investing in infrastructure training faculty members and supporting learners better; promoting collaboration among healthcare professionals; well as establishing quality assurance measures and plans, for long term sustainability. The study provides guidance on how to enhance the execution and impact of virtual education programs, in training health professionals. The results guide the development of policies based on evidence, allocation of resources and collaboration across sectors to establish an enduring policy framework for virtual healthcare professional education in Ghana.

Keywords: Virtual teaching and learning, Health professional education, Skill and knowledge acquisition, SWOT analysis, Socio-ecological model

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Introduction

The rapid progress of technologies has transformed the field of education in training healthcare professionals. In Ghana the use of teaching and learning has been, on the rise due to the impact of the COVID 19 pandemic disrupting traditional in person education methods [2]. With the increasing need for healthcare workers it's important to assess how online education affects skill and knowledge development for health professionals in Ghana [3].



The reason for exploring this issue is rooted in the potential of virtual learning to address challenges faced by health education in Ghana, such as access to training opportunities, resource limitations and shortages in the workforce [7]. Virtual teaching and learning bring benefits like improved accessibility, flexibility and cost effectiveness that can expand healthcare training programs [2]. However concerns have been raised about how effective virtual education's at teaching skills and ensuring healthcare professionals are competent [1]. Furthermore the integration of teaching and learning into health education is influenced by various factors across different levels – from individual to policy dimensions – creating a complex environment, for adoption [3] [5].

Understanding these elements is vital, for the implementation and longevity of education programs in the Ghanaian setting. Previous research has delved into facets of teaching and learning in healthcare professional training. For example Kyaw et al. [6] conducted a review and analysis on how digital education impacts communication skills among students shedding light on both the advantages and drawbacks of virtual learning. Likewise the World Health Organization [7] explored the factors that influence the integration of education to enhance healthcare workforce capacity underscoring the importance of taking an approach that considers different levels of impact.

Drawing from these studies this analysis aims to offer an evaluation of how virtual teaching and learning affect skill development and knowledge acquisition in training health professionals, in Ghana. The goal is to pinpoint the strengths, weaknesses, opportunities and threats linked to education initiatives while taking into account the socio factors that influence their effectiveness and sustainability.

The following are the sub-objectives that guided the analysis:

1. To explore the strengths and opportunities of virtual teaching and learning towards the increased access, flexibility, and cost-effectiveness of health professional education in Ghana.
2. To identify the weaknesses and threats associated with practical skill training, digital divides, and the competence of virtually educated health professionals.
3. To explore the socio-ecological determinants at the individual, interpersonal, organizational, community, and policy levels that influence the adoption and utilization of virtual teaching and learning in health professional education.
4. To recommend the areas that needs attention for an improved implementation of virtual teaching and learning in health professional education in Ghana.

In summary, the analysis of these sub-objectives will contribute towards the evidence-based planning and policy-making regarding virtual teaching and learning in health professional education. The target audience of the findings is the relevant authorities in Ghana who are expected to use the data to promote the competence and proficiency of the nation's health workforce.

Practical Significance

Overall, the SWOT and socio-ecological analysis of virtual teaching and learning in health professional education in Ghana provides meaningful implications. Through the identification of strengths, weaknesses, opportunities, and threats on multiple levels, the analysis sets a foundation to help educators, institutions, and policymakers adopt targeted strategies and interventions that enhance efforts towards virtual education implementation and efficacy. More specifically, the analysis of these levels can be used to highlight specific weaknesses and opportunities that require intervention. For instance, the analysis highlights the need for continued investment in digital infrastructure, faculty development, and learner support. It also shows the need for interprofessional collaboration and community involvement. Finally, the analysis also highlights the need for quality assurance mechanisms and sustainability



measures. Through these identified interventions, stakeholders can improve the quality and reach of health professional education in Ghana.

Policy Contributions

The SWOT Analysis of Virtual Teaching and Learning in Health Professional Education in Ghana also demonstrates the applicability of such a framework to the coverage of a broader range of aspects than traditional analyses of strengths, weaknesses, opportunities, and threats. As a result, the SWOT analysis combined with socio-ecological analysis demonstrates the potential for providing the policymakers with the scope of understanding necessary to make evidence-based policies and allocations. As the latter provides a socio-ecological perspective on the factors of policy implementation, the two combined perspectives are more extensive than the strengths and weaknesses of the SWOT. For the cabinet influence, the analysis of the role of policy demonstrates the importance of policies that support the digital infrastructure, data protection, and copyright and ensure that the guidelines and quality control are established. At the same time, the socio-ecological analysis emphasizes the connectedness of the policy level to sub-levels, such as organizational and community factors. This can influence the integrated approach that policymakers take, ensuring the collaboration with multiple stakeholders, including education institutions, industry associations, and technology companies. Therefore, this analysis can and should be used to encourage the delegation's decision-making on the matter.

Methods

The study, on how teaching and learning impact the skill and knowledge acquisition of health professionals in Ghana utilized both the SWOT framework and the socio ecological model. By combining these two methods a thorough exploration was conducted into the external factors that influence the effectiveness and sustainability of virtual education initiatives [5].

The SWOT analysis as a planning tool was employed to pinpoint the strengths, weaknesses, opportunities and threats related to teaching and learning [3]. This approach provided a means to evaluate both the strengths/weaknesses and external opportunities/threats affecting the success of virtual education [2].

Utilizing the socio model—a framework that considers various factors, at different levels—helped in comprehending the intricate dynamics that impact virtual teaching and learning [5]. This model scrutinized factors at individual, interpersonal organizational, community and policy levels that influence how virtual education is adopted and its effectiveness [1]. These methods have been well informed and applied in studies concerning health education and virtual learning. For instance Kyaw et al. [5] utilized the SWOT analysis to assess how digital education enhances communication skills in students. Similarly the World Health Organization [7] employed the socio model to investigate the factors that impact the integration of education, for enhancing health workforce capacity.

By combining the SWOT framework with the socio model, a comprehensive and reproducible approach is established for evaluating the effects of teaching and learning across different scenarios. This methodology can be adapted by researchers to analyze strengths, weaknesses, opportunities and threats associated with educational initiatives while considering various influencing factors unique, to their settings [7].

Results & Analysis

SWOT Analysis



Strengths Analysis

When it comes to health professionals, in Ghana, virtual teaching and learning offer benefits in terms of skill and knowledge acquisition. One significant advantage is the opportunity for enhanced access and flexibility in health education [2]. Through the use of platforms virtual learning can overcome boundaries and time limitations making it possible for a broader range of learners to participate in training initiatives [5]. This is particularly advantageous in countries like Ghana where there are disparities in accessing quality health education [3].

Furthermore virtual teaching can support knowledge acquisition by utilizing multimedia content and learning resources [3]. Digital tools such, as videos, animations and simulations offer informative ways to explain medical concepts and procedures [6]. This multimedia approach accommodates learning preferences enhances the retention of knowledge [7]. Additionally virtual platforms allow learners to retrieve and review course materials at their pace encouraging self-directed learning [2].

Virtual teaching provides a cost alternative, to in person training as highlighted by Asamoah Atakorah et al., [2]. By eliminating the need for facilities, travel expenses and accommodation costs virtual learning helps reduce the burden associated with health professional education [3]. This advantage is particularly beneficial in countries like Ghana with resources, where financial constraints often impede the expansion and sustainability of training programs [2].

Moreover virtual teaching facilitates standardization and quality assurance in health education [4]. Through the delivery of content and assessments across various training locations virtual platforms ensure that all learners receive uniform instruction and evaluation methods [5]. This standardized approach aids in oversight and accreditation procedures enhancing the quality and credibility of health professional training programs in Ghana [4].

In summary virtual teaching presents advantages for developing skills and acquiring knowledge among health professionals undergoing training, in Ghana. Virtual platforms, in Ghana can improve health education by boosting access offering multimedia learning providing affordable solutions and promoting standardization.

Weaknesses Analysis

Despite the strengths of virtual teaching and learning in health professional education, there are notable weaknesses that must be considered. One significant challenge is the difficulty in effectively teaching and assessing practical clinical skills through virtual platforms [2]. Health professions such as nursing and midwifery heavily rely on hands-on training and direct patient interaction to develop essential competencies [1]. Virtual learning may struggle to replicate the experiential nature of clinical skill acquisition, potentially compromising the readiness of trainees for real-world practice [6].

Another weakness is the digital divide and technological barriers that some learners may face [3]. In Ghana, disparities in internet connectivity, device access, and digital literacy can hinder the equitable participation of all learners in virtual education [2]. These technological challenges can exacerbate existing educational inequities and disadvantage certain groups of health professional trainees [5].

Furthermore, virtual teaching can lead to reduced face-to-face interaction and mentorship opportunities [2]. The lack of in-person engagement with faculty and peers can limit the social and professional development aspects of health professional education [6]. Virtual learning may not fully capture the nuances of interpersonal communication, empathy, and bedside manner that are crucial for effective healthcare delivery [1].

Lastly, the reliance on technology in virtual teaching can introduce risks of technical failures and cybersecurity breaches [5]. Disruptions in internet connectivity, software glitches, or hacking incidents can interrupt the continuity of learning and compromise the confidentiality of sensitive educational data [3].



In summary, while virtual teaching offers various strengths, it also presents weaknesses in terms of practical skill acquisition, digital inequities, reduced interpersonal interaction, and technological vulnerabilities. Addressing these challenges requires careful planning, resource allocation, and pedagogical adaptations to ensure the quality and effectiveness of virtual health professional education in Ghana.

Opportunities Analysis

The integration of teaching and learning, in health education within Ghana offers numerous avenues to improve the quality, reach and effectiveness of training initiatives. One significant prospect lies in utilizing platforms to enhance supervision and standardization of health professional education practices [4]. By establishing norms for curriculum delivery, assessments and certifications regulatory bodies such as the Nursing and Midwifery Council of Ghana can ensure quality across educational institutions [4]. Virtual platforms can streamline the monitoring and assessment of programs enabling decision making based on data insights and ensuring quality assurance [5].

Furthermore virtual teaching provides an avenue to expand healthcare training to address workforce shortages in Ghana [3]. By overcoming barriers and resource limitations virtual learning can broaden access for a larger cohort of aspiring healthcare professionals [2]. This scalability is particularly beneficial, in underserved regions where traditional training opportunities may be scarce [3].

Virtual instruction has the potential to contribute to a distribution of healthcare professionals and enhance healthcare accessibility, for communities as noted by the World Health Organization [7]. Another exciting prospect involves using emerging technologies like reality (VR). Augmented reality (AR) for engaging and immersive learning experiences as highlighted by Almpanis [5]. Through VR and AR simulations of scenarios learners can practice skills and decision making in a setting as demonstrated by Kyaw et al. [6]. These realistic experiences help bridge the gap between theory and practice improving skill development effectiveness. VR and AR technologies facilitate collaboration and mentorship connecting learners with experts from various locations as discussed by Asamoah Atakorah et al. [2].

Additionally virtual teaching offers opportunities for education and collaboration among healthcare disciplines according to Nyante et al. [1]. By bringing together learners from health professions in environments training programs can promote teamwork and understanding among professionals. This interprofessional approach breaks down barriers, between disciplines fostering care that's patient centered.

Virtual platforms can support learning activities, group discussions and problem solving tasks that simulate real life healthcare scenarios [6].

Moreover, virtual teaching provides avenues, for growth and lifelong learning opportunities [3]. Healthcare professionals can engage in web based courses, virtual seminars and e learning modules to keep abreast of the advancements in their fields [2]. Virtual platforms can offer tailored training programs for areas of practice empowering healthcare professionals to enhance their skills and adapt to changing healthcare demands [5].

In summary virtual teaching offers a multitude of possibilities for improving the education of healthcare professionals in Ghana. By utilizing tools for supervision expanding training initiatives integrating immersive learning experiences promoting collaboration, across disciplines and fostering continuous professional development virtual platforms can contribute to a more competent, responsive and inclusive healthcare workforce.

Threats Analysis



While the use of platforms for teaching and learning presents advantages for healthcare education in Ghana there are certain challenges that need to be addressed. One key issue is the risk of health trainee competence being compromised, impacting patient safety [1]. If virtual training doesn't adequately prepare learners for scenarios it could result in subpar patient care and negative outcomes [6]. Ensuring the effectiveness and thoroughness of virtual skill development is crucial to address this concern and uphold confidence in healthcare professionals' abilities [1].

Another challenge involves resistance to change from faculty members and institutional stakeholders [3]. Embracing teaching requires shifts in teaching methods, technological resources and organizational norms [5]. Some faculty members might hesitate to adopt learning due to unfamiliarity with the platform concerns about its efficacy or perceived threats to teaching practices [2]. Overcoming this resistance and securing faculty support are vital, for the integration and sustainability of virtual healthcare education programs [7].

Additionally the long term viability of virtual teaching programs is, at risk [3]. Setting up and maintaining virtual learning platforms demands commitments in technology, infrastructure and staffing [5]. In regions with resources like Ghana securing funding and backing for virtual education can pose difficulties [2]. Without planning and resource distribution virtual teaching endeavors may struggle to uphold their effectiveness and quality over time [7].

Moreover the paced advancements in technology and digital platforms bring about the risk of becoming outdated [6]. As new technologies surface and user preferences evolve virtual learning platforms must enhance themselves to stay relevant and efficient [5]. This necessitates investments in infrastructure, software upgrades and faculty training to match the ever changing digital landscape [3].

To sum up the challenges facing virtual healthcare education in Ghana encompass threats, to trainee competence and patient safety reluctance to change among stakeholders, sustainability hurdles as the swift evolution of technology. To tackle these challenges effectively it's crucial to plan allocate resources wisely implement quality control measures and continuously assess virtual learning programs, for success and effectiveness.

Socio-Ecological Analysis

Virtual platforms should aim to encourage conversations, feedback and assistance, between teachers and students [5]. Furthermore creating a sense of community and collaborative learning through virtual group activities and discussions can enrich the aspects of education and foster teamwork in solving problems together [1].

At the level it is crucial for organizations to have the capacity, resources, cultural support and leadership commitment for virtual learning [3]. Health training institutions in Ghana need appropriate technological infrastructure, financial backing and technical know-how to establish and maintain virtual education programs successfully [2]. Institutional policies should promote faculty growth opportunities, curriculum adjustments and quality assurance procedures for learning [World Health Organization, 2021]. Additionally organizational culture and leadership endorsement are vital to nurture an atmosphere for innovation and change management [5].

Factors at the community level, like perceptions of health professionals trained patient trust should not be underestimated [1]. It is essential for the public to trust health professionals who are trained through methods in order for them to be accepted and integrated into healthcare systems [6]. Involving communities and stakeholders, in the planning and execution of virtual education programs can help address concerns and establish trust [7]. Furthermore it is important for virtual learning initiatives to be aligned with the health needs and priorities of communities to ensure their relevance and effectiveness [2].

On a policy level, regulations and guidelines regarding health education, accreditation and licensing plays a significant role in creating an enabling environment [4]. In Ghana policymakers and regulatory bodies should set standards and quality assurance measures for virtual training programs to guarantee their credibility and efficiency



[5]. Policies should also cover issues related to infrastructure, data privacy and intellectual property rights within the realm of education [7]. Collaboration among policymakers, educational institutions, professional associations and technology providers is crucial for establishing a policy framework, for health professional education [4].

Moreover the socio ecological model underscores the interconnectedness and mutual influence, among these levels [5]. For example the policies and resources of organizations can affect how individual learners access technology and support while community perspectives can impact decisions and policy priorities [3]. Recognizing and utilizing these connections is vital for implementing and sustaining health professional education in Ghana [7].

To sum up the socio ecological examination sheds light on the factors that shape the effects of teaching and learning on skill and knowledge acquisition in training health professionals in Ghana. Overcoming challenges and seizing opportunities across interpersonal organizational, community and policy dimensions necessitates a collaborative approach. By taking into account the interactions of these elements stakeholders can devise tailored interventions and strategies to enhance the efficiency and scope of health professional education, within Ghana's unique context.

SWOT and Socio-Ecological Analysis

Combining the SWOT analysis with the socio model offers an insight into how virtual teaching and learning impact the development of skills and knowledge, among healthcare professionals in Ghana. The SWOT analysis delves into strengths, weaknesses, well as external opportunities and threats while the socio ecological model explores the interaction of factors across various levels [5].

The advantages of teaching, such as enhanced accessibility, flexibility and cost efficiency align with the potential for expanding training opportunities and addressing workforce shortages [2][3]. These strengths and opportunities are shaped by elements like resources and policies along with policy related aspects such as regulations and infrastructure support [7].

On the side the drawbacks of teaching—especially in terms of challenges related to practical skill instruction and assessment—are closely tied to concerns about trainee competence being compromised and potential risks, to patient safety [1][2]. The challenges and risks are influenced by aspects, like skills and engagement of learners as well as social factors such as faculty student interactions and mentorship [6].

The potential benefits of using technologies and promoting collaboration between professions [5] are closely linked to community level elements like public opinions and healthcare requirements [1]. The culture within an organization and the commitment of its leaders are vital in making the most of these opportunities and fostering innovation [7].

The threats posed by resistance to change and sustainability obstacles [3] are impacted by organizational factors such as faculty attitudes and available resources within institutions [2]. Dealing with these challenges necessitates a policy environment and collaborative actions at both community and policy levels [5].

The socio ecological model highlights how various factors at levels interact with each other. For example the achievements of learners are influenced by their interactions with others support, from organizations and how communities perceive them [3].

The strengths and opportunities identified in the SWOT analysis can be used to tackle weaknesses and reduce threats through focused interventions, at levels as mentioned by the World Health Organization [7].

To sum up, the combined SWOT and socio ecological analysis offers a perspective on how teaching and learning impact health professional education in Ghana. It underscores the balance of factors, at interpersonal organizational,



community and policy levels that shape the effectiveness and sustainability of virtual education efforts. By taking into account these elements and their interactions stakeholders can create strategies to maximize strengths, address weaknesses seize opportunities and mitigate threats related to teaching and learning within the context of Ghanaian health professional education.

Conclusion

The evaluation of how teaching and learning impact the acquisition of skills and knowledge, among health professionals in Ghana using the SWOT framework and socio ecological model has unveiled an interplay of factors that affect the effectiveness and longevity of virtual education initiatives. The strengths and opportunities of teaching such as enhanced accessibility, flexibility and cost efficiency are balanced by weaknesses and threats concerning skill development digital disparities and the proficiency of health professionals trained virtually.

Viewed from a socio-ecological standpoint it is evident that various factors at interpersonal organizational, community and policy levels are interconnected. This underscores the necessity for an approach to tackle challenges and capitalize on opportunities linked to education. The analysis offers insights and suggestions to enhance the implementation and impact of teaching and learning in health professional education in Ghana.

To fully tap into the potential of education in building a healthcare workforce collaborative efforts are essential, among educators, institutions, policymakers and other stakeholders. By taking into account the conclusions drawn from this analysis and implementing evidence based strategies Ghana can progress towards establishing an environment to sustainable virtual teaching and learning in health professional education.

Recommendations

Based on the findings it is suggested that those involved in healthcare education, in Ghana take the following steps;

1. Invest in technology training of faculty members. Provide support to learners to address challenges related to skill building and digital access disparities.
2. Encourage collaboration among professions. Involve the community to make the most of improved learning opportunities and societal contributions.
3. Establish measures for quality assurance and sustainable planning to address concerns about competency levels being compromised and ensuring long term success.
4. Create policies based on evidence that promote the development of infrastructure protect data privacy and uphold intellectual property rights to facilitate education effectively.
5. Collaborate, across sectors to enhance the implementation and impact of virtual education initiatives.

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