**Transforming lecturers for evolving education: addressing the knowledge and skills gap in education 5.0 era**

# Abstract

The paper examines the knowledge and skills gap among lecturers in the context of Education 5.0, an era defined by its emphasis on the integration of teaching, research, community service, innovation and industrialisation. The study argues that without targeted professional development and support, lecturers may struggle to meet the expectations of a modernised curriculum. Through a synthesis of literature and practical insights, the study proposes a framework for transforming lecturer competencies that aligns with the goals of Education 5.0. The framework explores strategic interventions including continuous professional development programs, pedagogical innovation, and technological integration, which enhance lecturer proficiency. Best practices from higher teacher education institutions illustrate effective transformation strategies, ensuring quality teacher preparedness for 21st century learning. Through an examination of the current educational reforms and the associated challenges faced by lecturers, this chapter sets the stage for a deeper understanding of the transformation required within teacher education in Zimbabwe.

# Introduction

The Education 5.0 paradigm requires a fundamental change on how teacher education and training is approached, compelling educators to embrace new strategies and frameworks that reflect the changing demands of societies. This evolving educational landscape represents a pivotal shift, emphasizing innovation, entrepreneurship, and the integration of technology in higher education. Tagwira (2018) says that, Education 5.0 reaffirms the primacy of universities, polytechnics, teachers’ colleges and industrial training colleges in economic growth, technological transfer and generation of new knowledge. This new educational powerhouse aims to transform the current education system into one that is outcome-based, addressing the evolving demands of societies while also grappling with issues such as infrastructure and resource limitations. The 5.0 Philosophy emphasizes not just the acquisition of knowledge but the integration of creativity and problem-solving skills.

According to Ahmad et al, (2023), Education 5.0 focuses on developing 21st century skills such as critical thinking, creativity, and problem-solving rather than just rote learning. It represents a paradigm shift towards a more holistic educational framework that prioritizes human-centric learning. The evolution, characterized by the convergence of technological advancements, societal needs, and economic imperatives, presents both opportunities and challenges for lecturers. Jagannath (2020) define a lecturer as a person who helps other people to acquire the knowledge, competencies and attitudes they require to be effective teachers. Therefore, the dynamic higher education landscape demands a paradigm shift in the way educators teach, research, and engage with their communities. This shift calls for a re-evaluation of pedagogical strategies and teaching methodologies in teacher training institutions. By shifting from traditional educational models to more dynamic and technology-driven methods, educators need to adjust to the needs of a generation that flourishes on innovation and interactivity, ultimately paving the way for industrialisation. The

ultimate goal of Education 5. 0 according to Ahmad et al (2023) is to create a more efficient, and equitable education system that can adapt to the changing needs of societies in the fifth industrialisation revolution. The shift represents a pivotal moment that challenges traditional teaching methodologies and redefines the role of educators.

As this reform aims to equip teacher trainees with relevant knowledge and skills, it becomes imperative to address the proficiency gaps among lecturers who are expected to implement the philosophy. Many lecturers continue to rely on traditional ways of teaching which may not align with the innovative approaches required by the 5.0 Philosophy. This knowledge gap is hindering the educators’ effectiveness in the lecture room and impact student engagement and learning outcomes. As navigating this era, it becomes increasingly evident that the knowledge and skills gap among lectures poses significant barriers to effective teaching and learning. As such, it is important to tackle the knowledge and skills gap that exists among lecturers as they play a vital role in shaping the minds of future generations. Closing the knowledge and skills gap among lecturers is fundamental as it enhances teaching quality, aligns with industry standards, promotes lifelong learning, and ensures educational equity.

As teacher training institutions strive to remain relevant and responsive to the needs of the 21st century, it has become increasingly evident that lecturers must undergo a transformation to effectively navigate this new era. This professional development necessitates a paradigm shift in lecturers’ pedagogical approaches, research methodologies, and community engagement strategies, aligning them with the demands of the 5.0 Philosophy. By reimagining their roles and responsibilities, lecturers can develop the requisite competencies, skills, and mindsets to thrive in this educational landscape, ultimately enhancing student learning outcomes. This chapter sets the stage for a comprehensive exploration of how transforming lecturers through targeted professional development, skill enhancement, and the integration of modern pedagogical practices is essential for bridging the gap in the Education 5.0 Era.

# Literature review in search of the conceptual framework

This study examined key issues that contribute to the transformation of lecturers in the Education 5.0 era. The 5.0 Philosophy is a heritage-based doctrine aiming to industrialise and modernise the country’s education system through science and technology transfer (GoZ. n.d.; Murwira, 2019; and Tagwira, 2018). Similarly, Wuta (2022) posits that, Education 5.0 is guided by Zimbabwe’s

heritage-based philosophy, which is mediated to use cutting-edge, competitive, universal, technological and scientific knowledge for production of quality goods and services. The philosophy is centred in creating a more efficient and equitable heritage-based education system. Conceptually, a nuanced understanding of the 5.0 philosophy necessitates critical examination of its five foundational tenets of teaching, research, community service, innovation and industrialisation (GoZ. n.d.; Muzira and Bondai, 2020; and Wuta, 2022). A burgeoning body of research has underscored the imperative of transforming lecturers to meet the demands of the Education 5.0 Era. This paper raises questions on the implementation of the Education 5.0 in teacher education and training. The major question is what are the challenges faced by lecturers in implementing the Education 5.0? What are the roles of lectures? Are they fully prepared to navigate the changes? Do they need professional development in response to the evolving education landscape? What strategies can be employed to enhance lecturers’ pedagogical skills?

The 5.0 Philosophy aims to enhance the effectiveness of higher and tertiary education institutions by integrating innovation and industrialisation into their core missions, thereby aligning educational outcomes with societal needs and fostering economic development (GoZ.n.d.). Wuta (2022) says, Education 5.0 deems it incumbent upon Zimbabwe’s Tertiary Education Institutions to spearhead the process of ideation, design thinking, innovation and industrialisation. Ideation is the process of generating ideas through the interplay of divergent and convergent thinking, innovation involves the inventive approach to creating or enhancing products, and industrialisation refers to the transformation of societies from an agro-based economy to a manufacturing-driven economy (GoZ. n.d.; and Wuta, 2022). Therefore, the 5.0 Philosophy is centered on the idea of creating a more student-centered, technology-driven, and industry-relevant education system. This transformative education paradigm is designed to propel the nation towards an innovation-led and knowledge driven economy, emphasizing the importance of integrating these missions to foster socio-economic development. The holistic education approach is driven by a heritage-based philosophy that emphasises the importance of cultural relevance in education while preparing teacher trainees for the challenges of the modern world.

Teacher training institutions in Zimbabwe play a critical role in preparing teachers to integrate technology and being innovative in their teaching practices.

However, they face a lot of challenges in the implementation phase. For example, many teacher training institutions lack the necessary infrastructure and resources to support the implementation of the 5.0 philosophy. Lecturers, are struggling to fully internalise and implement the philosophy, highlighting a gap between training and practice. The successful implementation of Education 5.0 in teacher education and training in Zimbabwe, hinges on addressing the critical question: how can these institutions effectively support lecturers to develop the necessary knowledge, skills, and competencies to thrive in this education paradigm.

# Methodology

To navigate this study, document analysis or desktop research was used to provide a rigorous and systematic approach to analyse written documents. Cardno (2018) says documentary analysis is a qualitative systematic procedure for reviewing or evaluating documents which are printed or electronic materials. The chapter made an analysis of research publications and course outlines from teacher training institutions. The chapter examined the transformation of lecturers in an evolving educational landscape drawing experiences in teacher education and training.

# The evolving landscape of education in the 5.0 era

The Education 5.0 era is marked by a dynamic interplay of technology and human-centric approaches across the five tenets of teaching, research, community engagement, innovation and industrialisation. According to Muzira and Bondai (2020), teaching should probe research, research influence community service through innovation and innovation should lead to industrialisation. Embracing these emerging trends and technologies is essential for preparing teacher trainees to thrive in a complex and interconnected world.

# Teaching and learning in the 5.0 era

The Education 5.0 teaching aspect emphasises that theory be blended with practice, and it promotes the use of indigenous languages, integration of technology as well as the use of locally available resources (GoZ. n.d.; Muzira and Bondai, 2020; and Wuta, 2022). The use of indigenous languages not only promotes cultural identity but also enhances comprehension and engagement among students. To promote the use of local languages, teacher training institutions can incorporate local languages into the curriculum (Wuta, 2022). This can include courses on the linguistic, cultural, translation, and pedagogical

aspects of local languages, ensuring that future teachers are well-equipped to teach the languages. The use of locally available resources is also vital in the teaching process. A study carried by Wuta (2022) reveals that, Education 5.0 is a relevant model of instruction which seeks to achieve vision 2030 through the use of locally available resources, which is a recipe for sustainable development in Zimbabwe.

The study further highlighted that, the utilisation of locally available resources encourages educators to draw on the community’s assets, such as local knowledge, materials and expertise, to create relevant and practical learning experiences. Teacher education and training programs can promote more contextual, cost-effective, and culturally sensitive learning experiences through the use of locally available resources. By leveraging locally available resources, teacher training institutions can create learning experiences that are deeply rooted in the society’s unique cultural, social, and environmental context. The use of locally available resources reduces dependence on external materials, saving costs and making education more sustainable (Muzira and Bondai, 2020. The resources reflect the society’s culture, values, and history, promoting culturally sensitive and preserving local heritage.

Locally available resources are often more accessible, reducing barriers to education and making it more inclusive (Murwira, 2019). There are many examples of locally available resources that can be used in teacher education and training programs. Using clay, wood and plant fibres for crafts and art projects is essential. Inviting local experts as guest speakers to share their knowledge and experiences with students, organising field trips to local historical sites, and using local stories into language and literacy education is also helpful. Using these locally available resources can enhance teacher education and training by providing practical, relevant, and engaging learning experiences. It gives teachers more flexibility and autonomy in their teaching practices.

The integration of technology is another critical component of teaching in the

5.0 era. Lecturers are encouraged to leverage digital tools and resources to enhance the learning experience. This include using online platforms for collaborative projects, interactive learning modules, and access to a wealth of information that can enrich the curriculum (Ahmad et al, 2023). The effective use of technology not only prepares teacher trainees for a digital economy but also fosters critical thinking and problem-solving skills. As the educational

landscape evolves, young children are increasingly becoming digital learners. Teacher trainees need to be equipped with the skills to integrate technology into their pedagogical approaches to meet the needs of these learners.

Providing them with hands-on experience in using technology helps build their confidence to utilise digital tools in real classroom settings. Effective use of technology leads to better student engagement, motivation, and academic performance. By equipping teacher trainees with these skills, they can better prepare their learners for success in a digital age, where proficiency in technology is a critical component. As the educational landscape continue to evolve, teacher trainees equipped with technological skills are better prepared to face future challenges after training. They can use technology to enhance their teaching methods, assess learner performance, and adapt to new educational trends.

The role of lectures evolves dramatically, becoming central to the successful implementation of the Education 5.0 paradigm. Teacher educators play an important role in shaping the minds of teacher candidates. Their expertise, guidance, and support are essential in preparing teachers to navigate the complexities of the 5.0 Philosophy. Lecturers are responsible for delivering lectures and facilitating learning in their course areas. This includes preparing course materials, designing syllabi, and assessing student performance through assignments and examinations. There is a growing need for lecturers to integrate practical, hands-on experiences in the teaching and learning situation (Wuta, 2022). They need to move away from traditional teaching methods towards a more facilitative approach that promotes student-centered learning. In this new paradigm, teaching extends beyond mere knowledge dissemination, but involves crafting and engaging student-centered learning experiences that foster critical thinking adaptability.

# Research and development in Education 5.0

The world is facing challenges such as evolving education, climate change, drug abuse, inequality, and technological disruption, which need innovative, collaborative, and impactful research. The Education 5.0 research aspect aims to address some of the challenges facing the education sector in Zimbabwe. The

5.0 era has ushered in a new paradigm for research, characterised by unparalleled levels of complexity and technological advancement (Murwira, 2019; and Tagwira, 2018). This shift has dictated a fundamental transformation in the way research is conducted, shared, and utilised, with a growing emphasis

on interdisciplinary collaboration and knowledge co-creation. The Zimbabwean government has emphasised the need for research and development in education, recognising its potential to drive economic growth and development (GoZ. n.d.). During the 3.0 era, teacher trainees conducted research but lacked innovation, which led to the introduction of the 5.0 framework.

A study carried in Botswana by Bhusare ((2017) revealed that researchers in teacher education lack the minimum abilities and skills to carry proper research as there is lack of motivation, and no proper incentives to do research which is causing a lot of challenges. A similar study conducted in India by Musa and Ojoniko (2020) highlighted that sometimes teacher educators are not willing to practice new innovative ideas as there is no motivation. The study further highlighted that, there is insufficient research as lecturers just supervise students as it is a requirement and are not conducting researches to improve teacher education programs. This inadequate research output among lecturers may hinder their ability to contribute to academic achievements.

Wuta (2022) posits that, research is the mainstay of literary development, ideation, innovation, industrialisation, commercialisation, economic growth and modernisation in Zimbabwe. Consequently, teacher training institutions need to prioritise influential educational research that addresses environmental, political, and socio-economic challenges. Education research involves developing new knowledge that informs and improves educational practice, and conducting such research enables educators to identify areas that need improvement (Bhusare, 2017; and Musa and Ojoniko, 2020). Teacher training institutions need to cultivate a research environment that values human experiences and perspectives, ultimately contributing to a more sustainable and harmonious future. By prioritising research and development, teacher training institutions can develop a more innovative and responsive education system, better equipped to meet the needs of the students and the whole education system.

Research encourages innovation and creativity, enabling teacher training institutions to stay ahead and address emerging educational challenges (Bhusare, 2017). It supports the continuous development of both lecturers and students, ensuring they stay updated on best practices and emerging trends in education. The study findings by Perines (2021) were that, research activities help student teachers to interpret the research produced by other people and enable them to be more aware of their own learning. By so doing, teacher

trainees can cultivate a deeper understanding of the complexities of teaching and learning through research. This will help them develop evidence-based practices that enhance the outcome of learners and inform educational policy. Additionally, research fosters collaborative partnerships between educational institutions and local communities, facilitating interdependent solutions and promote mutual growth.

# Community engagement in higher education

Community engagement is a critical aspect of higher education, enabling institutions to connect and contribute to the development of local communities. According to Rahmat (2021), education is an instrument of change that can transform the individuals in communities and later transform the communities. It serves as a bridge, connecting individuals with their communities while fostering collaboration and partnerships that drive transformative change. Education 5.0 emphasis the need for higher education institutions to engage with their local communities fostering partnerships and collaboration that promote mutual benefit (UNESCO, 2020). According to Wuta (2022), to sustain the competitive position among world higher and tertiary education systems, there is need to radically improve relevance to the development of the educational community.

There is a pressing need to radically transform and improve the relevance of our educational community, addressing the developmental needs of our societies. To achieve this, our educational community need to be re-oriented to prioritise the attainment of key development goals, including sustainable economic growth, social justice, and environmental stability. Therefore, community engagement in higher education contributes to local and national development by addressing pressing social, economic and environmental challenges. A study by Keller (nd) revealed that, service learning for teacher education has become part of the curriculum in many pre-service teacher programs. The study expressed the need for teachers to be involved in the community in which they teach so they would be more culturally competent and effective. Establishing partnerships with local communities can significantly enhance the relevance of teacher training programs. By collaborating with different societies, teacher training institutions can integrate community resources into their curricula. This not only enriches the educational experience but also helps teacher trainees understand the broader social context. Despite its importance, community engagement in higher education faces several challenges, including limited

resources and the much-needed institutional support. Future research needs to focus on developing effective strategies for community engagement in higher education, as well as evaluating the impact of community engagement on local and national development.

# Innovation in the 5.0 era

Education 5.0 emphasises the need for innovation in teacher education, bridging the gap between theoretical knowledge and practical application. According to (GoZ. n.d.), innovation is the bridge between knowledge produced in lecture rooms, laboratories and industrial production. Sharing the same view, Akhtar (2018) define innovation as the introduction of something new and useful, like introducing new methods, techniques, or practices or new altered products and services. Innovation refers to the process of creating new or improved products, services, processes, or ideas that provide value to individuals, organisations, or the society (Bhusare, 2017; and Wuta, 2022). Educational innovation in teacher education and training encompasses the advancement of knowledge and practical solutions to real problems within the education sector.

Teacher training institutions can carry out innovations or experimentation in any aspect of their work related to teaching and learning, aiming to improve efficiency (Akhtar, 2018). Teacher education programs need to foster innovation to prepare teachers for the complexities of 21st-century education. Innovation is a key driver of progress and improvement in various fields, including education. Experiential learning approaches, can help foster innovation in teacher education by providing opportunities for creativity and hands-on learning. For example, innovative use of technology, new pedagogical approaches, development of new educational materials and resources, and creation of new partnerships and collaborations. Industry partnership can play a crucial role in fostering innovation in teacher education, providing opportunities for teachers to engage with real-world problems and applications (Tagwira, 2018).

# Industrialisation of education

The advent of Education 5.0 has ushered a new era of industrialisation in the education sector, marked by the integration of technological advancements,

innovative pedagogies, and entrepreneurship spirit. Industrialisation is the Education 5.0 final stage for the production of goods and services (Murwira, 2019; Tagwira, 2018; and Wuta, 2022). The Education 5.0 focuses on producing goods and services useful to the economy, leveraging on the country’s rich heritage and natural endowments (The Sunday mail, 2024)). The

5.0 philosophy emphasises the industrialisation of education, where higher education institutions operate like industries, producing high quality graduates who can contribute in the production of goods and services (Muzira and Bondai, 2020).

The paradigm shift is redefining the education landscape, enabling institutions to produce highly skilled, industry-ready graduates, while fostering a culture of entrepreneurship, creativity, and innovation (Murwira, 2019). Industrialisation of education refers to the application of industrial principles and methods to the education sector, aiming to increase efficiency, productivity, and achievement (Wuta, 2022). The convergence of education and industries is being defined through strategic partnerships between educational institutions and industries. This will help to foster a collaborative curriculum development, experiential training, and career pathways that bridge the gap between academic preparation and workforce readiness. Through these partnership programs, educational institutions are able to tap the expertise and resources, ensuring that graduates possess the relevant skills, knowledge, and competencies demanded by the modern workforce. Consequently, teacher training institutions are also being revamped to equip educators with the necessary industry insights, pedagogical skills, and digital literacies to effectively integrate real-world applications and problem-solving into their teaching practices.

The 5.0 industrialisation aspect has a lot of benefits in teacher education and training, including enhanced employability, fostered entrepreneurship and innovation, technology-enhanced learning, and promoted lifelong learning. Encouraging entrepreneurship, creativity, and innovation can lead to the development of new products and services (Muzira and Bondai, 2020). A wide array of innovative goods and services can be designed, developed, and produced, transcending traditional boundaries and fostering a culture of creativity, entrepreneurship, and industry collaboration.

These goods in teacher education and training include a diverse range of products, which include workbooks and textbooks, classroom furniture, educational toys, handmade paper, and craft items like clay models, as well as

essential materials like face masks and sanitary pads. These goods can be produced through various methods such as 3 D printing and fabrication, digital design and medical production, furniture design and woodworking, painting and drawing, among others. By producing these goods, teacher education and training programs can provide teacher trainees with hands-on experience in designing, and creating educational materials, while also promoting innovation, creativity, and problem-solving skills. The production of goods such as educational toys provides them with hands-on experience in designing and creating educational materials, which can enhance their teaching practices. It also provides prospective teachers with a unique opportunity to develop entrepreneurial skills, as they can potentially sell or distribute the educational toys they produce.

A range of innovative services can also be offered within teacher education and training, including educational consulting, curriculum development, instructional coaching, mentoring, and professional development workshops, among others. Community engagement is a valuable service that can be offered in teacher education and training. These include outreach and extension programs, community-based research, and partnerships with local organisations to foster social responsibility and promote positive change in the community. These services offered by teacher training institutions such as community engagement programs can provide aspiring teachers with opportunities to gain practical experiences and apply theoretical knowledge in real-life situations. It fosters empathy, cultural competence, and social responsibility, as pre-service teachers engage with diverse communities and address social issues.

# Understanding the knowledge and skills gap

In the context of Education 5.0, lecturers are having pressure to upgrade their teaching practice and try contemporary reforms (Chalmers and Gardiner, 2015). Many academic professionals struggle with integrating modern pedagogical techniques that foster active learning and critical thinking as many were trained during the 3.0 era. This earlier educational paradigm primarily focused on traditional teaching methods and content delivery, which may not adequately prepare lecturers for the demands of the 5.0 philosophy. The changes from the Education 3.0 to Education 5.0 include, continual variations in subject content, innovative instructional methods, technological advancement, and general learning in teacher education and training (Hunzicker, 2011; Wuta, 2022).

To fully implement the Education 5.0, most universities and colleges that train teachers are offering courses such as:

* Educational Methodology, Technology and Media
* Environmental Management for Sustainable Development
* Heritage-based Agriculture Production
* Community-based Apprenticeship and Entrepreneurship
* Innovative Curriculum Models
* Theories and Practice of Translation
* Language Engineering
* Acquisitions and Learning of Indigenous and Foreign Languages
* Literacy Studies and Communication
* Materials in Design and Technology for ECD Instruction and Learning, among other courses.

These were introduced to promote the use of technology, teaching of indigenous languages and use of locally available resources in line with the Education 5.0. However, the introduction of new courses and curricula poses a lot of challenges, as the same old lecturers, with their existing mindsets and teaching methods, are expected to implement these changes. A study by Musa and Ojoniko (2020) showed that the lack of subject knowledge among lecturers would have a detrimental effect as, they would not be able to provide adequate explanation of the concepts to students. The shift towards learner-centered approaches requires teacher educators to be proficient in using technology and innovative teaching methods that engage student teachers effectively. Many lecturers may not be familiar with these latest digital tools or how to create interactive learning environments.

A study carried by Munikwa and Mapara (2022) highlighted that, Education 5.0 curriculum was characterised by lack of expertise in curriculum revision activities, superficial, understanding of the doctrine, limited stakeholder consultation, inadequate capacitation of lecturers and the limited time given to the exercise. Their findings are consistent with a study by Keche et al (2022), which revealed that, how can an incapacitated lecturer be optimistic about such drastic curriculum changes. These challenges can hinder the lecturers’ ability to create engaging and effective learning experiences for their students. As the education sector continues to evolve, the high demand for research that is relevant to societal needs and industrial applications is increasing. Lecturers

may lack relevant skills to conduct interdisciplinary research that aligns with community and industry challenges.

A study by Musa and Ojoniko (2020) revealed that teacher educators need to conduct research in terms of all areas and fields that are necessary to enhance teacher education programs. The study further highlighted that, lack of research skills and abilities among most educators affect their duties. They face the challenges due to limited expertise in interdisciplinary research, inadequate understanding of research ethics in the digital age, and limited experience with innovative research methodologies. These gaps can impede the ability of educators to conduct rigorous and impactful research that addresses complex societal problems (Bhusare, 2017; and Musa and Ojoniko, 2020). To effectively foster research skills, it is imperative that lecturers themselves be researchers, modelling the research process and provide teacher trainees with authentic research experiences. Lecturers who are researchers can model the research process, demonstrating the value and importance of research in education. They can also provide students with access to current and cutting-edge research in their field, enriching the learning experience and promoting students’ engagement.

Effective community engagement requires lecturers to possess strong interpersonal and communication skills. Many higher education instructors may not have the experience or training to collaborate with community stakeholders or to translate academic knowledge into practical solutions that benefit communities. This gap can hinder the ability to foster meaningful partnerships that enhance educational relevance. Consequently, this knowledge gap can limit the potential for teacher trainees to develop innovative solutions to pressing social problems and create positive impact in their communities. As Education

5.0 promotes innovation, academic professionals need to develop competencies in creating problem-solving and entrepreneurial thinking. This includes how to foster a culture of innovation within teacher education. Significant knowledge and skills gaps exist among lecturers, particularly regarding the innovation aspect that connects lecture room learning, laboratory experiences, and industrial production (GoZ. n.d; Murwira, 2019; and Tagwira, 2018). Lecturers in teacher education and training struggle with innovation, which may affect their ability to foster a culture of creativity and problem-solving in teacher trainees (Musa and Ojonko, 2020; and Bhusare, 2020). They may not be adequately trained in the latest innovative pedagogical approaches that are

essential for bridging theoretical knowledge with practical applications in the industry.

Many lecturers face significant knowledge and skills gap in areas such as design thinking and innovative methodologies. They lack the experience in key areas, including innovation incubators, industry-academia collaboration, and mentoring student teachers in product development. As a result, the disconnect between theoretical knowledge and industrial needs persists, affecting the effective preparation of future teachers for real-world challenges. There are also notable knowledge and skills gap in teacher education and training regarding the industrialisation aspect. Many academics may not have a comprehensive understanding of the latest industrial processes and technologies that are transforming production methods (Murwira, 2019).

This lack of knowledge can prevent lecturers from effectively teaching students about the integration of advanced manufacturing techniques and digital technologies that are essential in modern industries. They may fail to create partnerships that facilitate internships, hands-on projects, and other experiential learning opportunities that are vital for bridging the gap between education and industrial needs. The role of lecturers is to design and deliver educational programs that meet industrial needs (Bhusare, 2017). Another role is to guide and support student teachers in producing goods and services, providing feedback and guidance on design, prototyping, and testing. Lecturers need to adopt new roles, such as being facilitators, mentors, and coaches to support teacher trainees in developing industrial skills, for them to be industrious in the classroom. As a result, the transition to Education 5.0 presents challenges for those who have not updated their skills and knowledge to align with these evolving educational paradigms. Identifying and understanding the knowledge and skills gap help educational institutions to implement targeted professional development, ensuring lecturers remain equipped with the latest pedagogical strategies and subject matter expertise.

# Transformation of lecturers and institutional support

Transforming lecturers and providing support are crucial in ensuring that higher institution educators are equipped with the necessary skills, knowledge and competencies to effectively implement the principles of the Education 5.0. Addressing the knowledge and skills gaps ultimately leads to improved learning outcomes for teacher trainees and a more dynamic educational environment. According to Pham (2021), if an educational institution has a strong team of

lecturers in terms of quality, good expertise, and the passion for the career, it will be the driving force to directly improve the quality of education. Chalmers and Gardiner (2015) say, one way in which teacher training institutions try to improve the teaching quality is to engage academics with continuous professional development programs. Many teacher training institutions in the UK, Australia, Sweden, and South Africa are providing continuous professional development initiatives to improve academic teaching competencies (Botham, 2018 and Subbaye, 2018).

Continuous professional development is needed for lecturers to stay updated with latest educational trends and advancements in their fields. A study carried in Botswana by Chikari, Rudhumbu and Svotwa (2015) indicated that continuous professional development help educators improve their skills, and ideally rise among ranks. The industrialisation of education requires educators in teacher training institutions to engage in ongoing professional development to stay up-to-date with industry trends and technologies. To promote innovation and industrialisation, lecturers can be engaged in design thinking, innovation and entrepreneurship.

Lecturers need to engage in extensive upskilling and reskilling activities to effectively implement the 5.0 Philosophy, which emphasises a more integrated and technology-driven approach to learning. Lecturers can further their studies in higher institutions that offer comprehensive Education 5.0 programs, which can help them acquire the necessary knowledge, skills and competencies to effectively integrate Education 5.0 principles into their teaching practices. A study by Musa and Ojoniko (2020) is that, lecturers need to constantly upgrade themselves to avoid being obsolete in the system. A good lecturer can utilise own resources to keep him/herself acquainted of new knowledge and skills (Akhtar, 2018). Failure to do so can result in lecturers becoming outdated and ineffective. Teacher training institutions can help lecturers further their education by providing opportunities such as scholarships, study leave, and tuition reimbursement, as well as partnerships with other institutions that offer Education 5.0 programs.

Research methodology training, interdisciplinary research collaborations, and access to research funding can also be provided (Perines, 2021). With an increasing emphasis on research in teacher training programs, lecturers may require further training in research methodologies and data analysis to contribute effectively to their fields and guide student teachers in research

projects. Additionally, teacher educators can be encouraged to engage in community-based research, innovation, and industry-based projects. Conducting research increases lecturers’ research skills and increases content knowledge. A study carried in Indonesia by Zulfikar at al, (2022) indicated that research is a must activity that all lecturers should engage with, for that reason all lecturers need to publish their research findings. A similar study by Pham (2021) indicated that lecturers need to write papers for international and domestic journal. Institutions can foster a culture of research and innovation by organising conferences and seminars where teacher educators present their research papers, receive feedback, and engage in discussions with colleagues (O’Leary and Wood, 2020). Teacher training institutions can also collaborate with international institutions to increase their research skills and opportunities (Pham, 2021).

As Education 5.0 promotes innovation, academic professionals need to develop competencies in creative problem-solving and entrepreneurial thinking (Jagannath (2020). This includes how to foster a culture of innovation within teacher education. A study by Soyata and Ales (2024) revealed that through various educational training activities, a lecturer gradually gains new perspectives and confidence, expands knowledge, learns new techniques and takes on new roles. Ultimately, these ongoing training and development initiatives empower teacher educators to stay adaptable, innovative, and student-centered, thereby enhancing the overall quality of education and fostering a more dynamic learning environment. Teacher training institutions can support their lecturers by providing resources, infrastructure, and opportunities for professional development, such as funding for training and research, state-of-the-art facilities, and partnerships with industries and communities. These institutions can also establish centers for teaching and learning excellence, innovation hubs, and incubators to support lecturers in developing innovative solutions and integrating industry-specific skills into academic coursework. Murwira (2019) writes:

We have started creating innovation hubs at all Higher and Tertiary Education Institutions, as well as industrial parks linked to these institutions, in order to create a collaborative community of forward-looking private and public players and academics with the objective of developing cutting-edge products for the marketplace. Innovation hubs shall be sources of our new technology. Innovation hub is where technology will be born. Innovation hubs and industrial

parks built in most universities in Zimbabwe serve as incubators for new ideas, products, and services, providing resources, mentorship, and funding to support the development of innovative solutions that addresses local and global challenges (Murwira, 2018 and Wuta, 2022). The major challenge in Zimbabwe is that most innovation hubs and industrial parks are not directly integrated with faculties of education and many teacher training colleges still lack these facilities. A study by Musa and Ojoniko (2020) indicated that teacher educators are not able to imply innovations in their institutions as there is no support from the management and administration, no facilities are provided to them. This is hindering the development of innovative teaching and learning practices that can benefit both lecturers and students.

Knowledge sharing among lecturers and institutions is another way to transform lecturers. This allows them to learn from each other’s experiences, best practices, and innovative approaches, ultimately enhancing their teaching and research capabilities. Another strategy is to establish a center for teaching and learning, for all teacher training institutions in the country, which will systematically plan, implement and refine education 5.0 initiatives (Gaebel et al, 2018). Once a centre for teaching and learning is established and policies refined, it will be easier to review and monitor conducted continuous professional development programs initiatives across the country (Gaebel, et al, 2018; O’leary and Wood, 2019). Masoumi et al. (2019) stated that academics must develop the centre and fully take responsibilities by crafting professional development programs. By so doing, academics will engage in peer-to-peer learning which encourage effective communication (O’Leary and Wood, 2019). However, some teacher educators may not be willing to practice new ideas as there is no motivation. Teacher training institutions can provide incentives for lecturers to engage in interdisciplinary research collaborations, community- based projects, and innovation initiatives (Chikari et al., 2015).

Despite a lot of opportunities, the implementation of the Education 5.0 industrialisation aspect in teacher education is fraught with numerous challenges that require careful consideration and strategic planning. Teacher training institutions may lack the necessary resources, equipment, and facilities to support industrialisation initiatives. Some lecturers and administrators may resist the shift towards industrialisation, preferring traditional teaching methods. Teacher training institutions may need to hire or train staff with the necessary skills and expertise to implement industrialisation initiatives. A study by Pham

(2021) highlighted the importance of institutions to strengthen and improve the quality of recruitment and implement the policy of building and developing staff, especially remuneration, encouragement, and facilitation, in terms of working environment and income, to improve the life of educators. Institutions may struggle to integrate industrialisation aspects within existing teacher training curricula.

Lectures may need to strike a balance between theoretical foundations and practical, hands-on experience in industrialisation. Teacher training institutions may face challenges in establishing and maintaining partnerships with industries and communities. They may need to secure funding and ensure the long-term sustainability of industrialisation initiatives. Universities and colleges may need to develop new assessment and evaluation methods to measure the effectiveness of such initiatives. Educational institutions need to provide training for teacher educators to develop their skills and knowledge in industrialisation which is expensive (Pham, 2021). These academic institutions may need to navigate policy and regulatory frameworks that may not be supportive of industrialisation initiatives. Ultimately, addressing these crucial challenges will be crucial for teacher education institutions to successfully integrate the industrialisation aspect and equip aspiring teachers with the skills and competencies required for the 21st century education landscape.

# Conclusion

The Education 5.0 era presents transformative opportunities for the higher education sector, driven by the five tenets of teaching, research, community engagement, innovation and industrialisation. However, the successful implementation of the philosophy hinges on the ability of teacher educators to adapt to the evolving educational landscape. The roles and responsibilities of lecturers have expanded significantly in this new educational powerhouse. They are not only teacher educators but also facilitators of knowledge creation, researchers, contributors to community development, and catalyst of innovation and industrialisation. This shift necessitates the new roles and responsibilities of

lecturers in implementing the Education 5.0, as well as the knowledge and skills gap that exists among them. To bridge the gap, a transformative approach to lecturer development is necessary, one that emphasise institutional support, continuous professional development, and innovative pedagogies.

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