

Chapter # 17

REFRAMING SUBJECT ADVISORS' PROFESSIONAL ROLES AS CATALYSTS FOR SUSTAINABLE LIFE SCIENCES EDUCATION

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ABSTRACT

This chapter examines how partnerships between universities and Life Sciences subject advisors can foster sustainable teacher professional development in rural South African contexts, aligned with Sustainable Development Goal 4. Drawing on Sociocultural Theory, the study explores how subject advisors mediated learning, negotiated authority, and demonstrated resilience during a collaborative professional development initiative with university facilitators. A qualitative multiple case study design was employed, involving two subject advisors from Northern KwaZulu-Natal who participated in a series of university-facilitated workshops. Data was generated through semi-structured interviews, questionnaires, reflective journals, and observations, and analysed thematically through constant comparison and triangulation. Findings reveal that Life Sciences subject advisors' roles evolved from administrative oversight to collaborative mediation, enabling richer teacher engagement and contextualised curriculum support. However, structural constraints such as workload, limited resources, and lack of policy recognition impeded sustained participation. The chapter argues that sustainable teacher professional development requires reframing subject advisors' roles as pedagogical partners and knowledge brokers. It concludes that intentional, interactive partnerships between universities and education departments are vital for achieving the inclusive and equitable quality education envisioned by SDG 4.

Keywords: subject advisors, sociocultural theory, professional development, sustainable development goal 4, life sciences education, rural South Africa.

1. INTRODUCTION

The pursuit of equitable and quality education has taken center stage globally, reflected in the United Nations' Sustainable Development Goal 4 (SDG 4), which calls for inclusive and equitable quality education as well as lifelong learning opportunities for all (United Nations, 2015). Within the South African context, achieving this vision remains deeply intertwined with efforts to strengthen teacher professional development (PD), especially in rural schools where resource constraints, linguistic diversity, and cultural dynamics shape educational realities (Spaull & Jansen, 2019). On the other hand, Life Sciences as one of the gates keeping subjects to elite careers seeks to cultivate inquiry, reasoning, and problem-solving, is particularly challenged by the legacy of teacher under-preparedness, low learner achievement, as well as inadequate support structures (Xaba & Sondlo, 2022; Mavhunga, 2020).

Over the past decade, universities have increasingly sought to act as catalysts for sustainable change through community engagement and knowledge exchange with the school system (Boughey, 2024). This chapter emerges from a university-led initiative in KwaZulu-Natal that explored collaborative professional learning with Life Sciences teachers,

subject advisors, and higher education partners. The initiative aimed to enhance pedagogical content knowledge, integrate Indigenous Knowledge Systems (IKS), and foster professional resilience among teachers in rural schools. Grounded in a sociocultural perspective, the study recognises that teacher development does not occur in isolation but through meaningful participation in socially mediated activities (Eun, 2023; Johnson & Golombek, 2011).

This collaborative orientation is essential for addressing the persistent PD gap that undermines the realisation of SDG 4 in rural contexts. Subject advisors which are often viewed as bureaucratic intermediaries between the Department of Basic Education (DBE) and schools, play a crucial but under-examined role in mediating professional learning (Xaba, 2025). When reconceptualised as facilitators of dialogue and reflective practice, the study proposes that their role can evolve from administrative supervision to pedagogical mentorship that empowers teachers to become agents of curriculum transformation (Obi & Ticha, 2020; Xaba, 2025). Such a shift aligns with contemporary understandings of teacher professional learning as a situated, and socially mediated process (Eun, 2023; Shabani, 2016). Thus, this chapter addresses the following guiding research questions:

- How do subject advisors experience their professional roles in supporting teacher development in rural contexts?
- How can partnerships between universities and subject advisors foster sustainable teacher professional development aligned with SDG 4 (Quality Education)?

To address these questions, the study adopted a multiple case study design involving two Life Sciences subject advisors from two different districts in Northern Kwa-Zulu Natal who collaborated with university lecturers in a rural university–district professional development project. Data was collected through semi-structured interviews, reflective focus group interviews and questionnaires.

By linking the findings to issues of teacher professional identity, contextual constraints, and rural education development, this chapter contributes to the discourse on sustainable teacher professional learning in the Global South. In doing so, it reframes the subject advisor's role not only as a functional position but as a transformative agent in achieving SDG 4 through collaborative, context-sensitive professional development.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Literature Review: The Role of Subject Advisors in Professional Development

Subject advisors are central actors in the educational ecosystem of the Global South, yet their professional roles are often misunderstood or underutilised (Obi & Ticha, 2020). In South Africa, subject advisors serve as intermediaries between the DBE and schools, tasked with providing curriculum support, monitoring, and professional guidance to teachers (Xaba, 2025). However, systemic pressures, administrative burdens, and lack of continuous professional learning opportunities often constrain their effectiveness (de Beer, 2021; Sithole & Tachie, 2024; Van der Westhuizen & de Beer, 2021).

Emerging literature suggests that when subject advisors are empowered to act as facilitators of professional learning rather than inspectors of compliance, they contribute significantly to teachers' growth and confidence (Mutemeri, 2023). Within the sociocultural lens, subject advisors' interactions with teachers become mediational spaces where shared meaning-making unfolds. For example, collaborative lesson planning and reflective dialogue sessions can promote the internalisation of new pedagogical concepts while respecting teachers' experiential knowledge (Johnson & Golombek, 2011).

In rural contexts, subject advisors can also play a vital role in addressing the epistemic divide between Western scientific knowledge and IKS. By validating teachers' cultural resources, they help bridge the gap between local realities and formal curriculum expectations (Maphosa & Jita, 2020). This orientation supports both cognitive and affective dimensions of teacher development, contributing to the holistic professional growth that SDG 4 envisions.

2.2. Theoretical Framework: Sociocultural Perspectives on Teacher Learning

This study is underpinned by SCT, which views learning and development as fundamentally social and mediated by cultural tools, language, and interaction (Vygotsky, 1978). Within PD contexts, SCT foregrounds the idea that teachers and advisors learn through participation in shared activities, dialogue, and reflection rather than through transmission of knowledge (Johnson & Golombek, 2011). From this perspective, the collaborative teacher PD workshops examined in this study functioned as activity systems where Life Sciences subject advisors, lecturers, and teachers engaged in meaning-making through social exchange. The concept of mediation is central here, because the Life Sciences subject advisors acted as mediators between institutional expectations and classroom realities, facilitating communication and co-construction of pedagogical understanding.

Furthermore, SCT's notion of internalisation provides a useful lens for understanding how professional practices introduced during the workshops became embedded in the Life Sciences advisors' ongoing work. Through repeated interaction, it was envisioned that the Life Sciences advisors would develop new conceptual tools such as reflective dialogue, co-facilitation, and pedagogical scaffolding that will enable them to redefine their professional roles. This vision emanated from Shabani's (2016) argument that sociocultural approaches to PD has the potential of cultivating transformative learning through collaboration and guided participation.

By combining SCT with the sustainability principles of SDG4, this study frames PD as a dynamic, relational, and contextually grounded process. The integration of these frameworks highlights that sustainable educational change arises when professional growth is socially mediated, culturally responsive, and institutionally supported.

3. METHODOLOGY

To respond to the guiding research questions, the study adopted a qualitative approach situated within an interpretivist paradigm, which holds that social reality is constructed through meanings that people ascribe to their experiences (Creswell & Poth, 2018). The interpretivist stance is congruent with the chapter's theoretical framing in SCT, which emphasises that professional learning is mediated through interaction, language and participation.

A multiple case study design (Yin, 2018) was employed to enable contextualised, in-depth exploration of two Life Sciences subject advisors who participated in a university-school professional development initiative in Northern KwaZulu-Natal. The multiple case approach facilitated comparative analysis of how contextual factors (for example, district performance, workload and access to resources) shaped each subject advisor's enactment of role and partnership practices.

Two Life Sciences subject advisors were selected through purposive and convenience sampling. Purposive selection ensured that participants held official advisory roles and had substantive involvement in the PD initiative, thereby maximising information richness relative to the research questions. Convenience sampling reflected pragmatic considerations

of access and ongoing collaboration within the project (Creswell & Poth, 2018). The project spanned from 2023 to 2024. Table 1 summarises the advisors' demographic and professional profiles.

Table 1.
Demographic information of participating Life Sciences subject advisors.

Attribute	Subject Advisor 1	Subject Advisor 2
Highest qualification	Master's degree	Pursuing PhD
Years of experience	8 years	14 years
Number of schools overseen	45	50
District performance	High-performing district	Lowest-performing district

Data collection combined multiple qualitative instruments to illuminate the advisors' lived experiences and the dynamics of university–advisor partnerships. Each Life Science subject advisor participated in a one-hour semi-structured interview that explored their perceptions of role, experiences of collaboration with university facilitators, examples of support offered to teachers, and perceived enablers and barriers to sustaining professional learning. Semi-structured interview prompts were designed to align directly with the two guiding research questions.

At the end of the first year of the project, the two subject advisors completed a short structured descriptive rating scale designed to support qualitative comparison rather than statistical analysis. The instrument consisted of six role-related indicators, namely attendance, co-facilitation, support to teachers, resource provision, content contribution, and teacher motivation. Each indicator was rated on a 0–5 scale, where 0 indicated no involvement and 5 indicated full involvement. Given the small sample, these ratings were not treated as survey data but were used as analytic heuristics to complement the semi-structured interview narratives and observational evidence. This approach enabled systematic cross-case comparison of how each Life Sciences subject advisor enacted their role within the partnership, while remaining consistent with the interpretivist orientation of the study and its emphasis on meaning, context, and experience rather than measurement or generalisation.

Semi-structured interview transcripts, questionnaires, observational data and university lecture reflective journals were analysed using thematic analysis (Braun & Clarke, 2006). Analysis proceeded iteratively through familiarisation, coding, theme development, and refinement. Codes were developed inductively from participants' accounts but interpreted deductively through the lens of SCT (mediation, internalization and community participation to mention a few).

The university–district PD workshops were designed to strengthen both pedagogical and practical competencies in Life Sciences teaching within rural contexts. Workshop sessions focused on improving the teaching of practical work, including the development of scientific process skills, formulation of practical-based assessment questions, laboratory safety procedures, and strategies for improvising resources in under-resourced school settings as earlier mentioned in the chapter. In addition, sessions addressed pedagogical content knowledge by engaging teachers and subject advisors in collaborative lesson planning, discussion of common learner misconceptions, and alignment of curriculum content with assessment requirements. These activities were deliberately structured to enable subject advisors to mediate between university-based expertise and classroom realities, positioning

them as active participants in meaning-making rather than passive recipients of training. The workshop content therefore provided a concrete context through which subject advisors enacted, reflected on, and reframed their professional roles within the collaborative partnership.

Cross-source triangulation was used to confirm emergent themes and to ensure that interpretations answered the research questions about advisors' experiences and the ways that university–advisor partnerships contributed to sustainable professional development. Ethical clearance was obtained from the appropriate institutional review board. Participants provided written informed consent; anonymity was protected through pseudonyms and secure storage of data. To strengthen trustworthiness, the study employed multiple strategies: triangulation of data sources, member checking of key thematic summaries with participants, maintenance of an audit trail of analytical decisions, and researcher reflexivity documented in memos. These procedures supported credibility, dependability, and confirmability of the findings (Creswell & Poth, 2018; Yin, 2018).

4. RESULT AND FINDINGS

The analysis of data generated from the multiple data sources such as questionnaires, semi-structured interviews, observations and university lecture reflective journals produced three interrelated themes: (1) Mediation and the Reframing of Professional Roles, (2) Collaborative Meaning-Making as Professional Learning, and (3) Resilience and Sustainability in Rural Teacher Development. These themes emerged through a process of constant comparison and triangulation across data sources. They are discussed below in relation to the theoretical framing informed by Sociocultural Theory (Vygotsky, 1978) and Sustainable Development Goal 4 (SDG 4), which calls for inclusive, equitable, and quality education for all (UNESCO, 2023).

Table 2.
Overview of Data Triangulation.

Data Source	Analytical Focus	Emergent Theme(s)	Exemplifying Excerpt
Questionnaire (Subject Advisors, n=2)	Reflections on professional identity and collaboration	Mediation and reframing of roles	<i>“Support means learning together, not inspecting.”</i>
Semi-structured Interviews, o and journal (University partners)	Observation of shifts in advisor-teacher dynamics	Collaborative meaning- making and sustainable partnerships	<i>“Advisors began initiating dialogues about pedagogy rather than compliance.”</i>
Observation	Evidence of continuing engagement beyond formal training	Resilience and sustainability	<i>“We started WhatsApp groups to discuss upcoming lessons.... ”</i>

Theme 1: Mediation and the Reframing of Professional Roles

The first theme illustrates how the advisors' participation in the collaborative workshops encouraged a shift from viewing themselves as administrative monitors to recognising their potential as learning mediators. Both advisors acknowledged that their

professional roles had been historically framed around compliance and monitoring rather than co-learning. However, Subject Advisor 1, who engaged more consistently in the workshops, described a growing appreciation for learning “*alongside teachers*” rather than merely evaluating them. In an interview, he reflected:

I realised that supporting teachers goes beyond checking their work schedules. It means being part of the process—helping them understand concepts and not just expecting results.

Observational data supported this reflection, showing that during practical sessions, Advisor 1 often co-facilitated discussions on safety precautions, improvised resources, and question formulation, mediating teachers' understanding through guided questioning. The questionnaire data reinforced this pattern, showing Advisor 1's relatively higher ratings in attendance (4/5), co-facilitation (3/5), and support to teachers (5/5) compared to Advisor 2, who scored lower due to limited participation.

While Subject Advisor 2 demonstrated lower levels of visible engagement in the collaborative workshops, the data suggests that this limited participation was shaped primarily by structural and contextual constraints rather than a lack of professional commitment. Interviews and field notes indicated that Advisor 2 was responsible for a larger number of schools within a low-performing district, which required extensive administrative oversight, frequent crisis management, and sustained compliance-related responsibilities. These demands constrained his capacity to remain for full workshop sessions or to engage in co-facilitation activities. In this sense, Advisor 2's experience illustrates how institutional workloads and district-level performance pressures can restrict opportunities for subject advisors to enact developmental and mediational roles, even when they recognise the value of collaborative professional learning. This finding stresses a key tension within rural education systems, where subject advisors are positioned as agents of instructional improvement but are simultaneously overburdened by managerial expectations that limit sustained pedagogical engagement.

Through the lens of SCT, this reframing of role reflects mediation which is the process by which individuals construct meaning and internalise new practices through socially situated activity (Vygotsky, 1978; Shabani, 2016). By engaging in collaborative inquiry with teachers and university facilitators, the more active advisor transformed his professional identity from oversight to participation. The data reveal that mediation occurred not only between teachers and facilitators but also within the evolving identity of the advisor himself.

Theme 2: Collaborative Meaning-Making and Sustainable Partnerships The second theme revealed that partnerships between university Life Sciences lecturers and subject advisors fostered collective learning environments characterised by shared authorship, mutual respect, and dialogic engagement. Rather than occupying a peripheral or supervisory role, subject advisors experienced themselves as active contributors to knowledge production within the professional development process. Advisors explicitly noted a shift in how their expertise was recognised and valued, as illustrated below:

For once, we were asked what we thought before being told what to do...

University lecturers' reflections corroborated this perception, acknowledging that advisor contributions disrupted deficit-oriented assumptions about rural classrooms and enriched their own understandings of contextual realities:

The advisors' insights challenged our assumptions about rural classroom realities.

These reciprocal interactions cultivated a community of practice (Wenger, 1998) in which theoretical knowledge from the university and contextual knowledge from the field were brought into productive dialogue. Within this space, subject advisors engaged critically with pedagogical concepts rather than merely transmitting policy directives, enabling deeper professional learning and shared meaning-making. Such collaborative engagement aligns with the transformative intent of SDG4, which emphasises inclusive, locally grounded, and culturally relevant approaches to educational development (Maphosa & Jita, 2020; UNESCO, 2023). Importantly, the partnership signalled a shift from hierarchical, top-down models of PD toward dialogic and social forms of learning. This shift resonates with Eun's (2023) sociocultural interpretation of PD, where learning is co-constructed through language, reflection, and shared inquiry. As the PD progressed, the Life Sciences subject advisors increasingly assumed facilitative roles within teacher learning communities, initiating discussions and supporting peer reflection independently. This emerging capacity suggests that professional learning was not only collaborative but also becoming self-sustaining beyond the formal intervention

Theme 3: Resilience as a Pillar of Sustainable Development in Professional Learning

Resilience emerged as a collective phenomenon rather than an individual trait. Despite persistent infrastructural and systemic challenges which included limited resources, erratic connectivity, and geographical distance, Life Sciences subject advisors sustained their engagement through creative and self-initiated strategies. During a semi-structured interviews session, advisors described how they established WhatsApp support groups and peer study circles to maintain professional dialogue beyond formal sessions, thereby enacting SDG 4's vision of lifelong learning under conditions of adversity (United Nations, 2015).

One advisor reflected:

When sessions ended, we opened a WhatsApp group to discuss upcoming lessons... even if it meant using our personal data...

These practices illustrate the internalisation of agency (Shabani, 2016), whereby mediated professional learning experiences were transformed into self-directed and collectively sustained practices. Rather than withdrawing in the face of constraint, advisors mobilised available social and digital resources to support continued learning. Reflective journals further highlighted the affective dimensions of resilience, with one facilitator observing:

Their optimism and sense of purpose were contagious... they turned challenges into opportunities for innovation.

At the same time, advisors articulated frustration with institutional rigidity or structural stagnations, particularly the absence of policy mechanisms to recognise and reward their expanded developmental roles. Participants noted that while they were expected to support teacher learning and curriculum implementation, these contributions often remained institutionally invisible. Such silences, as Van der Westhuizen and de Beer (2021) argue, frequently undermine the sustainability of professional learning initiatives in rural South African contexts. These findings suggest that while resilience can be collectively cultivated through relational and agentic practices, its long-term sustainability depends on institutional frameworks that legitimate, recognise, and resource relational forms of professional development.

5. FUTURE RESEARCH DIRECTIONS

Future research should deepen understanding of how subject advisors' professional trajectories evolve within sustained partnerships and across diverse disciplinary contexts. Longitudinal ethnographic studies could trace how advisors' identities, beliefs, and practices shift as they participate in university-led interventions over time. Comparative research across provinces may also reveal contextual nuances in how policy environments and institutional support systems shape advisory practices. Further, mixed-method investigations could integrate network analysis to map the relational dynamics among universities, subject advisors, and teachers, providing empirical insight into how knowledge flows within such ecosystems. Examining how digital platforms can mediate collaborative learning in remote contexts, particularly under resource constraints would potentially extend the relevance of this work to broader educational transformation efforts across the Global South.

Finally, a critical area for future exploration involves reimagining the PD frameworks that underpin subject advisory roles. Research should interrogate how professional standards, accountability measures, and performance indicators can be restructured to value reflective practice, mentorship, and dialogical engagement as core elements of sustainable teacher development aligned with SDG 4. Together, these avenues could extend the knowledge base on how advisory practices can be leveraged as catalysts for both professional resilience and systemic sustainability in science education across resource-constrained contexts.

The findings point to the need for policy frameworks that formally recognise and support the developmental role of subject advisors within collaborative professional learning initiatives. At present, advisors' engagement in pedagogical mediation remains largely dependent on individual commitment rather than institutional design. To enhance sustainability, education departments could explicitly define subject advisors' responsibilities to include co-facilitation, curriculum mediation, and sustained teacher support within PD programmes. Such role clarification should be accompanied by workload adjustments, recognition mechanisms, and time allocations that enable advisors to participate meaningfully in collaborative initiatives without compromising their administrative obligations. In addition, structured partnerships between universities and education departments could be institutionalised through formal agreements that outline shared responsibilities, communication structures, and cycles of joint reflection. These measures would enable subject advisors to function as mediators of professional learning rather than peripheral administrators, thereby strengthening systemic capacity for sustainable teacher development in alignment with the equity and lifelong learning aspirations of Sustainable Development Goal 4.

6. CONCLUSION/DISCUSSION

The findings of this study reveal the multifaceted and evolving role of subject advisors within university-school partnerships, particularly in rural and under-resourced South African contexts. Drawing on Sociocultural Theory (Vygotsky, 1978; Shabani, 2016), the analysis revealed that the professional identities of Life Sciences subject advisors are shaped through mediated collaboration and reflective practice rather than mere administrative compliance. Their interactions within the professional learning communities became sites of

co-construction of meaning, enabling them to transition from oversight agents to learning partners. This transformation resonates with Johnson and Golombek's (2011) assertion that teacher learning is inherently social and dialogic, emerging from engagement within communities of practice. The Life Sciences subject advisors' gradual repositioning suggests that sustainable teacher development depends on creating dialogical spaces where hierarchical relations are re-negotiated. In such spaces, university facilitators, teachers, and advisors collectively contribute to pedagogical renewal, rather than reinforcing one-way models of capacity building (Eun, 2023). However, the study also highlights systemic barriers that constrain the actualisation of SDG 4's goals of inclusive and equitable quality education. Structural limitations such as inadequate staffing, extensive geographical coverage, and fragmented communication between universities and provincial departments often restrict subject advisors' potential to act as mediators of sustainable professional learning. These conditions reproduce what Van der Westhuizen and de Beer (2021) describe as "systemic inertia" in rural education systems, where innovative initiatives risk remaining episodic rather than embedded.

Critically, the study stresses that sustainability in professional development must be understood not only as programmatic continuity but as social and epistemic resilience. The Life Sciences advisors' sustained engagement, even amid logistical challenges, reflects the internalisation of professional agency, a key sociocultural mechanism for enduring transformation (Shabani, 2016). Thus, aligning SDG 4 with sociocultural mediation offers a novel lens through which to conceptualise teacher learning as an evolving and collective enterprise. This chapter has demonstrated that the professional role of subject advisors in rural South African contexts is not static but socially constructed through interaction, mediation, and reflection. Through collaborative engagement with universities and teachers, subject advisors can become pivotal agents in enacting SDG 4's vision of equitable and quality education for all. However, realising this potential requires intentional capacity-building strategies that move beyond administrative oversight toward relational, context-sensitive professional learning.

By situating the study within a sociocultural theoretical framework, the research has provided a nuanced understanding of how professional learning emerges from mediated social exchanges. The findings emphasise that sustainability in teacher professional development depends on cultivating environments that nurture dialogue, reciprocity, and shared ownership of knowledge. Strengthening partnerships between universities and departments of education therefore offers a promising pathway toward systemic transformation and enduring educational resilience in resource-constrained settings. In essence, this study reaffirms that achieving SDG 4 is contingent upon recognising and empowering and investing in human agents, for example subject advisors, teachers, and facilitators, who collectively shape the quality and sustainability of educational practice in South Africa and beyond.

Beyond strengthening pedagogical practice, the reframing of subject advisors' roles also holds potential for advancing broader equity goals embedded within Sustainable Development Goal 4. By mediating curriculum implementation and professional learning, subject advisors are positioned to support more inclusive teaching practices, including sensitivity to gendered participation patterns in science classrooms and responsiveness to learners with diverse educational needs. While this study did not empirically examine gender equity or special educational needs, the collaborative model foregrounds relational support and contextual responsiveness as foundational principles for inclusive education. In this sense, subject advisors' mediational roles extend beyond content and pedagogy to encompass ethical commitments to equity, inclusion, and social justice within rural schooling contexts.

It is important to declare that this chapter limitation is that it was based on an in-depth qualitative case study of two Life Sciences subject advisors working in rural districts of Northern KwaZulu-Natal and is intended to offer contextually grounded insights rather than generalisable claims across all educational settings.

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