

Reimagining the Physics Laboratory: An Autobiographical Journey From Natural Science to Curriculum Studies

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Abstract — This autobiographical study examines my movement from laboratory-based physics into curriculum studies, science education, and educational leadership in Tanzania and Canada. The study probes what influenced this intellectual and professional shift and what the shift means for pedagogy. I used an interpretive autobiographical approach, drawing on remembered educational and career experiences and two curriculum vitae as documentary records. I organised a chronological account, identified turning points, compared recurring meanings across memories and documents, and refined five themes through reflexive thematic analysis. The themes show that my journey was shaped by gendered participation in physics, persistence and changing understandings of scientific identity, the relationship between mothering and academic life, a commitment to challenge institutionalized gender norms through curriculum and pedagogy, and a progression of leadership responsibilities that transformed curriculum studies into public practice. The account suggests that moving from natural science to curriculum studies was not an abandonment of physics. Rather, it widened the questions I could ask from the properties of materials in a laboratory to the social and pedagogical conditions under which girls and women participate in science. The paper contributes a Tanzanian woman's first-person account of STEM persistence, disciplinary transition, and curriculum leadership, while acknowledging the selective and situated character of autobiographical knowledge.

Keywords: autobiography, curriculum studies, gender, physics education, Tanzania, women in STEM.

Introduction and Background

The physics laboratory has been one of the defining places in my intellectual life. It taught me to observe carefully, work patiently, test explanations, and respect evidence. Yet my career gradually led me beyond the laboratory bench. As a secondary-school teacher, curriculum developer, researcher, university educator, and education leader, I became increasingly concerned not only with how physical phenomena are investigated, but also with who is welcomed into science, whose knowledge is recognized, and how curriculum and pedagogy shape participation. This paper revisits that movement as an autobiographical journey from natural science to curriculum studies.

The journey is situated in Tanzania, where gendered expectations, unequal access to strong foundations in mathematics and science, limited role models, and institutional conditions have influenced girls' and women's participation in science. Masanja (2010) argues that

increasing women's participation in science, mathematics, and technology in Africa requires attention to education, employment, policy, and the social conditions that shape opportunity. Tanzanian scholarship has likewise shown that gender differences in science participation cannot be explained as differences in ability alone; they are connected to schooling, expectations, resources, and teachers' responses to learners (Kapinga, 2010; Kihwele et al., 2025; Massao et al., 2024; Mushi, 1996). My own history gives these broad concerns a personal and professional form.

Statement to the Problem

I entered the University of Dar es Salaam to study Science with Education, majoring in physics and mathematics. In the physics class that completed the programme in 1993, there were 32 students, seven of whom were women; I was the only woman in that group who graduated. I performed more strongly in physics than in mathematics, and this encouraged me to remain in the field despite the small number of

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women around me. I later completed a Master of Science in Physics, with research on the optical and electrical properties of sputtered zinc oxide films. That work confirmed that I could participate in advanced physics, but it did not remove the social experience of being a woman in a male-dominated discipline.

After teaching physics and mathematics at advanced-level secondary school from 1993, I joined the Tanzania Institute of Education in 2000. My responsibilities moved through monitoring and evaluation, teacher resource centres, curriculum design and development, research and publications, programme coordination, and senior academic leadership. These roles required me to think across classrooms, teacher education, materials, assessment, policy, and institutional management. Later doctoral study in Curriculum Studies at the University of British Columbia, together with teaching, research, laboratory-support, writing-consultation, and school-practicum roles there, gave me language for questions that had already emerged from practice. I came to see that the laboratory is not socially neutral: access, confidence, language, instructional design, assessment, technology, and mentorship all shape what becomes possible within it.

This paper therefore does not present my career as a simple departure from physics. It examines a widening of focus. Physics trained me to investigate the material world; curriculum studies enabled me to investigate the educational and social arrangements through which scientific knowledge is taught, valued, and made available. The purpose is to understand the factors that influenced this shift and to consider its implications for educators' pedagogical practice, especially in relation to girls and women in STEM.

Research Questions

The study addresses two questions:

1. What factors influenced my shift from laboratory-based physics research to social-science-based curriculum studies?
2. What implications does this shift have for educators' pedagogical practices?

Conceptual Framework

The study is guided by critical conscientization and transformative learning. Freire (1970) understands education as a practice through which people learn to read both the word and the world. Conscientization involves recognizing social conditions, questioning what has been treated as natural, and linking reflection with action (Salinas et al., 2023). For this study, the framework helps me examine how gendered expectations in science were experienced personally and how those experiences later informed curriculum work, teacher education, and leadership.

Mezirow's (1991) account of transformative learning complements this orientation by emphasizing critical reflection on assumptions and frames of reference (see also Kastner & Motschilnig, 2022). A professional transition is not only a change of job title or disciplinary label. It may involve revising what counts as a worthwhile problem, what counts as evidence, and what responsibilities accompany knowledge. My movement into curriculum studies required such revision. I retained the habits of careful inquiry developed in physics, but I learned to take experience, culture, pedagogy, language, power, and institutional history seriously as part of educational knowledge.

Together, these ideas frame autobiography as more than recollection. Reflection becomes a way to recognize how individual agency and institutional structures intersect. It also directs the analysis towards praxis: the question is not simply what happened to me, but how a re-reading of that history can support more inclusive science education.

Methodology

Research Design

I used an interpretive autobiographical design. Autobiographical research treats a life account as situated knowledge produced through memory, narrative, and interpretation rather than as a neutral record of the past (Abrahão, 2012). Interpretive biography similarly attends to turning points and to the relationship between personal experience and the social world (Denzin, 1989). Autoethnographic scholarship further emphasizes that writing the self can illuminate cultural and institutional processes when personal experience is analysed rather than merely reported (Adams et al., 2015).

This design was appropriate because the research questions concern an intellectual and professional transition that unfolded over many years. The study does not claim that one life represents all Tanzanian women in physics or all educators who change fields. Instead, it uses one situated trajectory to examine the interplay of gender, disciplinary identity, family responsibility, pedagogy, curriculum work, and educational leadership.

Sources of Autobiographical Evidence

The evidence consisted of two connected forms. The first was my written recollection of educational and professional experiences, including undergraduate study in physics and mathematics, postgraduate laboratory research, secondary-school teaching, curriculum development, doctoral study, university teaching and research, and leadership at the Tanzania Institute of Education. The second was documentary evidence contained in two versions of my curriculum vitae. The documents were used to check institutional affiliations, qualifications, dates, roles, publications, training, and the sequence of leadership responsibilities.

The curriculum vitae were not treated as independent measures of achievement. They are professional documents prepared for particular purposes and therefore emphasize some experiences while omitting others. Their value in this study was chronological and corroborative: they helped prevent the narrative from drifting away from recorded career events. Where documents differed in wording or timing, I used only details that could be stated without forcing a false precision. The analysis did not include interviews, invented dialogue, classroom observations, pupil results, or accounts from other participants.

Analytic Process

Analysis proceeded in four stages. First, I constructed a broad chronology of education, employment, research, teaching, curriculum work, and leadership. Second, I marked turning points: remaining in physics when few women were present, moving from school teaching into curriculum development work, undertaking doctoral study in curriculum studies, participating in university teaching and research across disciplinary settings, and assuming progressively wider leadership responsibilities. Third, I compared the meanings that recurred across the narrative and the professional record. These included gendered visibility, persistence, relational responsibility, inclusive teaching, institutional change, and leadership. Fourth, I reviewed and merged overlapping ideas until five themes provided a coherent answer to the research questions.

The five themes were not frequency counts and were not generated by software. They were interpretive patterns developed through repeated reading, chronological comparison, and reflexive questioning. For each theme, I asked: What experience or documented role supports this interpretation? How did it influence the move towards curriculum studies? What pedagogical or institutional implication follows? This procedure kept the themes aligned with the purpose of the study while allowing them to remain connected to the texture of a life history.

Reflexivity and Trustworthiness

Because I am both the researcher and the subject, interpretation cannot be separated from my present position as a curriculum professional and education leader. I now understand earlier experiences through concepts that were not always available to me at the time. Reflexivity therefore required me to distinguish between recorded events and the meanings I assign to them now. The curriculum vitae provided a check on sequence and responsibility, while the first-person narrative preserved the experiential meaning that a professional record cannot contain.

I strengthened credibility by retaining concrete details when they were supported, avoiding reconstructed quotations, and acknowledging inconsistencies or absences rather than filling them imaginatively. I also looked for continuity as well as change. The shift to curriculum studies

did not erase my identity as a physicist; it redirected that identity towards questions of teaching, participation, and institutional practice. This attention to both continuity and disruption helped guard against presenting the career as a neat success story constructed only in hindsight.

Ethical Considerations

The study is a self-study based on my own account and professional documents; it does not enrol human participants or report data collected from pupils, teachers, colleagues, or family members. Nevertheless, autobiography is relational. A life is lived among other people, and careless narration can expose them without consent. I therefore omitted names and identifying details of third parties unless they were already necessary public professional information. I did not attribute motives, speech, or private experiences to others.

A second ethical responsibility concerned representation. I resisted describing my experience as the experience of all Tanzanian women. The account is offered as one perspective shaped by place, education, institutional opportunity, gender, and professional responsibility. Its value lies in analytic particularity rather than statistical representation.

Findings from Autobiographical Reflection

Five interconnected themes explain the transition from laboratory physics to curriculum studies and its pedagogical meaning. The themes are presented analytically rather than as isolated periods; each developed across more than one stage of my life.

Gendered Entry into Physics and the Work of Belonging

My entry into higher education made gender visible. In the 1993 graduating physics group, I was the only woman graduate among 32 students, although seven women had been in the class. I did not interpret this as evidence that women could not study physics. My own performance, especially my stronger results in physics, contradicted that assumption. At the same time, being one of very few women meant that achievement could not be experienced as ordinary. I had to imagine a place for myself in a field in which men were the visible majority.

The gendered character of participation extended beyond numbers. Occupational stereotypes often presented caring and service work as suitable for women while positioning physics and technology as masculine domains (Deiglmayr et al., 2019). Such messages can influence confidence before learners reach university. Tanzanian research has documented how social expectations, school conditions, and teachers' perceptions shape gendered participation and performance in science (Kapinga, 2010; Mushi, 1996). My experience gives personal weight to that literature: the problem was not the intellectual content of physics itself, but the social meanings surrounding who was expected to master it.

Completing a Master of Science in Physics and conducting laboratory research on sputtered zinc oxide films deepened my scientific identity. Yet it also showed me that formal access does not automatically produce full intellectual belonging. A woman may enter a programme, complete demanding work, and still feel that her contribution is marginal (Bloodhart et al., 2020). This distinction between access and belonging later became important in curriculum studies. An inclusive curriculum must do more than admit girls to science courses. It must create conditions in which they can participate, make mistakes, ask questions, use equipment, and be recognized as producers of scientific knowledge (Dou & Cian, 2022).

This theme influenced my disciplinary shift because it moved gender from the edge of my thinking to the centre of an educational question. I began to ask why apparently neutral structures produce unequal experiences. Physics provided the setting; curriculum studies provided concepts and methods for examining the setting.

Persistence, Scientific Identity, and an Expanding Idea of Research

Persistence was necessary, but persistence alone does not explain the journey. I continued in physics because I was interested in the subject and because successful performance gave me confidence. Laboratory research demanded precision, patience, and willingness to repeat procedures. These habits remained part of my professional identity when I moved into education. The transition to curriculum studies was therefore not a rejection of scientific rigour; it was an expansion of what I understood a researchable problem to be.

Teaching physics and mathematics at secondary-school level from 1993 to 2000 was a decisive bridge. In a laboratory, I could focus closely on materials and measurement. In a classroom, I also had to attend to learners' prior knowledge, language, confidence, participation, and response to instruction. The teacher cannot assume that a correct explanation automatically becomes meaningful learning. This practical lesson opened a space between knowing physics and knowing how physics becomes teachable.

My work at the Tanzania Institute of Education widened that space. Curriculum development required consideration of aims, content progression, teacher guidance, learning materials, assessment, resources, and national priorities. Professional training in competence-based curriculum, governance, management, and curriculum design further supported this change in perspective. Curriculum questions were no less rigorous than laboratory questions; they required a different form of rigour, one attentive to context and consequence.

Doctoral study in Curriculum Studies at the University of British Columbia from 2015 to 2021 gave theoretical

depth to this emerging position. During the wider period of my work at UBC, I served in roles that included laboratory and teaching assistance, academic writing support, sessional teaching, teacher-candidate supervision, and research on multi-campus teaching. Working across science laboratories, writing, teacher education, technology, and curriculum reinforced an important insight: disciplinary knowledge and pedagogy are interdependent. A researcher can move between them without becoming intellectually divided.

Through this transition, my central question changed. I had once asked mainly what physical properties a material displayed under particular conditions. I increasingly asked what educational conditions enable a learner, especially a girl, to engage confidently with physics. That change of question marks the core of my movement into curriculum studies.

Mothering, Relational Responsibility, and Academic Identity

Mothering formed part of my academic life and complicated the idea that a serious scholar should be detached from relationships and care. Family responsibility can constrain time, mobility, and concentration, particularly where institutions are organized around an assumed worker who is continuously available (Vurayai & Chingombe, 2025). I experienced the tension between the demands of study and professional advancement and the responsibilities of sustaining relationships.

At the same time, motherhood was not only a constraint. It strengthened my awareness that learning is relational. Learners do not enter a classroom as minds separated from family, culture, emotion, and responsibility. Patience, attentive listening, and concern for another person's development are not opposed to intellectual standards. They can support the conditions under which demanding learning becomes possible.

This recognition influenced how I understood female participation in STEM. Policies that invite women into science without attending to the organization of academic and family life address only part of the problem. Women may be asked to prove uninterrupted commitment within systems that do not recognize unequal responsibilities. My autobiography cannot define the experience of other mothers, but it shows why institutional accounts of merit should not treat care as evidence of weak commitment.

In curriculum studies, this relational insight became pedagogical. Inclusive teaching requires high expectations together with structured support, responsive feedback, and recognition of learners' circumstances. The lesson is not that women possess a naturally caring pedagogy. Rather, my experience of mothering made visible the educational importance of relationships and the need to design institutions that do not require scholars to deny significant parts of their lives.

Challenging Institutionalized Gender Norms Through Curriculum and Pedagogy

My career in curriculum work transformed personal experience into an institutional question. If girls encounter science as a field for boys, the problem cannot be solved by asking individual girls to become more confident while leaving teaching and curriculum unchanged. Institutions must examine how content is presented, who is visible in examples, who handles apparatus, whose questions receive attention, how achievement is assessed, and whether teachers are prepared to recognize gendered patterns in participation (Kihwele et al., 2025).

This does not mean that boys and girls require fixed, separate learning styles. Such a view can reproduce the stereotypes it intends to address. The more useful goal is varied and equitable pedagogy: multiple representations of concepts, purposeful practical work, opportunities for discussion and explanation, fair access to equipment and technology, formative feedback, and classroom norms that treat scientific ability as developable. Research on technology-supported physics learning also suggests that tools such as simulations can create useful opportunities, although technology must be integrated through sound pedagogy rather than treated as a solution by itself (Alabi et al., 2023).

My involvement in curriculum design, teacher professional development, learning materials, science textbooks, assessment materials, and educational projects gave me practical locations from which to act on these ideas. Curriculum is not only a written syllabus. It is also the guidance teachers receive, the examples learners encounter, the resources that reach schools, the assessments that signal what counts, and the professional learning available to educators (Massao et al., 2024). Tilya (2003) and Mafumiko (2006) similarly show, in Tanzanian science-education contexts, that innovation depends on teacher support, usable approaches, and attention to classroom implementation.

Mentorship and role modelling are equally important. My presence as a woman trained in physics can challenge the assumption that advanced science belongs to men. Yet representation must be accompanied by institutional support (Babalola et al., 2021). Women teachers and researchers need opportunities to lead, publish, mentor, and influence policy. Girls need sustained contact with adults who take their scientific questions seriously. This theme therefore connects conscientization with action: recognizing gendered norms creates a responsibility to redesign educational practice.

Leadership as Curriculum Praxis

The fifth theme emerged most clearly when the two curriculum vitae were read as a record of progressive responsibility. After joining the Tanzania Institute of Education in 2000, I served as head of a monitoring and

evaluation section, coordinator of teacher resource centres, head of the Education Resource Centre, head of the Department of Curriculum Design and Development, acting director responsible for research, information, and publications, director of curriculum design and review, and coordinator of major education programmes. By 2025, my recorded role was Deputy Director General for Academic, Research and Consultancy responsibilities. The titles matter less than the widening scope they represent.

In the earlier roles, responsibilities centred on planning, monitoring, training, proposals, and coordination. Departmental and director-level work added staff supervision, strategic and annual planning, budgets, research activities, curriculum review, and advice to management and government. Programme coordination involved admissions, records, face-to-face and online training, meetings, budgets, and collaboration across institutions. At senior level, responsibilities extended across academic departments and units, policy advice, budgeting, and institutional functions. This progression shows curriculum studies becoming a form of public practice rather than remaining an academic specialization.

Leadership also changed how I understood evidence. A laboratory investigation can control many conditions. Educational leadership rarely permits that separation. Decisions must be made across competing priorities, limited resources, policy demands, professional knowledge, and the realities of schools and teacher education. My scientific background supported disciplined attention to evidence, while curriculum studies supported attention to interpretation, stakeholder experience, and context. Both were necessary.

The leadership trajectory also complicates a deficit account of women in STEM. My story includes marginality, but it is not only a story of barriers. It is also a record of accumulated competence, responsibility, and contribution: coordinating regional curriculum education, supporting teacher development, contributing to textbooks and modules, participating in research projects, and advising on curriculum and policy. Leadership did not follow after curriculum studies as an unrelated reward. It became one of the ways curriculum knowledge was enacted.

For me, leadership as praxis means connecting reflection to institutional action. It involves asking whether plans, budgets, materials, training, and assessment support the educational values an institution claims to hold (Pillay, 2025). It also involves using authority to widen participation and to create conditions in which others can contribute. This is the fullest expression of my shift from the physics laboratory: not leaving evidence behind, but bringing evidence, critical reflection, and responsibility together in curriculum leadership.

Discussion

The findings show that the movement from physics to curriculum studies was produced by the interaction of personal agency and institutional experience. Gendered visibility in physics made belonging a question. School teaching made pedagogy a question. Curriculum work made educational structures a question. Mothering made relationships and institutional expectations a question. Doctoral study provided theoretical resources, and leadership made reflection consequential at programme and system levels. No single event explains the transition; it emerged through the accumulation and reinterpretation of these experiences.

Critical conscientization clarifies why the journey involved more than professional mobility. Experiences that might once have been accepted as personal difficulty could be re-read as part of wider social arrangements (Freire, 1970). Transformative learning clarifies the accompanying change in perspective: I moved from seeing curriculum mainly as content to be organized towards seeing it as a social, pedagogical, and political arrangement that distributes opportunities to participate (Mezirow, 1991). The autobiographical method makes this change visible because it links present interpretation to the events through which the interpretation developed.

The account also resists a simple opposition between natural and social science. Physics and curriculum studies ask different kinds of questions and use different forms of evidence, but both can be systematic, critical, and ethically responsible. My scientific training contributed persistence, analytical discipline, and respect for evidence. Curriculum studies enabled me to examine assumptions, relationships, language, culture, pedagogy, and power. The transition was generative because it brought these orientations into conversation.

The five themes also show why increasing women's participation in STEM requires more than access programmes. Access is important, and initiatives that widen entry can change lives. However, persistence and contribution depend on what happens after entry: whether women experience intellectual belonging, whether care responsibilities are recognized, whether teaching supports meaningful participation, whether technology is pedagogically integrated, whether mentorship is sustained, and whether women can move into positions where they shape curriculum and policy. Masanja's (2010) regional analysis remains relevant here because participation must be considered across education and employment, not at a single point of entry.

Finally, Theme 5 extends the meaning of transition. The outcome was not simply that a physicist became a curriculum researcher. The outcome was a layered professional identity: physicist, teacher, curriculum scholar,

researcher, writer, mentor, and leader. This layering is significant for STEM education because people who understand both disciplinary knowledge and curriculum systems can connect classroom realities with institutional decisions.

Implications for Pedagogy and Educational Leadership

First, physics teaching should make participation visible. Educators can monitor who answers, who asks questions, who handles equipment, who leads practical tasks, and whose explanations are taken seriously. Equitable participation should be planned rather than assumed. Teachers should avoid language that frames difficulty as proof that a learner does not belong in science.

Second, conceptual understanding should be supported through varied representations and active engagement. Practical investigation, discussion, diagrams, mathematical reasoning, writing, and well-designed simulations can complement one another. Technology is most useful when it helps learners test ideas, receive feedback, or visualize phenomena that are otherwise difficult to access. It should not replace the teacher's attention to prior knowledge, language, confidence, and classroom interaction.

Third, teacher education and professional development should address gender as part of subject pedagogy. General statements about equality are insufficient if teachers have not examined how expectations and routines shape participation. Professional learning can use classroom cases, observation, learner work, and reflective inquiry to help teachers identify patterns and design alternatives.

Fourth, mentorship should be built into institutions rather than left to individual goodwill. Girls and early-career women benefit from seeing women teach, research, design curricula, and lead. Mentors also need recognition and support, especially when mentoring responsibilities are unevenly carried by the few women in a field.

Fifth, leadership decisions should connect curriculum intentions with implementation. Inclusive policy requires budgets, materials, teacher preparation, monitoring, and feedback from practice. Leaders should ask not only whether a curriculum mentions equity, but also whether its resources and assessment arrangements enable equity to be enacted.

Contribution to Knowledge

This study contributes a first-person Tanzanian account of disciplinary transition, gender, and curriculum leadership. Much discussion of women in STEM concentrates on entry, enrolment, or achievement. This account follows a longer arc—from being one of very few women in physics, through laboratory research and school teaching, to curriculum scholarship and senior educational responsibility. It therefore shows participation not as a

single outcome but as a continuing negotiation of belonging, knowledge, responsibility, and influence.

The study also contributes a view of disciplinary transition as expansion rather than loss. It demonstrates how natural-science training can inform curriculum inquiry and how curriculum studies can deepen the social purpose of science education. Finally, it links autobiography to institutional practice: reflection on a life becomes valuable when it helps educators and leaders reconsider the conditions they create for others.

Limitations

This study is based on one person's retrospective account and cannot represent the experiences of all Tanzanian women, physicists, mothers, curriculum scholars, or education leaders. Memory is selective and is shaped by present concerns; events that now appear to be turning points may not have been understood in the same way when they occurred. The curriculum vitae helped confirm chronology and responsibilities, but they are selective professional records rather than complete accounts of experience.

The study also relies on documents produced by the author and does not include independent interviews, classroom observations, institutional records, or pupil outcomes. It therefore cannot establish how colleagues or learners understood the events described, nor can it demonstrate that particular pedagogical or leadership practices caused specific outcomes. The themes are interpretive constructions, not objectively discovered categories.

Relational ethics limited the detail that could be provided about family members, colleagues, and institutions. This protects others but reduces contextual depth. Future research could use ethically designed collaborative autobiography, interviews with women across career stages, analysis of curriculum and policy documents, and classroom-based studies to examine where this account converges with or differs from other experiences.

Conclusion

My journey from natural science to curriculum studies began within physics rather than outside it. Being one of very few women in the field taught me that ability and belonging are not the same. Laboratory research taught me disciplined inquiry. Teaching showed me that knowledge must be made learnable. Mothering sharpened my understanding of relational responsibility. Curriculum work revealed how institutional arrangements shape classroom possibilities. Leadership created opportunities to connect reflection with decisions about programmes, materials, research, teacher education, and policy.

I therefore do not understand myself as having left the physics laboratory behind. I have reimagined it. The laboratory now includes the social and pedagogical conditions around the apparatus: the learner who approaches it, the teacher who organizes participation, the curriculum that defines worthwhile knowledge, and the institution that distributes resources and recognition. For girls and women to flourish in physics, these conditions must be examined and changed alongside the content of science itself.

Autobiographical reflection cannot provide a universal model, but it can make one pathway visible. My account shows that a woman's persistence in physics can become a foundation for curriculum scholarship and educational leadership. It also carries a responsibility: to use the opportunities I have received to make scientific learning more equitable, meaningful, and possible for those who follow.

References

1. Abrahão, M. H. M. B. (2012). Autobiographical research: Memory, time and narratives in the first person. *European Journal for Research on the Education and Learning of Adults*, 3(1), 29–41. <https://doi.org/10.3384/rela.2000-7426.rela0051>
2. Adams, T. E., Holman Jones, S., & Ellis, C. (2015). *Autoethnography*. Oxford University Press.
3. Alabi, A.-H. A., Mohammed, R. E., & Yusuf, A. A. (2023). Gender influence of PhET simulation on students' score level. *Physics Education Research Journal*, 5(2), 61–68. <https://doi.org/10.21580/perj.2023.5.2.14141>
4. Babalola, O. O., du Plessis, Y., & Babalola, S. S. (2021). Insight into the organizational culture and challenges faced by women STEM leaders in Africa. *Social Sciences*, 10(3), Article 105. <https://doi.org/10.3390/socsci10030105>
5. Bloodhart, B., Balgopal, M. M., Casper, A. M. A., McMeeking, L. B. S., & Fischer, E. V. (2020). Outperforming yet undervalued: Undergraduate women in STEM. *PLOS ONE*, 15(6), Article e0234685. <https://doi.org/10.1371/journal.pone.0234685>
6. Deiglmayr, A., Stern, E., & Schubert, R. (2019). Beliefs in “brilliance” and belonging uncertainty in male and female STEM students. *Frontiers in Psychology*, 10, Article 1114. <https://doi.org/10.3389/fpsyg.2019.01114>
7. Denzin, N. K. (1989). *Interpretive biography*. Sage.
8. Dou, R., & Cian, H. (2022). Constructing STEM identity: An expanded structural model for STEM identity research. *Journal of Research in Science Teaching*, 59(3), 458–490. <https://doi.org/10.1002/tea.21734>
9. Freire, P. (1970). *Pedagogy of the oppressed*. Herder and Herder.
10. Kapinga, B. B. (2010). Women access to science at the University of Dar es Salaam (UDSM), Tanzania.

- European Journal of Educational Studies, 2(3), 273–280.
11. Kastner, M., & Motschilnig, R. (2022). Interconnectedness of adult basic education, community-based participatory research, and transformative learning. *Adult Education Quarterly*, 72(3), 223–241. <https://doi.org/10.1177/07417136211044154>
12. Kihwele, G. E., Kinyota, M., & Moses, I. (2025). Pre-service teachers' conceptualisation of gender-responsive pedagogy as a strategy for achieving gender equality in classrooms. *Cogent Education*, 12(1), Article 2584919. <https://doi.org/10.1080/2331186X.2025.2584919>
13. Mafumiko, F. S. M. (2006). *Micro-scale experimentation as a catalyst for improving the chemistry curriculum in Tanzania* [Doctoral dissertation, University of Twente]. <https://research.utwente.nl/en/publications/micro-scale-experimentation-as-a-catalyst-for-improving-the-chemi-2/>
14. Masanja, V. G. (2010). *Increasing women's participation in science, mathematics and technology education and employment in Africa* (EGM/ST/2010/EP.8). United Nations Division for the Advancement of Women.
15. Massao, P. B., Sheshe, B. A., & Mkenda, T. B. (2024). Gender and active citizenship in Tanzanian teacher education: Curriculum analysis and student teachers' reflections. *European Journal of Education*, 59(4), Article e12762. <https://doi.org/10.1111/ejed.12762>
16. Mezirow, J. (1991). Transformation theory and cultural context: A reply to Clark and Wilson. *Adult Education Quarterly*, 41(3), 188–192. <https://doi.org/10.1177/0001848191041003004>
17. Mushi, P. S. D. (1996). Tanzania secondary school science teachers' perception and reaction to gender difference in performance in science. *Utafiti*, 3(2), 91–130. <https://journals.udsm.ac.tz/index.php/uj/article/view/1229>
18. Pillay, P. (2025). Women's leadership in South African higher education: A systematic review of research trends, methodological approaches, and transformation challenges (2010–2024). *International Journal of Contemporary Educational Research*, 12(1), 56–70. <https://doi.org/10.52380/ijcer.2025.12.1.736>
19. Salinas, I., Fernández, M. B., Johnson, D., & Bastías, N. (2023). Freire's hope in radically changing times: A dialogue for curriculum integration from science education to face the climate crisis. *Cultural Studies of Science Education*, 18(1), 21–39. <https://doi.org/10.1007/s11422-023-10157-4>
20. Tilya, F. N. (2003). *Teacher support for the use of microcomputer-based laboratories in activity-based physics teaching in Tanzania* [Doctoral dissertation, University of Twente]. <https://research.utwente.nl/en/publications/teacher-support-for-the-use-of-mbl-in-activity-based-physics-teac>
21. Vurayai, S., & Chingombe, A. (2025). Motherhood penalty and women's participation in Southern African higher education. *African Journal of Gender, Society and Development*, 14(3), 113–131. <https://doi.org/10.31920/2634-3622/2025/v14n3a6>