

A Model to Reconstruct Lecturer Dilemma in Balancing Research and Teaching Responsibilities: A Case of One Rural University in South Africa

Cias Thapelo Tsotetsi¹ Akinlolu Ademola Onaolapo^{2*} **AFFILIATIONS**

^{1,2}Department of Education Management, Policy, and Comparative Education, University of the Free State, QwaQwa Campus, South Africa.

CORRESPONDENCEEmail: 2019446430@ufs4life.ac.za***EDITORIAL DATES**

Received: 15 October 2023

Revised: 28 February 2024

Accepted: 29 February 2024

Published: 13 March 2024

Copyright:

© The Author(s) 2024.

Published by [ERRCD Forum](#).This is an open access article distributed under Creative Commons Attribution ([CC BY 4.0](#)) licence.DOI: [10.38140/ijrcs-2024.vol6.04](https://doi.org/10.38140/ijrcs-2024.vol6.04)

Abstract: In this empirical study, we explore the challenges faced by lecturers at a rurally located university in South Africa as they try to balance the demands of research and teaching. Universities in rural areas play a crucial role in providing higher education access to underprivileged communities and promoting regional development. Our study is based on role theory, which emphasises the intended and unintended purposes of lecturer roles in society. Through a qualitative study of six lecturers, we examine the various issues they encounter when managing research and teaching commitments. We adopt a case study design within an interpretive paradigm. Semi-structured interviews were conducted with six new lecturers from the university to understand their personal experiences and perspectives on the tension between research and teaching, as well as the potential consequences for their research productivity. We use thematic analysis to analyse the collected data. The findings reveal that the participants at the university struggle to balance the demands of research and teaching, encountering

various challenges in the process. These challenges include a lack of funding for research, limited research resources and facilities, and an overwhelming teaching workload. Based on the findings, the study suggests solutions and strategies to guide university administrators, policymakers, and lecturers in navigating this challenging landscape and fostering a supportive environment that values research and teaching contributions. This study contributes to the knowledge by proposing a model that lecturers can follow to balance their work roles.

Keywords: Research responsibility, teaching responsibility, rural university, role theory, model.

1. Introduction

Lecturers worldwide adhere to rules of engagement in teaching, learning, and research (Nel et al., 2023). However, some lecturers complain about the teaching load and the pressure to focus on their research. Promotion and ratings, both domestically and internationally, depend on their research output. This creates a challenging and complex situation for university teachers who must juggle both their classroom and research responsibilities. This issue is also prevalent in rural campuses in Africa, where lecturers are expected to have more community engagement. In South African rural universities, lecturers often find it difficult to balance their research and teaching responsibilities (Du Plessis & Mestry, 2019). These universities are typically under-resourced and have limited facilities for conducting high-quality research (Rammbuda, 2023).

On one hand, lecturers are expected to contribute to the body of knowledge through their research endeavours (Mandell et al., 2013). The United Nations recognises the importance of research for national and global development, as highlighted in a document by Dumitriu (2018). Similarly, at African universities, research is crucial for advancing academic disciplines, addressing local

How to cite this article:

Tsotetsi, C. T., & Onaolapo, A. A. (2024). A model to reconstruct lecturer dilemma in balancing research and teaching responsibilities: A case of one rural university in South Africa. *Interdisciplinary Journal of Rural and Community Studies*, 6, 1-16. <https://doi.org/10.38140/ijrcs-2024.vol6.04>

community needs, and maintaining a competitive position nationally and internationally (Claassens & Sihlali, 2022).

Despite the significance of research, lecturers in South African universities, especially those in rural areas, face unique challenges in balancing their research and teaching responsibilities (Mestry, 2022; Pietersen, 2023). On the one hand, engaging in rigorous research is essential for knowledge advancement and addressing local development issues. On the other hand, lecturers are also tasked with providing high-quality teaching to students who often come from disadvantaged backgrounds (Robinson, 2022). Many students in rural universities have limited educational opportunities or face socioeconomic barriers that affect their learning experiences, as supported by literature and observations (Belando-Montoro, 2022; Martins & Gresse von Wangenheim, 2023). Therefore, there is an urgent need for dedicated educators who can offer effective pedagogical support and help bridge the educational gap, but this leaves a gap in research outputs and the development of rural lecturers.

The challenge arises from the inherent tension between two critical aspects of academic life, which is often worsened by limited resources, infrastructure, and support systems in rural settings (Shava, 2022; Ifeanyi, 2023). Lecturers face immense pressure as they try to balance engaging in meaningful research and meeting their teaching obligations (Yuan et al., 2022). The dilemma is that some lecturers focus more on teaching, affecting their research, while others prioritise research and struggle with teaching and meeting deadlines. Putting more effort into research results in a divided focus and negatively impacts teaching responsibilities. Research is crucial for career progression, promotion, and recognition by the National Research Foundation (NRF) and other research bodies in the country (Mahoko, 2023). Lecturers must navigate competing demands from academic promotion requirements, student expectations, administrative responsibilities, and personal career aspirations to achieve academic balance (Hammoudi Halat et al., 2023).

Additionally, the resource constraints faced by these universities often lead to heavy teaching loads for lecturers, leaving them with limited time and energy for research (Hutchens & Fernandez, 2023). This imbalance further complicates the challenge of maintaining a strong research profile while ensuring excellent teaching outcomes (Creagh et al., 2023). Addressing this dilemma requires a comprehensive understanding of the unique context of rural South African universities and innovative strategies that prioritise both research and teaching excellence (Nurumal et al., 2023). By creating supportive environments that value and facilitate interdisciplinary collaboration, establishing mentorship programs for early-career researchers, securing adequate funding for research initiatives in rural areas, and promoting professional development opportunities related to teaching approaches, these institutions can better support their academics in navigating this delicate balance (Chatzea et al., 2022; Kent et al., 2022).

In rural universities, lecturers have the responsibility to prioritise teaching and ensure that students receive a quality education (Tomlinson et al., 2023; Barbeau & Happel, 2023). This encompasses tasks such as preparing lectures, grading assignments, and providing support to students beyond the classroom (Njuguna & Itegi, 2013). However, there is also an expectation for lecturers to engage in research and publish in academic journals, as it contributes to the institution's reputation and funding opportunities. Unfortunately, lecturers face challenges in pursuing research due to limited resources and infrastructure (Ajani & Maphalala, 2023). Access to laboratories, equipment, and funding for data collection is often restricted, making it difficult to carry out meaningful research projects. Additionally, the demands of teaching leave lecturers with little time to dedicate to their research interests (Gibson et al., 2023).

1.1 Literature review

Rurally located universities often prioritise community engagement and applied research, which focuses on addressing local challenges (Mbah et al., 2021). Instead of solely pursuing theoretical or

disciplinary-focused research, lecturers may be encouraged or required to collaborate with local organisations or communities on practical projects. However, this emphasis on community engagement can sometimes overshadow the importance of publishing in academic journals, which is typically seen as a measure of academic success. Therefore, lecturers often struggle to strike a balance between conducting relevant research that benefits their immediate surroundings and contributing to the wider body of knowledge through publications (Diamond & Adam, 2023). To address this dilemma, some lecturers have integrated their teaching and research activities by incorporating real-world problems into their coursework. By involving students in practical projects that serve both educational purposes and contribute to local development initiatives, lecturers are able to fulfil their responsibilities as educators while also making meaningful contributions to their communities.

The roles of lecturers encompass various tasks, including teaching, assessment, research, administrative duties, and involvement in university committees and initiatives (Badaru & Adu, 2022). Within the dynamic realm of academia, university lecturers play a significant role in shaping the educational landscape and fostering local development (Gottardello & Karabag, 2022). Their responsibilities extend beyond the lecture halls and encompass a wide range of tasks that form the foundation of higher education (Nkosi, 2021). From engaging students in practical projects that integrate theory with real-world application to meticulously grading assignments, conducting groundbreaking research, and participating in vital administrative functions, lecturers navigate a complex and demanding terrain. In this discourse, we probe into the intricate web of duties that define the daily life of lecturers, from their involvement in research retreats to their commitment to mentoring students, serving on committees, and ensuring the seamless execution of educational deliverables.

Additionally, collaborating with colleagues within the university or across institutions can help overcome resource limitations by pooling expertise and sharing facilities (Khethiwe, 2023). Lecturers may also seek external funding through grants or partnerships with larger institutions to support their research endeavours (Gamoran, 2023). Finding a balance between teaching and research in South African rural universities requires creativity, collaboration, and engagement with the local community. While the challenges are significant, lecturers can still contribute to knowledge creation while providing quality education to their students. Therefore, striking a balance between research and teaching is crucial for lecturers in rural South African universities (Pika & Reddy, 2022). By addressing these challenges and finding effective ways to balance these two crucial aspects of their professional lives, these academics can make meaningful contributions to knowledge production while ensuring that students receive a high-quality education. The study is structured as follows: role theory as a theoretical framework, methodology, findings, and conclusion.

1.2 Theoretical framework

Role theory is a valuable framework for understanding human interactions and societal structures (Biddle, 2013). It acknowledges that individuals are not isolated but are integral parts of larger social systems (Solomon et al., 1985). These systems assign roles to us, such as parents, teachers, students, doctors, or friends, and each role comes with a script - a set of expectations and behaviours deemed appropriate by society (Biddle, 1986). These roles influence how lecturers behave, how they relate to others, and how others perceive and interact with students (Koenig & Eagly, 2014). Role theory aims to uncover the dynamics at play in this complex dance of roles, exploring how individuals adapt, negotiate, and sometimes clash with the expectations associated with their roles (Eagly, 1997). Role theory, a foundation of the study of human behaviour and social dynamics, is the result of collective intellectual exploration rather than the singular vision of one individual (Franke, 1997).

The concept of roles and their impact on human interactions and societal structures has fascinated scholars for generations (Walker, 1987). George Herbert Mead, Erving Goffman, and Robert K.

Merton have each contributed unique perspectives to our understanding of roles and their multifaceted influence on individuals and communities (Fine, 1995). George Herbert Mead's work on symbolic interactionism laid the groundwork for examining how individuals adopt and adapt to roles through social interactions (Mead, 1934). Erving Goffman's dramaturgical theory further enhanced this understanding by comparing social interactions to a theatrical performance, where individuals play different roles in various social settings (Goffman, 1974; Goffman, 2016). Robert K. Merton's contributions introduced the concepts of manifest and latent functions, highlighting that roles often serve intended and unintended purposes within society (Merton, 1938). These scholars, among others, have collectively shaped the trajectory of role theory, providing valuable insights into the fabric of human social existence.

Role theory is relevant to this study as it examines society, human behaviour, and social interactions from various angles. Within this study, we explore the roles of lecturers, including teaching and research, and how the pressure associated with these roles creates tensions and dilemmas for lecturers in fulfilling their responsibilities. The theory offers a framework for understanding and analysing the roles individuals occupy and the impact of these roles on their actions, identities, and relationships. In the context of education, role theory can shed light on the roles of teachers, students, and administrators. It can help us understand how role expectations influence teaching methods, student engagement, and the overall learning environment. The theory assists the researchers in deciphering the roles ahead of lecturers and finding a way to manage their responsibilities and stress in rural universities in South Africa.

1.3 Research question and objectives

To address the research problems mentioned above, the study raised the following research question and objectives:

- What are the primary challenges faced by lecturers in a South African rurally located university when it comes to balancing their research and teaching roles?

To further guide the study and answer the main research question, the following objectives were raised:

- To explore the challenges lecturers encounter in balancing their teaching and research roles.
- To examine potential solutions to the challenges faced by lecturers in rural universities in South Africa.

2. Methodology

This study is situated within an interpretive paradigm (Wilson, 2017). The interpretive paradigm is relevant because it provides insight into the worldview of participants who interact with the phenomenon. The research is qualitative (Mohajan, 2018), which is applicable to the study as it allows the researcher to ask probing questions to participants using appropriate data collection instruments. The research design chosen for this study is a case study design as it is deemed necessary to conduct an in-depth inquiry into the roles of lecturers in universities (Tetnowski, 2015). The sampling technique used in this study is purposive, as the target participants are lecturers at a rural university in South Africa (Etikan et al., 2016). The participants in this study were six lecturers from the faculty of education, each assigned a pseudonym (L1, L2, L3, L4, L5, L6). Data was collected through individual interviews conducted via WhatsApp voice notes and telephonic interviews to obtain participants' answers. Due to practical constraints in meeting the lecturers in person, we opted for a convenient data collection method. The answers were recorded in voice notes and transcribed verbatim. Similar preliminary codes were identified and organised into themes using Thomas and Hardy's (2008) three-step process for thematic analysis, which involves coding, arranging themes, and analysing the data. The researchers strictly adhered to ethical principles when collecting data from the participants, ensuring their rights were respected (Lochmiller, 2021). Informed consent was

obtained, and the researcher received approval from the University of the Free State with the ethical number UFS-HSD2021/1003/21. The researchers communicated their findings through research reports and presentations. Below is a demographic representation of the participants.

Table 1: The demographic representation of the participants

Numbers	Participants	Departments
1	Lecturer 1	Education Foundations
2	Lecturer 2	Education Foundations
3	Lecturer 3	Curriculum Studies and Higher Education
4	Lecturer 4	Curriculum Studies and Higher Education
5	Lecturer 5	Education Management, Policy, and Comparative Education
6	Lecturer 6	Education Management, Policy, and Comparative Education

3. Findings And Discussion

The results provide a snapshot of the potential findings from a study on the balancing act of research and teaching in a rural university in South Africa. The study's findings are grouped into several themes, which are explored below. These themes represent the study's objectives: The challenges lecturers encounter in balancing their teaching and research roles and the potential solutions to the challenges they face. In this section, we begin by examining the challenges and then move on to suggestions for addressing these challenges.

3.1 Challenges lecturers encounter in balancing their teaching and research roles

This section sheds light on some primary challenges faced by lecturers in a South African rural university. Specifically, we have identified three issues: lecturers face challenges related to resource constraints, including limited funding, outdated infrastructure, and insufficient research support; balancing the demands of teaching and research within a constrained time frame is a significant challenge; and difficulty in accessing local development initiatives and community engagement opportunities impacts their research endeavours.

Sub-theme 1: Resource constraints, limited funding, outdated infrastructure, and insufficient research support

Lecturers in South African universities, especially in rural areas, often encounter numerous challenges in their daily roles. These challenges, including limited funding, outdated infrastructure, and insufficient research support (Moshtari & Safarpour, 2023; Joseph, 2022) have been supported by participants in this study. It is important to note that these challenges, as identified by the participants, can significantly affect lecturers' ability to balance research and teaching. The responses of participants L1, L2, L3, L4, L5, and L6 have been arranged accordingly below.

" **L1:** Resource constraints are a constant struggle. Our research often relies on up-to-date equipment and facilities, and yet we have outdated infrastructure. Funding opportunities are limited, making it challenging to pursue innovative research projects that could benefit the local community. We find ourselves constantly improvising to make the most of what we have."

"**L2:** Teaching is our core responsibility, but without proper research support, it is hard to stay updated with the latest pedagogical methods. We need resources for curriculum development and access to research on effective teaching practices. It's frustrating when we have ideas to improve our courses, but the means to implement them are lacking."

"**L3:** The incentives for writing research are often less in this university compared to other universities within the country. We often have to turn to external grants, which are highly competitive. Without adequate research support, our ability to contribute to research efforts is hampered."

"L4: In education, staying current with research is crucial, but accessing journals and research databases can be a financial burden. We need [a] more institutional support for journal subscriptions and research materials. Without these resources, our research output suffers."

"L5: Balancing administrative responsibilities and teaching leaves little time for research, and when we do find time, the lack of research support is discouraging. It is frustrating when we want to guide students in research projects like the honours students, masters thesis and PhD.... to facilitate their learning effectively."

"L6: Our university is in a prime position to contribute to local development, but resource constraints hinder our ability to engage meaningfully with the community. Funding is needed to support community-based projects and research that can have a direct impact. Without it, our efforts are often limited to the classroom."

The data sets above reveal that budget constraints contribute to the overall challenges lecturers face in universities. The participants' views highlight the specific challenges educators face in a university setting, particularly regarding limited resources and research support. These challenges align with existing literature, which emphasises the importance of adequate resources for research and innovative projects. According to Sebola (2023), inadequate funding and outdated infrastructure can hinder research productivity and limit the impact of research on local communities. Similarly, Ghani et al. (2024) emphasise the need for resources for curriculum development and access to research on effective teaching practices to improve the quality of education. The participants' frustration with the lack of incentives for conducting research aligns with the findings of Majola and Mudau (2022), who highlight the importance of recognition and rewards for research activities in motivating academics.

Furthermore, the participants' struggle to access journals and research databases due to financial constraints reflects a broader issue within academia. According to Sheikh and Richardson (2023), rising journal subscription costs have made it increasingly difficult for universities to afford access to essential research materials. This not only hampers the research output of academics but also limits their ability to stay up-to-date with the latest research findings. The participants' desire to guide students in research projects, but facing challenges due to time constraints and lack of research support, resonates with the findings of Cutillas et al. (2023), who emphasise the importance of mentorship and support for students' research endeavours. Overall, the participants' views underscore the critical need for institutional support and funding to enhance research capacity and facilitate meaningful engagement with the community.

Sub-theme 2: Balancing the demands of teaching and research within a constrained time frame is a significant challenge

The study explored the challenges faced by faculty of education lecturers at a Rural South African university as they strive to balance their teaching and research responsibilities with limited time and resources. The findings emphasise the overwhelming demands of both roles and the necessity for institutional support and innovative strategies to effectively address these challenges (Horn et al., 2023). By incorporating role theory, lecturers can gain awareness of their responsibilities and discover ways to balance their roles without conflicts or time constraints. The following is a compilation of six participant perspectives that shed light on the challenges experienced by education lecturers in a rural South African university in regard to managing the demands of teaching and research within a limited timeframe. The participants, listed as L1, L6, L5, L2, L3, and L4, respectively, are presented in the order of their viewpoints.

"L1: Teaching is incredibly rewarding, but it is also time-consuming. Preparing lectures, grading assignments, and mentoring students can be all-consuming. When we add research

expectations to the mix, it becomes a juggling act. There just are not enough hours in the day to justice to both teaching and research."

"L6: Our students deserve the best education we can provide, but research commitments often mean sacrificing the time we could spend improving our teaching methods. We want to incorporate the latest pedagogical approaches, but finding time for professional development is challenging."

"L5: In education, research is essential to stay current and make meaningful contributions to the field. However, the pressure to publish can be overwhelming. We're constantly torn between preparing for classes, supervising student projects, and conducting our research."

"L2: The rural setting has its unique advantages, but it can also be isolating. We lack the academic network and collaborative opportunities that lecturers in urban universities enjoy. Research often involves travelling long distances to connect with peers, further squeezing our time."

"L3: Our university's commitment to local development initiatives is admirable, but it adds another layer of complexity. Engaging with the community, conducting relevant research, and teaching effectively – all [within] a limited time frame – can be overwhelming. We often feel stretched thin."

"L4: We're passionate about our roles, both as educators and researchers, but we need more institutional support. Adequate resources and recognition of the challenges we face would go a long way in helping us strike a better balance between teaching and research."

The participants' views explored above indicate that lecturers in rural universities often face disadvantages when it comes to research networks and managing sufficient time for research. These views highlight the challenges that educators in rural university settings encounter in balancing teaching and research responsibilities. These challenges align with existing literature, which emphasises the time-consuming nature of both teaching and research activities in academia. For instance, Haight et al. (2023) discuss the demands of teaching, grading, and mentoring students, noting that these responsibilities often leave academics with limited time for research. Similarly, Alenezi et al. (2023) highlight the challenges of incorporating the latest pedagogical approaches into teaching practice, especially when research commitments take precedence. The pressure to publish, as mentioned by the participants, is a common theme in academic literature, with scholars often feeling overwhelmed by the need to produce research outputs while fulfilling teaching obligations (Heng et al., 2023).

Furthermore, the participants' comments regarding the isolation of rural university settings and the lack of academic networks align with the findings of Véliz et al. (2023) and Ross et al. (2023), who discuss the challenges of conducting research in remote locations. The limited collaborative opportunities in rural settings can hinder research productivity and professional development (Mundy & Baumgartner, 2014). Additionally, the participants' desire for more institutional support resonates with the findings of Chigeda et al. (2022), who argue that adequate resources and recognition of academic challenges are essential for fostering a supportive academic environment. The participants' views emphasise the need for universities to provide better support and resources to help educators effectively balance their teaching and research responsibilities in rural settings.

Sub-theme 3: Difficulty in accessing local development initiatives and community engagement opportunities affects their research endeavours.

The participant views demonstrate the complex relationship between education lecturers, local development initiatives, and community engagement in a rural university. Although there is a strong desire to contribute to local development, challenges such as access, trust-building, and institutional support can impede research efforts aimed at making a meaningful impact on the community

(Netshandama, 2023). By focusing on role theory, lecturers can access local engagement opportunities and empower themselves to develop communities. Participants highlighted the concern of lecturers (L6, L5, L4, L1, L3, and L2) regarding access to local initiatives in the following sections:

"L6: We recognise the potential of our university to contribute to local development, but the limited outreach and connections to local initiatives hinder our research. Engaging with the community is essential for our research projects, but building those bridges takes time and effort."

"L5: Access to local development initiatives and community engagement opportunities can be sporadic. It often depends on personal networks and luck. Without consistent and structured support, our research in education struggles to have a sustained impact."

"L4: The rural context is a rich source of research inspiration, but it is a challenge to connect with local communities and their development needs. We want our research to be relevant, but without proper channels, it is difficult to identify and address those needs effectively."

"L1: Community engagement is a two-way street, and sometimes there is resistance or skepticism from the community to academic involvement. Establishing trust and meaningful partnerships takes time and patience, which can be at odds with our research timelines."

"L3: Our university's commitment to community development is admirable, but the bureaucratic processes can be slow and cumbersome. This affects our ability to access resources and collaborate effectively with local organisations on research projects."

"L2: We're passionate about making a difference in the local community, but it is disheartening when our efforts don't always align with the community's immediate needs. We need better mechanisms for communication and collaboration to ensure our research truly benefits the region."

Participants highlighted the third challenge in the selected university as the difficulty in accessing local development initiatives and community engagement opportunities that impact their research endeavours. This aligns with previous research on the challenges faced in accessing local initiatives and community engagement opportunities in research. The participants' perspectives emphasised the challenges of engaging with local communities and development initiatives in a rural university setting. These challenges are consistent with existing literature, which recognises the significance of community engagement for research impact and the obstacles in establishing meaningful partnerships. For example, Ogunsanya and Govender (2019) and Akhund et al. (2023) stressed the importance of universities building trust and relationships with local communities to ensure the relevance and sustainability of research efforts. The participants' comments also highlight the sporadic nature of access to community engagement opportunities, echoing the findings of Godonoga and Sporn (2023), who discuss the role of personal networks and chance in accessing community partnerships. Additionally, the bureaucratic processes and challenges in aligning research efforts with community needs resonate with the findings of Brockman et al. (2023), who emphasise the barriers to effective community engagement in rural settings, including limited resources and communication channels. Overall, the participants' views underscore the importance of universities streamlining processes, enhancing communication, and building strong, collaborative relationships with local communities to maximise the impact of research on rural development.

3.2 Possible solutions for balancing research and teaching

Balancing research and teaching is a challenge that academics all over the world face. In higher education, educators are expected to excel in both areas - advancing knowledge through research and providing high-quality education to students. However, achieving this balance is not easy and often requires creative and strategic solutions. The participants' views reflect a range of potential

solutions, such as fostering collaboration and innovation, improving access to resources, and strengthening community engagement. Addressing the challenges faced by lecturers in balancing research and teaching requires a multifaceted approach involving both individual and institutional efforts. The comments of participants L1, L3, L2, L4, L6, and L5, respectively, are provided below to address the challenges they face in balancing research and teaching at a rural South African university.

"L1: One solution is to foster stronger collaboration among faculty members. By pooling our resources and expertise, we can tackle research projects more efficiently. Additionally, seeking external partnerships and grants can help secure the funding needed for our research endeavours."

"L3: To address the time constraints, we could explore innovative teaching methods that integrate research into the classroom. In this way, we can achieve both our teaching and research goals simultaneously. Professional development opportunities on effective teaching strategies would be beneficial."

"L2: We should establish closer ties with local communities and development organisations. This can provide us with better access to community-driven research projects and ensure that our work aligns with local needs. Building trust and engaging community leaders is essential."

"L4: In our department, we can create a research support committee that assists lecturers in identifying funding opportunities, preparing grant proposals, and navigating the publication process. This would help alleviate some of the resource constraints."

"L6: Our university could develop a mentorship program where experienced lecturers guide newer faculty members in finding a balance between teaching and research. This program could also include strategies for managing administrative responsibilities more effectively."

"L5: Harnessing the best part of the lecturers' ability is a plus, if you're good at research, be commended, and if you're lagging in meeting deadlines, be commended in delivering research outputs in PhDs and Masters students."

These participant views reflect a range of potential solutions to address the challenges faced by lecturers in balancing research and teaching. These solutions include fostering collaboration and innovation, improving access to resources, and strengthening community engagement. According to Kohl et al. (2022), Vishnoi and Pandey (2023), and Vabø and Schmidt (2023), it is crucial to balance the roles of lecturers in order to improve teaching effectiveness and maintain competitiveness with other universities worldwide. Collaboration among faculty members has been emphasised as a key strategy for improving research efficiency and securing funding (Kienast, 2023). Furthermore, establishing partnerships with local communities and development organisations can enhance the relevance and impact of research projects (Bates et al., 2023). The integration of research into teaching, as proposed by the participants, aligns with the growing trend in higher education towards experiential and inquiry-based learning approaches (Sachdeva, 2023). Additionally, the idea of mentorship programs for faculty members aligns with research highlighting the importance of mentorship in academic career development (Hernandez et al., 2023). These strategies, if implemented effectively, can address the challenges lecturers face in balancing teaching, research, and administrative responsibilities, ultimately enhancing the quality and impact of their work.

4. Recommendation of a Model

Based on the findings and theoretical implications of the study, the following model (Figure 1) presents a valuable perspective for understanding and addressing this issue.

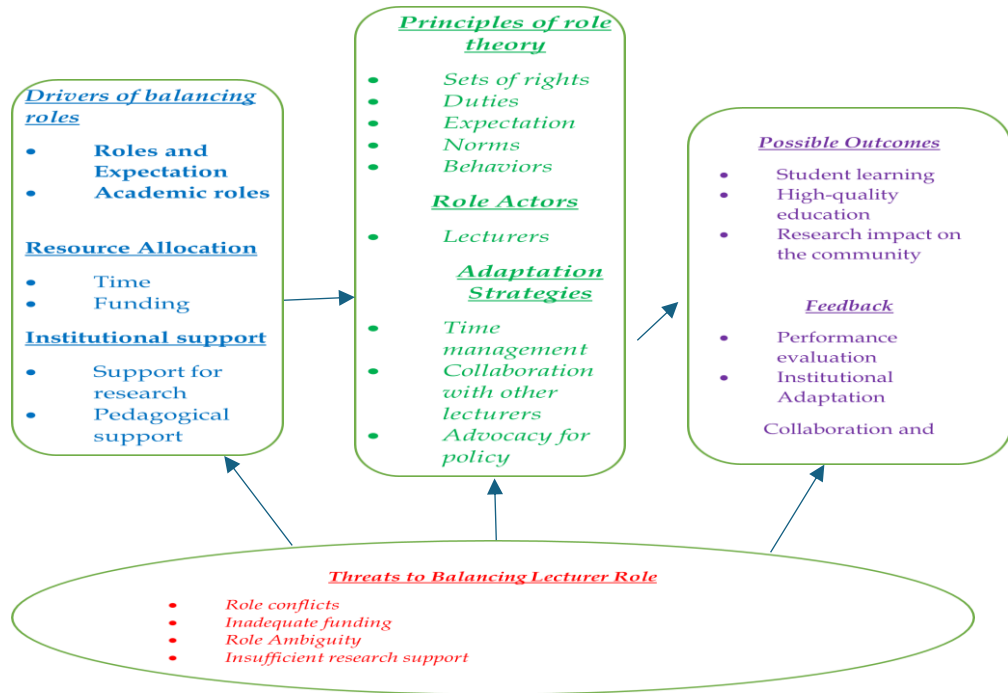


Figure 1: Balancing lecturer's teaching and research responsibilities

The model emphasises the importance of clarifying lecturers' roles as both researchers and educators. It suggests that lecturer expectations and responsibilities in both domains should be clearly defined to help lecturers understand the time and effort required for each role. Additionally, efficient time management is crucial. Lecturers should set aside dedicated blocks of time for research and teaching and prioritise tasks based on their urgency and importance. When it comes to research, focusing on high-impact projects that align with long-term goals is recommended. Setting clear research objectives and milestones can help lecturers stay on track and make efficient use of their research time. Continuous professional development is also important to stay updated on the latest teaching methods and research techniques. This can help lecturers become more efficient in both roles. Taking care of the lecturer's wellbeing is essential to avoid burnout. Balancing research and teaching is not just about work but also about maintaining a fulfilling personal life. Communication with the lecturer department, colleagues, and students about lecturer commitments and limitations is key. Transparency can help manage expectations and garner support. It is important to acknowledge that achieving a perfect balance may not always be possible, and priorities may shift over time. Therefore, flexibility, adaptability, and mindfulness of the lecturer's personal and professional goals are crucial as lecturers strive to excel in both research and teaching within the dynamic landscape of higher education. The researchers designed a model to address these challenges.

The model discusses how lecturers should balance their duties in research and teaching. Lecturers are expected to excel in both areas, which can lead to conflicts within and beyond the classroom. Conflicting expectations and demands on their time can cause role conflicts and make it difficult to prioritise tasks. A lack of defined priorities can also lead to role ambiguity, leaving lecturers uncertain about how to successfully balance their responsibilities. The term "resource allocation" refers to the limited availability of funds and time, which may hinder lecturers' ability to succeed in both areas.

The level of institutional support provided by the university plays a significant role in lecturers' ability to manage their duties effectively. Role performance, which affects academic recognition through specific outcomes, is used to evaluate success in research and teaching. To effectively manage their responsibilities, lecturers should employ various strategies, such as teamwork, time management, and seeking support from colleagues. The conclusion of the study suggests that research impact and student learning outcomes serve as indicators of how well lecturers balance their responsibilities. By using role theory as a lens, this framework offers a platform for addressing the challenges faced by academics at a rural institution in South Africa. It provides an organised perspective on these challenges.

5. Conclusions and Implications for Practice

These findings shed light on the difficulties experienced by lecturers trying to strike a balance between teaching and research in a rural South African university. These obstacles—lack of resources, schedule conflicts, and barriers to participating in community development projects—combine to create a setting that affects how lecturers carry out their duties as educators. One of the biggest obstacles to effective research participation is a lack of resources, which may include inadequate financing, outdated infrastructure, and insufficient research assistance. These limitations make it more difficult for lecturers to conduct cutting-edge research, acquire modern equipment, and access vital resources such as scholarly publications. As a result, both the volume and quality of research output are noticeably influenced.

The constant challenge is juggling research and teaching responsibilities within a limited time constraint. It is difficult for lecturers to effectively allocate their energy, as the commitment required to succeed in the classroom clashes with the time needed for in-depth study. This difficulty often leads to trade-offs, where pursuing one aspect of their academic role may mean sacrificing another. Another major obstacle is the difficulty in finding opportunities for community participation and local development projects. While there is ample room for significant research at a remote institution, connecting with local people and development programs can be challenging.

Building trust, effective communication, and collaboration all require time and effort, which exacerbates the previously mentioned time constraints. Despite these overwhelming obstacles, the study's conclusions also offer some potential solutions. By working together, academic staff and external partners can pool resources, knowledge, and support, providing a way to overcome limited resources. Integrating research into mentoring, professional development, and teaching initiatives may help academics devise creative ways to divide their responsibilities. Furthermore, the establishment of liaison offices and strengthened collaborations can enhance community participation and open up new avenues for local development projects.

While lecturers at a rural South African institution face many challenges, this study highlights their tenacity, commitment, and enthusiasm in overcoming these obstacles. Striving for a healthy balance between research and teaching is not without difficulties, but it also has the potential to promote academic achievement, support community growth, and enhance the intellectual and social fabric of the institution and its surrounding areas.

6. Declarations

Author Contributions: Conceptualization (A.A.O.); Literature review (C.T.T. & A.A.O.); methodology (C.T.T.); software (N/A); validation (C.T.T.); formal analysis (C.T.T. & A.A.O.); investigation (C.T.T. & A.A.O.); data curation (A.A.O.); drafting and preparation (C.T.T. & A.A.O.); review and editing (C.T.T. & A.A.O.); supervision (C.T.T.); project administration (A.A.O.); funding acquisition (N/A). All authors have read and approved the published version of the article.

Acknowledgement: All the participants who participated in this study are acknowledged exclusively.

Funding: The study received no external funding.

Conflict of interest: The authors declare no conflict of interest.

Data availability: As a result of strict adherence to ethical protocols and the terms stipulated in the participant consent agreement, the data cannot be publicly disclosed. However, the study includes the presentation of the key and relevant information derived from the data.

References

- Ajani, O. A., & Maphalala, M. C. (2023). The impact of the COVID-19 pandemic on educational transformation in African higher education: a systematic literature review on rural universities. *International Journal of Research in Business and Social Science*, 12(8), 445-453. <https://doi.org/10.20525/ijrbs.v12i8.2886>
- Akhund, S., Mangrio, W. B., Qureshi, A. S., & Naqvi, I. B. (2023). Assessment of integration of sustainable development principles in university curricula, a systematic literature review. *International Journal of Business and Management Sciences*, 4(4), 157-182.
- Alenezi, M., Wardat, S., & Akour, M. (2023). The Need of Integrating Digital Education in Higher Education: Challenges and Opportunities. *Sustainability*, 15(6), 4782. <https://doi.org/10.3390/su15064782>
- Badaru, K.A., & Adu, E.O., (2022). Platformisation of Education: An analysis of South African Universities' learning management systems. *Research in Social Sciences and Technology*, 7(2), 66-86. <https://doi.org/10.46303/ressat.2022.10>
- Barbeau, L., & Happel, C.C., (2023). *Critical teaching behaviors: Defining, documenting, and discussing good teaching*. Taylor & Francis.
- Bates, G., Le Gouais, A., Barnfield, A., Callway, R., Hasan, M. N., Koksai, C., & Ayres, S. (2023). Balancing autonomy and collaboration in large-scale and disciplinary diverse teams for successful qualitative research. *International Journal of Qualitative Methods*, 22, 1-15. <https://doi.org/10.1177/16094069221144594>
- Belando-Montoro, M.R., Naranjo-Crespo, M., & Carrasco-Temino, M.A., (2022). Barriers and facilitators to the retention and participation of socially, economically, and culturally disadvantaged university students. An international systematic review. *International Journal of Educational Research*, 113, 1-10. <https://doi.org/10.1016/j.ijer.2022.101968>
- Biddle, B.J., (1986). Recent developments in role theory. *Annual review of sociology*, 12(1), 67-92.
- Biddle, B. J., (2013). *Role theory: Expectations, identities, and behaviors*. Academic press.
- Brockman, T. A., Shaw, O., Wiepert, L., Nguyen, Q. A., Kelpin, S. S., West, I., & Patten, C. A. (2023). Community engagement strategies to promote recruitment and participation in clinical research among rural communities: A narrative review. *Journal of Clinical and Translational Science*, 17(1), 1-37. <https://doi.org/10.1017/cts.2023.16>
- Chatzea, V. E., Mechili, E.A., Melidoniotis, E., Petrougaki, E., Nikiforidis, G., Argyriadis, A., & Sifaki-Pistolla, D., (2022). Recommendations for lecturerng researchers on how to better advance their scientific career: A systematic review. *Population Medicine*, 4 (September), 1-17. <https://doi.org/10.18332/popmed/152571>
- Chigeda, F., Ndofirepi, T.M. & Steyn, R., (2022). Continuance in organisational commitment: The role of emotional intelligence, work-life balance support, and work-related stress. *Global Business and Organizational Excellence*, 42(1), 22-38. <https://doi.org/10.1002/joe.22172>
- Claassens, A., & Sihlali, N., (2022). Dilemmas and Issues Confronting Socially Engaged Research within Universities. In *Critical Engagement with Public Sociology* (192-214). Bristol University Press.
- Creagh, S., Thompson, G., Mockler, N., Stacey, M. & Hogan, A., (2023). Workload, work intensification and time poverty for teachers and school leaders: a systematic research synthesis. *Educational Review*, 1-20. <https://doi.org/10.1080/00131911.2023.2196607>

- Cutillas, A., Benolirao, E., Camasura, J., Golbin Jr, R., Yamagishi, K., & Ocampo, L. (2023). Does mentoring directly improve students' research skills? Examining the role of information literacy and competency development. *Education Sciences*, 13(7), 694. <https://doi.org/10.3390/educsci13070694>
- Davis, K., & Moore, W.E., (2017). Some principles of stratification. In *Kingsley Davis* (221-231). Routledge.
- Diamond, R. M., & Adam, B.E. (Eds.), (2023). *The disciplines speak I: Rewarding the scholarly, professional, and creative work of faculty*. Taylor & Francis.
- Du Plessis, P., & Mestry, R. (2019). Teachers for rural schools – a challenge for South Africa. *South African Journal of Education*, 39(1), S1-S9. <https://doi.org/10.15700/saje.v39ns1a1774>
- Eagly, A. H. (1997). Sex differences in social behaviour: Comparing social role theory and evolutionary psychology. *American Psychologist*, 52(12), 1380–1383. <https://doi.org/10.1037/0003-066X.52.12.1380>
- Etikan, I., Musa, S.A., & Alkassim, R.S., (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, 5(1), 1-4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fine, G.A. ed., (1995). *A second Chicago school?: The development of a postwar American sociology*. University of Chicago Press.
- Franke, G. R., Crown, D. F., & Spake, D. F. (1997). Gender differences in ethical perceptions of business practices: A social role theory perspective. *Journal of Applied Psychology*, 82(6), 920–934. <https://doi.org/10.1037/0021-9010.82.6.920>
- Gamoran, A., (2023). Advancing institutional change to encourage faculty participation in research-practice partnerships. *Educational Policy*, 37(1), 31–55. <https://doi.org/10.1177/08959048221131564>
- Ghani, E. K., Muhammad, K., Ali, M. M., Ismail, R. F., Susanti, S., Bahtiar, M. D., & Rohayati, S. (2024). Can Research Behavior and Motivation Influence Academics' Research Productivity? A Malaysian Evidence. *Educational Administration: Theory and Practice*, 30(2). 312-324. <https://doi.org/10.52152/kuey.v30i2.1058>
- Gibson, H., Jerro, K.J., Namboodiripad, S., & Riedel, K., (2023). Towards a decolonial syntax: Research, teaching, publishing. *Preprint*.
- Godonoga, A., & Sporn, B. (2023). The conceptualisation of socially responsible universities in higher education research: a systematic literature review. *Studies in Higher Education*, 48(3), 445-459. <https://doi.org/10.1080/03075079.2022.2145462>
- Goffman, E. (1974). *Frame analysis: An essay on the organisation of experience*. Harvard University Press.
- Goffman, E. (2016). The presentation of self in everyday life. In *Social theory re-wired* (482-493). Routledge.
- Gottardello, D., & Karabag, S.F., (2022). Ideal and actual roles of university professors in academic integrity management: a comparative study. *Studies in Higher Education*, 47(3), 526-544. <https://doi.org/10.1080/03075079.2020.1767051>
- Haight, W. L., Suleiman, J., Flanagan, S. K., Park, S., Soltani, L. J., Carlson, W. C., & Turck, K. S. (2023). Reflections on social work education during the COVID-19 pandemic: Experiences of faculty members and lessons moving forward. *Qualitative Social Work*, 22(5), 938–955. <https://doi.org/10.1177/14733250221114390>
- Hammoudi Halat, D., Soltani, A., Dalli, R., Alsarraj, L., & Malki, A., (2023). Understanding and Fostering Mental Health and Wellbeing among University Faculty: A Narrative Review. *Journal of Clinical Medicine*, 12(13),1-28. <https://doi.org/10.3390/jcm12134425>
- Heng, K., Hamid, M. O., & Khan, A. (2023). Research engagement of academics in the Global South: the case of Cambodian academics. *Globalisation, Societies and Education*, 21(3), 322-337. <https://doi.org/10.1080/14767724.2022.2040355>
- Hernandez, P. R., Ferguson, C. F., Pedersen, R., Richards-Babb, M., Quedado, K., & Shook, N. J. (2023). Research apprenticeship training promotes faculty-student psychological similarity and

- high-quality mentoring: a longitudinal quasi-experiment. *Mentoring & Tutoring: Partnership in Learning*, 31(1), 163–183. <https://doi.org/10.1080/13611267.2023.2164973>
- Horn, A., Scheffelaar, A., Urias, E., & Zweekhorst, M. B. (2023). Training students for complex sustainability issues: a literature review on the design of inter-and transdisciplinary higher education. *International Journal of Sustainability in Higher Education*, 24(1), 1-27. <https://doi.org/10.1108/IJSHE-03-2021-0111>
- Hutchens, N.H., & Fernandez, F. (2023). Academic freedom as a professional, constitutional, and human right. In L.W. Perna (Ed.), *Higher Education: Handbook of Theory and Research* (pp. 23-45). Springer. https://doi.org/10.1007/978-3-031-06696-2_2
- Ifeanyi, F.O., (2023). Barriers to learning linger into post-pandemic for multi-campus institutions in developing nations: A case of the University of The Free State. *Social Sciences & Humanities Open*, 7(1), 100438. <https://doi.org/10.1016/j.ssaho.2023.100438>
- Joseph, O.B., (2022). *Lecturers' perspectives on challenges facing final-year engineering students at a TVET college in Nongoma, Kwazulu-Natal* [Doctoral dissertation, University of South Africa]. Electronic Theses and Dissertations. <https://hdl.handle.net/10500/30003>
- Kent, B. A., Holman, C., Amoako, E., Antonietti, A., Azam, J. M., Ballhausen, H., Bediako, Y., Belasen, A.M., Carneiro, C.F., Chen, Y.C., & Compeer, E.B., (2022). Recommendations for empowering early career researchers to improve research culture and practice. *PLoS Biology*, 20(7), e3001680. <https://doi.org/10.1371/journal.pbio.3001680>
- Khethiwe, D., (2023). Education and social inequality in Africa: Gender, poverty, and regional disparities. *Research and Advances in Education*, 2(8), 52–65.
- Kienast, S. R. (2023). How do universities' organisational characteristics, management strategies, and culture influence academic research collaboration? A literature review and research agenda. *Tertiary Education and Management*, 1-22. <https://doi.org/10.1007/s11233-022-09101-y>
- King, L. A., & King, D. W. (1990). Role conflict and role ambiguity: A critical assessment of construct validity. *Psychological Bulletin*, 107(1), 48–64. <https://doi.org/10.1037/0033-2909.107.1.48>
- Koenig, A. M., & Eagly, A. H. (2014). Evidence for the social role theory of stereotype content: Observations of groups' roles shape stereotypes. *Journal of Personality and Social Psychology*, 107(3), 371–392. <https://doi.org/10.1037/a0037215>
- Kohl, K., Hopkins, C., Barth, M., Michelsen, G., Dlouhá, J., Razak, D.A., Abidin Bin Sanusi, Z., & Toman, I., (2022). A whole-institution approach towards sustainability: a crucial aspect of higher education's individual and collective engagement with the SDGs and beyond. *International Journal of Sustainability in Higher Education*, 23(2), 218-236. <https://doi.org/10.1108/IJSHE-10-2020-0398>
- Lochmiller, C.R., (2021). Conducting thematic analysis with qualitative data. *The Qualitative Report*, 26(6), 2029-2044.
- Mahoko, N. (2023). *Factors influencing lecturers' retention in A South African university* [Master dissertation, University of the Free State]. University of the Free State, South Africa.
- Majola, M.X., & Mudau, P.K., (2022). Lecturers' experiences of administering online examinations at a South African Open Distance E-Learning University during the COVID-19 Pandemic. *International Journal of Educational Methodology*, 8(2), 275-283. <https://eric.ed.gov/?id=EJ1345066>
- Mandell, N., King, K., Weiser, N., Preston, V., Kim, A., Luxton, M., Din, N., & Silver, A., (2013). Community-academic research partnerships: Practical, ethical and strategic approaches to fostering engaged scholarship. *Community-Academic Research Partnerships*, 1–12.
- Martins, R.M. & Gresse von Wangenheim, C., (2023). Teaching computing to middle and high school students from a low socioeconomic status background: A systematic literature review. *Informatics in Education*, 1-33. <https://doi.org/10.15388/infedu.2024.01>
- Mbah, M., Johnson, A.T., & Chipindi, F.M., (2021). Institutionalising the intangible through research and engagement: Indigenous knowledge and higher education for sustainable development in

- Zambia. *International Journal of Educational Development*, 82, 102355. <https://doi.org/10.1016/j.ijedudev.2021.102355>
- Mead, G. H. (1934). *Mind, self, and society* (Vol. 111). University of Chicago press.
- Merton, R. K. (1938). Science and the social order. *Philosophy of science*, 5(3), 321-337.
- Mestry, R. (2022). The resilience of South African academic staff during the COVID-19 pandemic. In *Academic Resilience* (pp. 71-88). Emerald Publishing Limited.
- Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of economic development, environment and people*, 7(1), 23-48.
- Moshtari, M., & Safarpour, A., (2023). Challenges and strategies for the internationalisation of higher education in low-income East African countries. *Higher Education*, 1-21. <https://doi.org/10.1007/s10734-023-00994-1>
- Nadel, S. F. (2013). *The theory of social structure*. Routledge.
- Nel, M., Hay, J., Bekker, T., Beyers, C., Pylman, N., Alexander, G., & Matoti, S. (2023, March). Exploring the perceptions of lecturers and final year students about the infusion of inclusion in initial teacher education programmes in South Africa. *Frontiers in Education*, 8, 1-15. <https://doi.org/10.3389/feduc.2023.1024054>
- Netshandama, V. O., (2023). The (im) possibility of monitoring and evaluating the impact of community engagement performance in South African universities: A review. *South African Journal of Higher Education*, 37(1), 166-184. <https://dx.doi.org/10.20853/37-1-5667>
- Njuguna, F., & Itegi, F., (2013). Research in institutions of higher education in Africa: challenges and prospects. *European Scientific Journal*, 1, 352-361.
- Nkosi, T.L., (2021). *Harnessing the Fourth Industrial Revolution for improved educational infrastructure in South African Higher Education Institutions* [Doctoral dissertation, University of Johannesburg]. University of Johannesburg, South Africa <https://hdl.handle.net/10210/503479>.
- Nurumal, M. S., Zahir, N.M., Ridzwan, M.D.F.M., Hasan, M.K.C., & Sutrisno, R.Y., (2023). Experiences and challenges encounter among female academics during COVID-19 pandemic: A systematic review. *International Journal Of Care Scholars*, 6(1), 92-118.
- Ogunsanya, O., & Govender, I., (2019). University-community engagement. *International Journal of African Higher Education*, 6(1), 51-76.
- Petru Dumitriu. (2018). *Strengthening policy research uptake in the context of the 2030 agenda for sustainable development*. United Nations Digital Libraries. <https://digitallibrary.un.org/record/3923499?ln=en>
- Pietersen, D., (2023). Perspectives on dialogue and care in teaching, learning relationships in an everchanging online higher education landscape 1. *Perspectives in Education*, 41(2), 134-150. <https://doi.org/10.38140/pie.v41i2.6291>
- Pika, S.T. & Reddy, S., (2022). Unintended pedagogical consequences of emergency remote teaching at a rural-based university in South Africa. *Education Sciences*, 12(11), 830. <https://doi.org/10.3390/educsci12110830>
- Rambuda, M. C. (2023). Challenges faced by curriculum advisors when offering curriculum support to schools in rural South Africa. *International Journal of Research in Business and Social Science*, 12(5), 354-361. <https://doi.org/10.20525/ijrbs.v12i5.2582>
- Robinson, C.D., (2022). A framework for motivating teacher-student relationships. *Educational Psychology Review*, 34(4), 2061-2094. <https://doi.org/10.1007/s10648-022-09706-0>
- Ross, P. M., Scanes, E., & Locke, W. (2023). Stress adaptation and resilience of academics in higher education. *Asia Pacific Education Review*, 1-21. <https://doi.org/10.1007/s12564-023-09829-1>
- Sachdeva, V. (2023). NEP 2020: emphasising experiential learning and inquiry-based approaches in higher education. *International Journal of Applied Research*, 9(6), 179-184. <https://doi.org/10.22271/allresearch.2023.v9.i6c.10938>

- Sebola, M. P. (2023). South Africa's public higher education institutions, university research outputs, and contribution to national human capital. *Human Resource Development International*, 26(2), 217-231. <https://doi.org/10.1080/13678868.2022.2047147>
- Shava, E., (2022). Reinforcing the role of ICT in enhancing teaching and learning post-COVID-19 in tertiary institutions in South Africa. *Journal of Culture and Values in Education*, 5(1), 78-91. <https://doi.org/10.46303/jcve.2022.7>
- Sheikh, A., & Richardson, J. (2023). Open access movement in the scholarly world: Pathways for libraries in developing countries. *Journal of Information Science*, 01655515231202758. <https://doi.org/10.1177/01655515231202758>
- Sieber, S.D., (1974). Toward a theory of role accumulation. *American sociological review*, 567-578.
- Solomon, M.R., Surprenant, C., Czepiel, J.A., & Gutman, E.G. (1985). A role theory perspective on dyadic interactions: the service encounter. *Journal of marketing*, 49(1), 99-111. <https://doi.org/10.1177/002224298504900110>
- Tetnowski, J., (2015). Qualitative case study research design. *Perspectives on fluency and fluency disorders*, 25(1), 39-45. <https://doi.org/10.1044/ffd25.1.39>
- Tomlinson, A., Simpson, A., & Killingback, C., (2023). Student expectations of teaching and learning when starting university: a systematic review. *Journal of Further and Higher Education*, 1-20. <https://doi.org/10.1080/0309877X.2023.2212242>
- Vabø, A., & Schmidt, E.K., (2023). Emerging geopolitical barriers to the realisation of international policies for collaboration in higher education and research: The case of Scandinavia. *Annual Review of Comparative and International Education*, 2022, 163-181. <https://doi.org/10.1108/S1479-36792023000046B010>
- Véliz, D., Bernasconi, A., Celis, S., Mella, M., & Miranda, C. (2023). Pathways to the creation of research capacities in Universities in developing countries: perspectives from a literature review. *Journal of Higher Education Policy and Management*, 1-17. <https://doi.org/10.1080/1360080X.2023.2211317>
- Vishnoi, M.V., & Pandey, M., (2023). A review analysis of workplace stress and its impact on college teachers. *Boletín de Literatura Oral-Tradition Oral Literature*, 10(1), 2320-2334.
- Walker, S.G. *Role theory and foreign policy analysis*. United States. Wilson, T. P., (2017). Normative and interpretive paradigms in sociology. In *Everyday Life* (57-79). Routledge.
- Yuan, R., Lee, I., De Costa, P.I., Yang, M., & Liu, S., (2022). TESOL teacher educators in higher education: A review of studies from 2010 to 2020. *Language Teaching*, 1-36. <https://doi.org/10.1017/S0261444822000209>

Disclaimer: The views, perspectives, information, and data contained within all publications are exclusively those of the respective author(s) and contributor(s) and do not represent or reflect the positions of ERRCD Forum and/or its editor(s). ERRCD Forum and its editor(s) expressly disclaim responsibility for any damages to persons or property arising from any ideas, methods, instructions, or products referenced in the content.