

## SCAFFOLDING IN EDUCATION RESEARCH MENTORSHIP: WHAT, WHY, AND HOW?

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### ABSTRACT

Scaffolding is necessary for effective mentorship in educational research. The mentorship between the mentor and mentee in educational research is fraught with challenges that can be eliminated through scaffolding. Consequently, this research paper was conducted with the sole purpose of answering the following basic questions: what, why, and how is scaffolding done in educational research mentorship? Soliciting information from existing bodies of knowledge, scaffolding in education research mentorship enables mentors to build mentees from what they cannot do, to what they can do with help; and finally, to what they can do alone without help from a mentor in research. It involves the development of instructional plans that leads the students from the known to the unknown and the execution of the plans which provides support to the students at every step of the learning process. Scaffolding has six basic steps: providing feedback to initial probing questions; giving hints, clues or suggestions to help the mentee proceed further; instructing the mentee on what to do; explaining to provide more details or clarification; modelling to demonstrate for the mentee; and questioning to check understanding. It was concluded that scaffolding in education research mentorship enables the mentee to acquire necessary competencies in conducting research in universities and beyond. Therefore, it was recommended that scaffolding must be an integral part of education mentorship.

**KEYWORDS:** Education, Mentorship, Research, Scaffolding, Vygotsky's (1978)

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## INTRODUCTION

The impact of research in all fields of human endeavor, including education, has been a major source of concern for all nations around the world. Over the decades, stakeholders' primary research concern has been what the purpose of research in the development of scientific knowledge in the field of education should be (Ponce & Pagán-Maldonado, 2017). Educational research is a systematic investigation into the teaching and/or learning process to discover facts, establish or review a theory, or develop a plan of action based on the facts discovered. Such research is usually aimed at discovering facts that may be a problem or solution (exploratory research), establishing or reversing a theory, model, framework, or strategy (descriptive research), and developing an action plan to solve a problem (explanatory research) (Question Pro, 2021). Education research identifies new teaching and learning opportunities, discerns teachers' and students' potential, sets pragmatic educational goals, develops teaching and learning strategies, and identifies possible challenges that could hinder effective learning among learners. As a field of scientific research, educational research develops new theories that guide the practice of the profession (Asogwa & Wombo, 2016; Green, 2010). It further ensures the formulation of relevant policies for successful implementation of the scientific educational models (Pring, 2007).

Educational research is increasingly challenged for not contributing effectively enough to the improvement of policy and practice worldwide (Crossley & Holmes, 2001). Ponce and Pagán-Maldonado (2017) identified three challenges to educational research: the political nature of education, the problem of its definition as a science, and the dislocation between educational research and the practice of education. Despite the implications of research in education, one of the greatest challenges for education researchers is mentorship. According to (Brown (2019), one of the issues faced by academic or educational researchers is a lack of research culture that is perpetual in nature and significantly difficult to overcome without mentorship in educational research. In the United States of America, the first university professors employed in the departments or schools of education came from the various disciplines of natural science because education was perceived as a particular study in a discipline organized in departments of education (Ponce & Pagán-Maldonado, 2017). Hence, they brought research models and mentorship styles from their academic disciplines and applied them to public education research (Ponce, 2016; Walters, 2009). The traditional distinctions between "academic" and "lay" knowledge are widening since research is gaining increased support as a socio-cultural process (Crossley & Holmes, 2001). This makes the popular image of the expert social researcher as a "lone ranger" entering the empirical world increasingly challenged. The model of the social researcher, though widely used, is inconsistent with theoretical approaches in education that emphasize how knowledge is socially distributed and culturally mediated (Wertsch, 1995).

Being a socio-cultural process, the learning process requires mentorship. Mentorship is a professional, voluntary relationship between a mentor (more experienced person) and the mentee (less experienced person). It is the act of helping and advising a less experienced person, especially in a job, over a period of time for guidance and sustainable development. Mentorship in education involves a relationship between two people where the mentor plays a supportive and advisory role for the student, the learner (Argente-Linares



et al. 2016). In mentorship, there is a relationship between two people where the mentors can pass along what they have learned to the mentees through help and advice within a certain field (Cambridge University, 2021; Oshinkale, 2019). Because of its importance in universities, mentoring has recently gained international attention in educational research. Mentorship is used in professional education and training as a means of helping new employees in their introduction to the labor market (Arnesson & Albinsson, 2017). On the other hand, education research mentorship entails supporting and encouraging young, willing researchers to manage their own learning so that they may maximize their potential, develop their skills, improve their performance, and become the person they want to be in the education sector (University of Reading, 2021). Education research mentorship can help to minimize researchers', especially graduate students', isolation (Gardner, 2010; Stubb et al., 2011), encourage social support for both mentors and mentees to cope with and overcome research challenges in education (Byers et al., 2014), reduce power differentials for mutual learning among young researchers (Byers et al., 2014; Murdock et al., 2013), and provide a variety of psychosocial and even academic benefits from interacting with and learning from mentors (Holmes et al., 2014). Research mentorship encourages knowledge sharing, skills development, academic milestones, and programme support among peer researchers (Lorenzetti et al., 2020). Mentorship promotes the development and growth of the mentee's knowledge and skills through the mentor's experience. It is aimed at advising, building, and supporting the mentee's confidence and transitioning to further education research (Argente-Linares et al., 2016). It helps the mentees avoid research and learning errors for quick and sustainable professional development in educational sectors. While mentorship in education research improves the mentor's problem-solving skills, networking abilities, self-confidence, socialization abilities, and organizational awareness, it also facilitates the mentee's professional growth, self-reflection and problem-solving capacities, the ability to put difficult experiences into perspective, behavior management skills, and the capacity to adapt to the research's norms and expectations. Eller *et al.* (2014), in a study, categorized behaviours helpful for effective mentoring relationships between mentors and mentees into eight key areas, as shown in Figure 1.

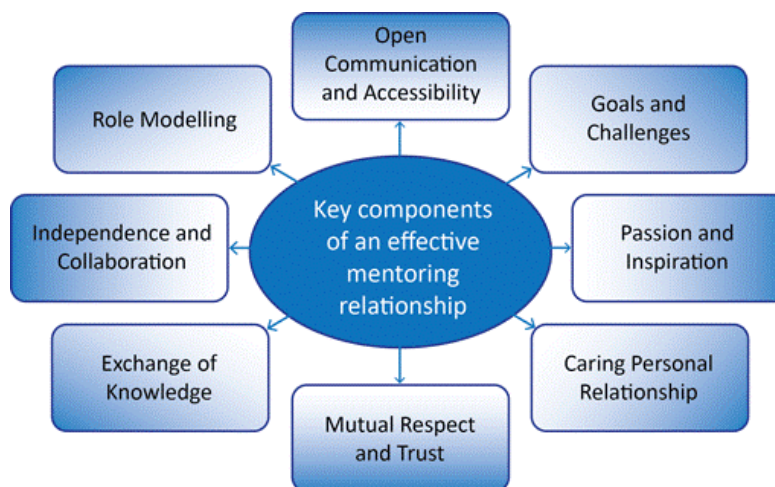


Figure 1: The key components of effective mentoring relationships (adapted from Eller *et al.*, 2014)

Despite the numerous benefits of mentorship in education research, both mentors and mentees are often faced with several challenges, ranging from the mentor's inability to assess the mentee's background knowledge, skills, and values in research to identifying the mentee's motivation, dealing with the mentee's inexperience in research, addressing the mentee's misconceptions about education research, and setting reasonable and feasible goals for the project. Hagler (2018) noted that research mentoring is bedeviled by challenges such as behavioural problems, lack of self-esteem, and academic engagement; long waste of time, lack of interest, geographic relocation, and change of contact information; stress; highly subjective self-judgment and self-perception; and a lack of observational techniques to reduce bias and possible dropout. Meeting as scheduled, excessive time and energy commitments, unrealistic expectations, over-dependence on the mentor or mentee, unfair manipulation on the part of the mentor or mentee, resentment or jealousy from others, and ineffective mentoring pairs are among the challenges of mentorship among youth, according to Mentoring University (2019). The inability to reschedule a convenient time for mentor and mentee, generational health and financial crises, anxiety or depressive symptoms, and the mentee's employment status were identified as challenges in research mentorship (Talbert et al., 2021). Barrett et al. (2017) found that while mentees demonstrate resistance to criticism, mentors lack a commitment of time and energy due to an excessive workload.

In any case, challenges are unavoidable in any two-person relationship, but according to education research, the use of specific teaching strategies such as scaffolding could help mentors eliminate some of the challenges for more effective mentoring. Most of these challenges germinate due to mentors' lack of experience using certain frameworks or strategies. Previous studies (Eby & Allen, 2008; Eby *et al.*, 2013; Mijares *et al.*, 2013) indicate that there is limited research on the experience of mentors on the use of scaffolding in higher education research in Africa and beyond. While there are several strategies used by mentors, literature (Argente-Linares *et al.*, 2016; Byers *et al.*, 2014; Talbert *et al.*, 2021) provides evidence that most mentors apply scaffolding in their education research mentorship. Evidently, more than ten years' experience among the researchers shows that scaffolding is used by most of the mentors without a clear understanding of the what, why, and how of its application. Based on previous application and proven efficacy of scaffolding in teaching, learning, and research (Dix, 2016; Limpabandhu *et al.*, 2018; Piamsai, 2020; Spycher, 2017; Yau, 2007), most challenges in education research mentorship could be attributed to a lack of proper understanding of what, why, and how to use scaffolding by many educational research mentors in Nigeria and the African continent. Believing in the philosophy that the only way for ignorance to continue is for the experienced men to stay back and do nothing, it becomes pertinent to discuss what, why, and how scaffolding can be used in educational research mentorship for easy understanding, practice, and improvement among the educational research mentors and mentees. This will provide both mentors and mentees with detailed information about the meaning, relevance, and, most importantly, how to use scaffolding in education research mentorship for overall effectiveness. Therefore, it is against this background that this research study examined what scaffolding is in education research mentorship, why scaffolding is used in education research mentorship, and how scaffolding can be used in education research mentorship.

## What is Scaffolding in Education Research Mentorship?

Scaffolding is an instructional technique whereby the instructor models the desired learning strategy or task, then gradually shifts responsibility to the learners (Tabak, 2004). It is a model of teaching in which the instructor (mentor) models or demonstrates a lesson, steps away to let students (mentees) work independently or as a group, and then provides them with support as needed (Firestone, 2021). In education research mentorship, scaffolding is a process through which a mentor builds supports for mentees to enhance learning and aid in the mastery of tasks in the research process (Vanderbilt University, 2021). It means doing some of the work for the mentee, who is not quite ready or experienced enough to accomplish a task independently. Piper (2005) postulated that scaffolding is the support given during the learning process that is tailored to the needs of the mentee with the intention of helping the mentee achieve his or her learning goals. According to the author, instructional scaffolding is a temporal learning process designed to promote a deeper level of the students' learning. Alibali (2006) stated that scaffolding is an adult controlling those elements of the task that are essentially beyond the learner's capacity, thus permitting him to concentrate on and complete only those elements that are within his range of competence. The control and support of the mentor are gradually removed as mentees develop autonomous learning strategies, thus promoting their own cognitive, affective, and psychomotor learning in research. When mentors scaffold in education research mentoring, they typically break up a learning experience, concept, or skill into discrete parts and then give mentees the assistance they need to learn and carry out each part of the research process until they master it (Great Schools Partnership, 2015).

Moreover, one of the main goals of research mentorship is to help mentees understand, retain, and apply new knowledge for success. Scaffolding is a teaching technique that helps mentees adapt to new learning. It is a mentorship strategy in which mentors offer a particular kind of support to mentees as they learn and develop new concepts, skills, or values through research. In this strategy, a mentor may share new information about the research process, explain the rationale for such operations in the research process, or demonstrate how to solve a problem in the education research process. The mentor then, gradually steps back to allow the mentees to reason and practice on their own. Before the mentees become completely independent, structured support ("scaffolding") is put in place, and then gradually withdrawn, sometimes for independent individual or group practice. Mentors might work together in small groups to help each other. This process in education is also sometimes called "I do; We do; You do." In other words, the mentor shows how something is done, then the class practices together with the teacher, and finally, the mentees work individually for mastery (Grand Canyon University, 2020).

In the same vein, Jumaat and Tasir (2014) identified four types of scaffolding that mentors can use in education research mentoring, including: procedural scaffolding, which assists mentees in using research tools; conceptual scaffolding, which assists mentees in determining what to consider in learning (that is, it guides them to prioritize fundamental concepts); and strategic scaffolding, which suggests alternative ways for mentees to learn. Each type of scaffolding can be critical to a mentee's success in any education research. For instance, procedural scaffolding can play a critical role in ensuring that mentees can use tools like the

mean, t-test, and Analysis of Variance (ANOVA) to analyze their research data. Conceptual scaffolding can guide mentees' understanding and utilization of research theories, frameworks, and models. Similarly, strategic scaffolding helps mentees find a new way to overcome challenges in their research, like the limitations of the study, sampling error, and ethical issues, and meta-cognitive scaffolding encourages them to take a moment to evaluate their progress in education research.

### **Why is Scaffolding used in Education Research Mentorship?**

The relevance of scaffolding in education research mentorship varies across disciplines and between mentors and mentees. Puntambekar and Kolodner (2005) observed that scaffolding enables the learner to bridge the gap between the actual and the potential, depending on the resources or the kind of support that is provided. It offers opportunities for supervisor-student interaction, giving supervisors the opportunity to diagnose students' research skills and adapt their support to their needs (de Kleijn *et al.*, 2015). The key features of scaffolding include a common goal, shared understanding, ongoing diagnosis and adaptive support, dialogues and interactions, fading, and transfer of responsibility (West *et al.*, 2021). The author emphasized that instructional scaffolding is used to help students in various ways, such as by modeling a task, giving advice, providing coaching, and supervising their research work. Theoretically, scaffolding enables undergraduate science majors to develop an understanding of the research process and have an opportunity to explore a research area to see if it is one in which they wish to pursue a career (Colbert-White & Simpson, 2017). Hence, such research experiences transform students into self-learners (Wolfe *et al.*, 2002).

Through scaffolding, students experience a higher level of engagement, which improves student learning more than traditional lecture-based instruction (Bluestone, 2007; Elmes, 2002). Participating in education-mentored research experiences engages students in experiential learning (Bluestone, 2007) and has been shown to increase students' self-reported interest in applying to graduate or professional programs (Eagan *et al.*, 2013). Practically, during scaffolding, students develop technical and interpersonal skills, such as analytic thinking, logic, synthesis, writing, speaking, and reading skills (Wolfe *et al.*, 2002), as well as independent learning skills (Ishiyama, 2002; Landrum & Nelsen, 2002). Beyond these practical benefits, scaffolding research experiences improve students' academic achievement, interpersonal interactions, and self-esteem (Prince, 2004). In the context of this study, scaffolding is an instructional strategy whereby mentors provide mentees with temporal support in phases to enable them to later acquire necessary competencies for carrying out research in universities. In other words, scaffolding in education research mentorship enables mentors to build mentees from what they cannot do to what they can do with help, and finally to what they can do alone without help from a mentor, as shown in Figure 2: Zone of Proximal Development (Vygotsky, 1978).



## Theoretical Support

This study is supported by Vygotsky's (1978) idea of the Zone of Proximal Development (ZPD). According to Vygotsky, there are two parts to a learner's developmental level: the "actual developmental level" and the "potential developmental level." "The zone of proximal development" represents "the distance between the actual developmental levels as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or collaboration with more capable peers" (Vygotsky, 1978, p. 86). In this context, the zone of proximal development represents the areas between what the mentees can do by themselves in education research and that which can be attained with the support of more knowledgeable persons, here referred to as the "mentor" in education. In education research, the mentor bridges the gap between what the mentee knows and what he or she does not know through scaffolding. In education research, as the mentee gains the desired knowledge, skills, or attitude, the actual developmental level has been expanded and shifted (Yelland & Master, 2005).

The ZPD changes constantly as the mentee learns new knowledge or ideas and progresses from what he or she cannot do to what he or she can do with help and then to what he or she can do without help (Figure 2). Scaffolding is an ideal method of individualized instruction for mentors in education research mentorship as a result of this trend. Importantly, ZPD enables mentors to determine what the mentee can do on his or her own and allows the mentee to do as much as possible without any assistance. Until mentees can demonstrate mastery of new or difficult tasks, they are given more assistance or support from a mentor. Larkin (2002) noted that as the experienced mentors could have some strategies to overcome any shortcoming of using scaffolding for effective education research mentorship in Nigeria and African universities. Therefore, the use of scaffolding as a strategy for education research mentorship is always challenging when the mentor does not understand what the mentee cannot do, what he or she can do with help, and what he or she can do without help upon gradual withdrawal of the support and independence. In any case, a few.

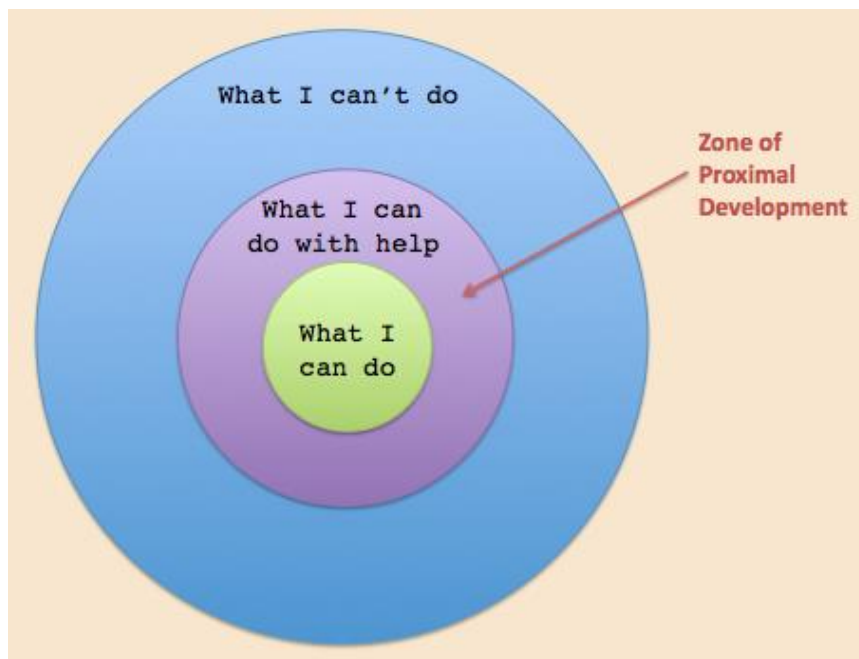


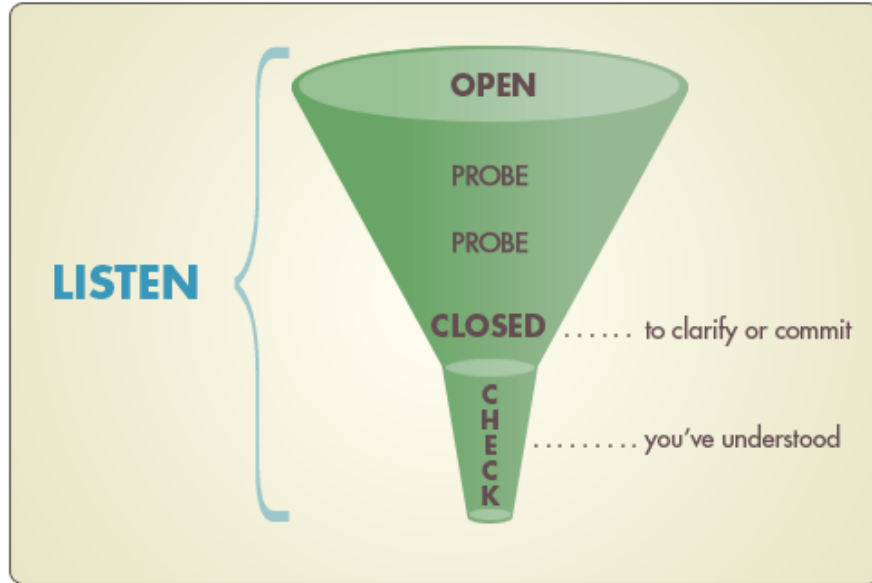
Figure 2: Adopted from Vygotsky (1978)

### How can Scaffolding be used in Education Research Mentorship?

Instructional scaffolding involves two major steps. The first step is the development of instructional plans to lead the students from what they already know to a deep understanding of new material (Turnbull et al., 1999). Scaffolding plans must be written carefully so that each new skill or bit of information that the students learn serves as a logical next step based upon what they already know or are able to do. The instructor must prepare both to continuously assess student learning and to connect new information to the students' prior knowledge. Turnbull et al. continued that the second major step of instructional scaffolding is the execution of the plans, wherein the instructor provides support to the students at every step of the learning process.

In the practice of research mentoring in higher education, where graduating students (mentees) write projects, the mentors (known as supervisors) would ask the students to first outline some topics. The topics come as answers or responses to the questions that mentors could have posed, such as, "What topical issue or area do the mentees intend to study?" These topics often emanate from areas of interest or any identified research problem area based on the mentees' observations. The students package and submit the titles along with objectives that they seek to achieve. The mentors would now ask some in-depth questions based on the title and stated aims to determine the precise areas in which the mentees need direction or assistance. The above is just in line with the wide-open top of the funnel as proposed by the London Deanery (2012) Model in Figure 3.





**Figure 3:** The funnel questioning technique by London Deanery (2012)

Down the narrowing body of the funnel are the instances where a mentor could ask a series of probing questions that lead the mentee to briefly state his or her research focus (that is, what the researcher seeks to achieve). This is like the situation where the mentor asks the mentees to discuss the research background to the point of deriving the research objectives. Perhaps it might include questions on how the mentee intends to collect and analyze the data based on the direction of the research objectives. The mentor then draws out, checks, or confirms specific pieces of information, or gets the mentee to commit more precisely to a point. The bottom of the funnel shows that the mentor provides clarification using a short summary based on what comes out of the discussion, aiming to check the level of understanding of the main points.

In the sequence of interaction between the mentor and mentee in an educational research mentoring relationship, the process might proceed thus: How did you go about determining the research topic in relation to the background of the study (Scaffolding in Education, 2016)? This guides the mentee on the procedure to follow to conduct research as he or she progresses until the project is completed. Scaffolding in Education (2016) identified six scaffolding methods to support student learning activities, which include (1) Feeding back to the initial probing question: This involves the mentor providing information regarding the student's performance to him/her. (2) The giving of hints, which entails the provision of clues or suggestions by the teacher to help the student proceed further. Under such circumstances, the teacher deliberately does not supply the entire solution or detailed instructions. (3) Instructing: This involves the teacher telling the students (mentees) what to do or giving an explanation of how and why something must be done. (4) Explaining: This refers to the teacher's providing more detailed information or clarification. (5) Modeling: This can include the demonstration of particular skills. This may be likened to the "show (demonstrate) and tell" model by Alber (2011). Some research mentors will provide guides through clues in the process while holding a model of the

finished product. Finally, question six is: This involves asking students questions that require them to do further searches for skills and knowledge of how the research process goes on.

Whether a teaching strategy qualifies as scaffolding generally depends upon its enactment in actual practice and more specifically upon whether the strategy is applied contingently and whether it is also part of a process of fading and transfer of responsibility (Tharp & Gallimore, 1988). During the research and writing process, mentors and mentees ought to work together on a rough outline and then generate search term lists (Reavis & Thomas, 2019). According to the authors, these students often need guidance on conducting thorough and appropriate literature reviews. It has been argued (Linn et al., 2015) that although many students have positive experiences with their supervisors (mentors) in educational research practice, negative experiences (referred to in this study as shortcomings) are not uncommon.

### **Shortcomings of Scaffolding in Education Research Mentorship**

Research experiences and the mentor-mentee relationships involved are important for the career progression of trainees in education disciplines (Eagan et al., 2013). Student researchers gain mastery of the research process through mentorship, especially from their lecturers, who are also regarded as supervisors. The research process in education is so challenging that some shortcomings are observed in the use of scaffolding despite its strengths. However, these shortcomings depend on the kind and level of the mentor-mentee relationship. Positive relationships tend to lead students to persist through the challenges and transitions of their research careers, whereas less supportive relationships lead students to self-select out of the field (Linn et al., 2015). For undergraduates, the process of identifying suitable career mentors is often arbitrary and challenging (Hurtado et al., 2009). In the case of students from under-represented backgrounds, this challenge is even greater because, in many cases, the faculty come from very different backgrounds too (Linn et al., 2015; Prunuske et al., 2013; Prunuske et al. 2016).

*Inadequate time and other resources:* The relationship between tertiary education students and their research mentors is time-bound and therefore requires that mentors prioritize their time to work with their mentees (Anderson & Shore, 2008). According to Anderson and Shore, since mentors must be willing to devote a substantial amount of time, a minimal number of mentees must be assigned. This is because studies reveal that mentees can feel neglected when they do not receive the desired attention from their mentors due to the large number of mentees assigned to a mentor. They also got shuttled off to unofficial mentors (regarded as graduate student mentors). Accordingly, the optional mentor-mentee contract establishes meeting frequencies right from the beginning of the research process so that both mentor and mentee can agree on the commitment.

*Inadequate support:* An effective mentored research experience requires guidance (i.e., structured support, scaffolding of learning), but this amount may vary with the developmental level of the mentee, the complexity of the tasks, and the goals of both the mentor and mentee. Consequently, the supervision style utilized by the mentor may be either too much (e.g., micromanaging) or not enough (e.g., the mentor is traveling and

unavailable for regular meetings). To complicate matters, young adults are often unaware of the amount of guidance they require or may feel uncomfortable asking for additional support from mentors. Colbert-White and Simpson (2017) observed that in self-assessment, the mentor and mentee will get a sense of the mentee's research knowledge and skills. This should help the mentor tailor tasks and responsibilities to the student's intellectual level and motivation.

*Lack of suitable mentor-mentee pairing:* The process of identifying suitable career mentors is often arbitrary and challenging (Hurtado et al., 2009). Therefore, faculty members must pay adequate attention to the procedures and criteria they adopt in assigning mentees to their mentors for the purpose of research and writing supervision. In the case of students from under-represented backgrounds, this challenge is even greater because, in many cases, the faculty come from very different backgrounds, do not look like them, and may be difficult to approach (Prunuske et al., 2013; Prunuske et al., 2016). The process of helping early undergraduates find research mentors in their discipline must become more intentional if the diversity of the scientific workforce is to be achieved (Boyd & Wesemann, 2009; Packard, 2015; Ramirez, 2012). Studies on the impact of undergraduate research have struggled to articulate the contribution of mentor-mentee relationships to student development, degree completion, and career progression (Packard 2015; Thiry & Laursen 2011). These relationships are complex and multifaceted, often including additional parties such as graduate students and research group members that enrich the experience but also make it more difficult to control (Aikens et al., 2016; Aikens et al., 2017; Pfund et al., 2016).

*Insufficient knowledge and mentoring skill training:* Graduate programs rarely include training on how to be a good mentor; thus, mentoring skills are most often learned informally by observing one's own mentors (Handelsman et al. 2009; Sorkness et al., 2013). Likewise, incoming college students may not be ready to enter productive mentoring relationships, and often little is done to help students understand the bidirectionality of the mentoring (Branchaw et al., 2010). Due to a lack of proper training and the inexperience of most mentors on research principles and mentoring practices, mentors scaffold their mentees while relying on or concentrating on redundant information and relegating areas that the mentees are not already familiar with (Kim & Hannafin, 2011).

*Misunderstanding:* Disappointments and disagreements often result from failures to communicate expectations (Young & Perrewé, 2000). Mentors and mentees must explicitly share their thoughts at the beginning and throughout the term. Mentors need to listen to mentees and be sensitive to both verbal and nonverbal communication, especially signs of frustration or distress.

*Depth of experience; ability to balance productivity and learning:* Mentors are described as being both "talent scouts" and "gatekeepers," Accordingly, some mentors seek out mentees with exceptional skills and strengths, and they match mentees' strengths to appropriate research tasks (Anderson & Shore, 2008). At the same time, the author believed that, due to the absence of a definite pattern for allocation, some mentors can selectively exclude certain mentees from becoming involved in various research assignments if mentees



are perceived as not being worthy of the investment. Thus, mentors are in a position of authority over mentees and may unconsciously use this power to exploit them (Blevins-Knabe, 1992; Green & Bauer, 1995). Unfortunately, when confronted with situations in which mentors may take advantage, educational research mentees may be less capable of recognizing and advocating for themselves (Anderson & Shore, 2008). For example, a mentor may ask a mentee to do tasks outside the scope of the project, which would clearly be inappropriate. In part, the cause of such problems may be that the primary goal of students' research for some mentors is productivity (Kierniesky, 2005). This narrow focus can be highly detrimental to the quality of a student's experience in the research, learning, or mentoring process.

*Organized assessment for mentored research experiences:* Through the process, students' research experiences could be enhanced through the oversight, evaluation, and re-structuring provided by the mentors (synonymous to organized support-scaffolding). In some research settings, the only requirements are that the work must be educational, and/or that students must work for a certain number of hours per week for each credit hour earned. Such requirements allow for great flexibility, which, in some cases, may be useful, but can also increase the possibility that a student might not benefit in the specific ways they expected going into the experience.

*Lack of a definite and structured format for assessing students' progress in terms of their experiences:* During the process of mentoring, the mentees, who are students, may receive only vague feedback (e.g., satisfactory or unsatisfactory grades), lacking a structured assessment with personalized and constructive feedback. For students who are designing and conducting independent studies, assessments should be prepared in the form of a written research report (Horowitz & Christopher, 2013). However, for students who are assisting with a project that is already in progress, assessment can be more difficult. While exceptionally skilled mentors exist and achieve great success in navigating students through the research process, other mentor-mentee pairs may benefit from an assessment tool for guidance and standardization for both the mentee and mentor.

*Poor communication skills of mentors:* There can be issues relating to poor communication between mentors and mentees when both parties (mentors and mentees) fail to discuss expectations of each other and/or expectations of the research experience itself (Horowitz & Christopher, 2013). Thus, regular one-on-one meetings between mentors and mentees are encouraged. Other shortcomings of scaffolding have been documented in the literature, including but not limited to mentors' inability to discern when to withdraw support (the scaffold); insufficient personnel (research mentors); tendencies for incorrect judgment on the zone of proximal development; and inadequate comprehension of the appropriate theories and models guiding the application of the scaffold based on the individual student researcher's interest, needs, and abilities.

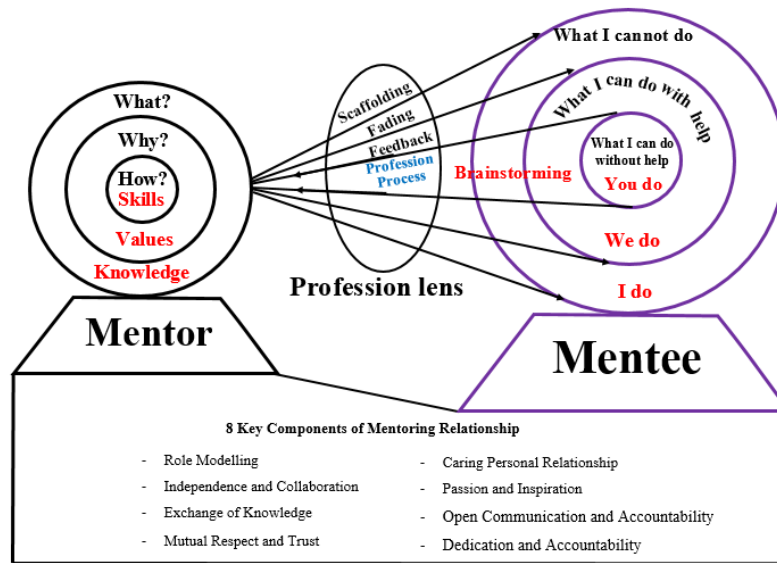
Furthermore, the main challenge for scaffolding research appears to be its measurement (Eagan et al. 2013; Moed 2012). Several difficulties with the measurement of scaffolding were encountered. The main impediments include no generally accepted measurement instrument; and no instrument in which the three



key characteristics of scaffolding (insert the three key characteristics of scaffolding) are considered together. Despite the fact that the last decade's rich body of scaffolding research provided us with useful knowledge on the appearances of scaffolding, much remains unknown about the effectiveness and processes of scaffolding. Solid research and solid measurement instruments are needed for this purpose. In summary, the measurement and analysis of scaffolding still appear to be in their infancy. Such an endeavour is a time-consuming and elaborate enterprise (Prunuske et al. 2013, 2016). The conceptual model of scaffolding and framework for analysis of scaffolding strategies presented here, however, can provide a concrete starting point for the development of an agreed-upon measurement instrument.

### Mentorship Framework

This study is framed using the diagram on mentorship in education research (Asogwa & Mathenjwa, 2023). This diagram believes that mentorship in education research is a relationship that is built on key components such as role modeling, independence and collaboration, the exchange of knowledge, mutual respect, and trust, a caring personal relationship, passion and inspiration, open communication, dedication, and accountability between the mentor and the mentee for it to be successful and produce results.



**Figure 4: Mentorship Theory (Asogwa & Mathenjwa, 2023)**

For a mentee to choose a mentor, he or she must be convinced that the mentor has more experience in research and wishes to develop to that higher platform. In any mentorship, especially in education research, the research lens serves as a filter and guide for both mentor and mentee to operate within the activities inherent in the research process, such as self-awareness, problem identification, materials and methods, data collection and analysis, interpretation and conclusion, publication, and application (Asogwa, 2020). In each step of the research process, it is the onus of the mentor to brainstorm with the mentee to assess his/her competence on what the research process is like, like problem identification, why problem identification is necessary in research, and how he/she can identify a problem for research. In this case, the mentor will



understand what the mentee cannot do in each of the research processes to support (scaffold) him/her, what he/she can do with help to reduce the support (fade), and what he/she can do without help to obtain information on the extent of improvement for criticism and advice (feedback). Mentorship in education is a relationship between two parties that is often hindered by several challenges, but the extent to which both the mentor and the mentee adhere to the eight key components of a mentoring relationship determines the success and sustainability of any mentorship in education research.

## CONCLUSION

In educational research, mentoring is a scaffolding relationship between an experienced mentor and a less experienced mentee, where the later aims at learning under the mentor's guidance. Role modeling, independence and collaboration, knowledge sharing, and respect for one another serve as the foundation of this partnership. Scaffolding is an instructional technique where a mentor models a learning strategy and gradually shifts responsibility for mastery. It offers supervisor-student interaction, diagnostic support, dialogues, and interactions, allowing supervisors to diagnose students' research skills and adapt support accordingly. It also develops technical and interpersonal skills, such as analytical thinking, logic, synthesis, writing, speaking, and reading, as well as independent learning skills. Scaffolding is an instructional strategy that helps mentors build mentees from what they cannot do to what they can do with help, ultimately enhancing their research achievement and self-esteem. There are six steps scaffolding methods can be used in education research mentoring namely: feeding back, giving hints, instructing, explaining, modeling, and asking questions for further searches. The effectiveness of a teaching strategy depends on its enactment in practice and whether it is contingent or part of a process of fading and transfer of responsibility. Mentoring challenges include inadequate time and other resources, inadequate support, insufficient knowledge and mentoring skill training and lack of suitable mentor-mentee pairing.

## Recommendations

1. Both mentors and mentees should understand the key components of mentoring relationship to enable each of them live up to expectation smoothly without being pressurized for successful mentorship. For instance, in the exchange of knowledge, there should be mutual respect, and trust between both since respect is reciprocal.
2. The mentor should be guided by the research lens in any education research mentorship to avoid distraction and deviation into an unrelated activities and unhealthy relationship.
3. During brainstorming, the mentee should be open minded to the mentor on what he/she cannot do, can do with help, and do without help in research process so that the mentor will understand when and where to support (scaffold), and reduce (fade) support and provide feedback for independence and sustainable growth in the profession.

4. The mentee should actively participate in the mentorship in education research to enable him/her to understand and construct his/her knowledge about what, why and how of each of the education research process.
5. The mentor should always provide forum for scaffolding via brainstorming with the mentee on each of the research process rather than making him/her a passive learner through teacher centered approach.
6. Educational planners should make scaffolding an integral part and teaching strategy of education research mentorship.

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