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Extensive Usage of Teachers' Portfolio in Reflection of Physics Subject Teaching Strategies for Public Secondary Schools in Moshi District Council, Tanzania

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Abstract:- The use of portfolio in monitoring students' authentic learning process has gained momentum in recent years by which this study sought to assess its extensiveness in secondary schools in Moshi District, Tanzania. The study addressed extensive usage of teacher's portfolio in reflection of Physics subject teaching strategies. Guided by the Reflective Practice Theory (RPT) the study employed a convergent design under a mixed-methods research approach. The target population for the study consisted of 2,830 individuals including; heads of schools, physics teachers, students and District School Quality Assurance Officers (DSQAO) in 61 secondary schools. Simple random, stratified random, and expert sampling techniques were used to obtain DSQAO, heads of schools, Physics teachers and students making a total of 363 respondents. The validity of research instruments was ensured by research experts in the faculty of education specialized in Assessment and Evaluation at the University. The reliability of Likert scale items in questionnaire was assured through Cronbach's Alpha coefficient which had outputs of .84 and .79 for teachers' and students respectively. The trustworthiness of qualitative data collection instruments was established through peer debriefing and triangulation. The quantitative data were descriptively analyzed in percentages, and frequencies, mean scores while qualitative data were analyzed thematically. The study adhered to ethical rules in research such as: anonymity, informed consents and confidentiality. The study found that although teachers are preparing portfolio documents, doubts regarding the organization and timely accessibility of these documents hinder their ability to enhance teaching and learning. The study concludes that teachers prepare documents for teaching and learning in physics, but improper portfolio organization remains a threat to providing constructive feedback for students' physics achievement. The study recommends proper organization and compilation of portfolios for effective tracking of students' learning progress.

Keywords:- *Teacher's Portfolio, Teaching Strategies, Physics Subject, Reflection, Extensiveness.*

I. INTRODUCTION

Portfolios are now acknowledged as a useful instrument for educators in the field of science at all levels of schooling, aiding in the genuine evaluation of teaching and learning. As Swaran-Singh et al. (2022) pointed out, a portfolio is a deliberate compilation tool that efficiently displays an individual's work, development, and accomplishments throughout time. Its main roles involve intentional selection, contemplation, evaluation, tracking progress, customization, active involvement, and flexibility. Furthermore, portfolios offer concrete proof of a person's abilities, accomplishments, and capabilities, making them a beneficial tool for prospective employers or customers (Chere & Mothetsi, 2022). Portfolios are widely acknowledged as a flexible and versatile tool that allows educators to assess teaching and learning dynamics across different educational levels in a meaningful way. Portfolios serve as a complete collection of an individual's achievements, enabling teachers and students to reflect on their practice, establish specific objectives, and track their professional development.

A teacher's portfolio is an important resource that acts as a complete documentation of their professional background, credentials, and proof of teaching success (Aras, 2021). Teacher portfolios that are effective show various key signs that indicate the teacher's capacity to reflect on and highlight their instructional methods (Kır, 2023). Portfolios should contain a variety of items, like lesson plans, student work samples, and assessments, to demonstrate the teacher's methods and practices effectively. Additionally, incorporating reflective narratives enables the teacher to explain the reasoning behind their teaching choices and the effect of certain strategies on student progress. By including these components, a teacher's portfolio can efficiently record their teaching methods and act as a beneficial tool for career growth

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and progress (Malicay, 2023). Nevertheless, even though there are advantages in utilizing teachers' portfolios to encourage active learning, Indonesian teachers frequently do not have the required expertise to develop and execute them adequately (Nurhayani et al., 2023). Furthermore, the absence of clear guidelines or standards for teacher portfolios in terms of structure, content, and evaluation could cause inconsistencies and uncertainties in their use, ultimately reducing their efficacy as a tool for reflection.

In Ghana, teachers have a restricted grasp and knowledge of portfolios, which prevents them from reflecting on teaching methods effectively (Ankrah et. al., 2023). Likewise, in Kenyan educational institutions, teachers' ability to reflect and build portfolios is greatly influenced by the sizable number of students in each class (Mutuku, 2019; Onguko et al., 2020; Simatwa et al., 2019). Moreover, in Uganda, teachers have a problematic grasp of portfolios, leading to inconsistencies in material, structure, and assessment (Bakaira, 2023). This lack of awareness and understanding of portfolios as a reflective tool among teachers, especially in the field of physics education, is a major issue.

To build students' lifelong learning skills effectively, it is crucial to utilize carefully crafted teaching strategies. These tactics and procedures used by educators to help students learn and achieve specific learning goals are known as strategies (Bagaskara et al., 2022). These carefully planned tactics aim to involve students, stimulate critical thinking, and improve their comprehension of the material. Common teaching methods consist of hands-on activities to promote experiential learning, integrating technology for a dynamic educational setting, focusing on active student involvement in student-centered approaches, and utilizing traditional lecture-style teaching. Implementing these successful teaching techniques is essential for providing students with the necessary skills to excel in both academic settings and future pursuits (Li et al., 2023). Nonetheless, the issue of teachers' lack of understanding and recognition of portfolios as a tool for reflection is still worrisome, and more research is needed to examine the implementation and effectiveness of these teaching methods in the field of physics education.

The learning and teaching of physics is commonly viewed as a challenging topic in secondary schools, which has resulted in low student achievement as shown in table 1.

Table 1 Low Student Achievement

Year	Candidates who sat for the National Examinations	Candidates who Passed	Percentage
2020	12,0342	58,808	48.87
2021	11,5846	64,096	55.33
2022	11,4472	78,009	68.34

Source: Candidates' Item Response Analysis (CIRA, 2022)

These low pass rates, revealing that more than 30% of students failed to meet the necessary standards, suggest possible problems with how physics is taught and learned in high school. The poor physics results and decreasing student numbers in secondary schools from 2020 to 2022 highlight the importance of investigating the reasons for low performance and creating programs to improve physics teaching. Despite a gradual increase in pass rates from 2020 to 2022, the overall performance remains below expectations, highlighting the need for further efforts to address the root issues in secondary physics education.

In 2012, the Tanzanian Institute of Education (TIE) implemented a curriculum framework focusing on practical skills and competencies in secondary education (Komba & Shukia, 2023). This model promotes the utilization of various teaching and evaluation techniques to aid in student education. Furthermore, the 2014 Tanzania Education and Training Policy (ETP) emphasizes the significance of enhancing student competency by utilizing diverse teaching methods and adaptable assessment techniques (Msamba et al., 2023). The assessment guidelines provided by the National Examinations Council of Tanzania (NECTA, 2021) and the policies set by the URT (2021) highlight the significance of incorporating reflective assessment tools and implementing strong teaching strategies. In spite of these attempts, there are still doubts among teachers about fully grasping the importance of integrating portfolio-based assessment for showcasing teaching methods in Physics at secondary schools in Tanzania. Thus, the present research evaluated the extent to which teacher portfolios are utilized to improve reflection on teaching strategies in physics subjects in public secondary schools in Moshi district Council, Tanzania.

- *Statement of the Problem*

A major challenge in Tanzanian secondary schools is the lack of effective reflection on teaching strategies for the physics subject, which is often seen as difficult and results in low student achievement. Improving the utilization of successful teaching methods in physics education is acknowledged as essential to enhancing student learning. (Nyirahagenimana and colleagues, 2022). Yet, it is not clear how much teacher portfolios have been used to support reflection and enhance physics instruction (Bin, 2021). Although NECTA's policy guidelines stress the importance of portfolios in evaluating teaching and learning methods, obstacles in teaching Physics continue to exist. Concerns have been raised by students, teachers, quality assurance officers, school administrators, parents, and education researchers regarding the utilization of teacher portfolios to improve

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Physics education in Tanzanian secondary schools. Past research has investigated how portfolios can aid teachers in reflection, critical thinking, and professional growth, but they have not concentrated on portfolios' role in improving reflection on teaching methods (Chye et al., 2019; Ayaz and Gök, 2022; Beka, 2021; Tshering et al., 2022; Ndomba, 2021). Hence, the current study aims to assess the extensive usage of teacher's portfolio in reflection of Physics subject teaching strategies in public secondary schools in Moshi District Council, Tanzania.

- *Research Question*

This research study sought to answer the question: To what extent does teacher's portfolio help in reflection of physics subject teaching strategies in Moshi District Council, Tanzania?

- *Significance of the Study*

This research is important as it could provide useful information for school administrators, physics teachers, and students. It seeks to assist physics educators in improving the consistency between their teaching materials and teaching techniques, encouraging more intentional recording of teaching methods. By demonstrating how portfolios can display teaching methods, students may gain a deeper understanding of educators' commitment. Furthermore, the results could assist administrators in assessing and backing Physics Educators, impacting decision-making on teacher education and accreditation. This study broadens knowledge on utilizing teaching portfolios to improve teaching methods, specifically in physics education, enhancing current literature on this reflective instrument.

II. THEORETICAL FRAMEWORK

The research was influenced by the Reflective Practice Theory (RPT) created by Donald Schön during the 1980s. RPT stresses the significance of thoughtfully reviewing their experiences, actions, and beliefs to improve professional practice and support ongoing learning and advancement. It requires individuals to consciously and systematically reflect on their thoughts, emotions, and behaviors in connection to their professional duties and obligations. Through participating in reflective practice, professionals are able to develop a better understanding of how they make decisions, solve problems, and perform in general. This enables them to recognize their strengths and weaknesses, as well as create new viewpoints to enhance their performance.

The Reflective Practice Theory is very important for this study as it corresponds with the goal of a teacher's portfolio, allowing teachers to think about their teaching approaches, methods of instruction, and results of student learning. By utilizing the portfolio, educators can assess their work, identify strengths and areas for growth, and adjust their teaching methods to improve student learning, acting as an essential tool for tracking and evaluating their professional growth. The concept advocates for self-awareness and self-reflection, offers a systematic method for ongoing learning and career growth, and fosters critical examination and analysis of personal experiences, assumptions, and beliefs. Nonetheless, the theory's strong dependence on subjective interpretation and the amount of time and effort needed for reflective practice are viewed as its drawbacks, as they may lead to bias and hinder the objectivity of reflection, while also presenting obstacles in its execution.

III. LITERATURE REVIEW

The review of research studies focuses on examining how teacher portfolios demonstrate strategies for teaching physics. The focus is on using teacher portfolios for reflection in educational environments.

Chye et al. (2019) carried out research on the utilization of e-portfolios to enhance reflection: Findings from an analysis based on activity theory in Singapore. 40 teachers were randomly selected from five schools and 259 students were randomly chosen from the same five schools as part of the research. The research employed a descriptive survey design, utilizing a questionnaire for the teachers and conducting interviews with the parents. By analyzing the information, the authors suggest a framework that showcases how the different parts of the activity system (subject, object, community, tools, rules, and division of labour) interact when using e-portfolios for reflection. The use of a descriptive survey design and questionnaires for teachers, along with interviews with school heads, in the study has led to worries about the depth and richness of the data gathered. Surveys and questionnaires may have limitations in capturing the complex experiences and perspectives of participants, which can introduce biases and limitations in understanding students' reflections and experiences with e-portfolios. Also, the results of the research predominantly depend on e-portfolios, which may pose challenges in their implementation in developing nations such as Tanzania because of technological and economic limitations. Therefore, it is necessary for the study to be carried out within the Tanzanian context, taking into consideration Tanzania's technological and economic status.

Ayaz and Gök (2022) carried out research on how the utilization of e-portfolio application impacts the reflective thinking and learning motivation of school teacher candidates in Turkey. The study utilized a quasi-experimental design involving a pretest-posttest control group. The research utilized a combination of quantitative and qualitative methods. The results of the research show that the experimental group had higher post-test mean scores in reflective thinking compared to the control group. This indicates that the utilization of e-portfolios had a positive impact on the development of reflective thinking in prospective teachers. Furthermore, the research utilized a quasi-experimental design featuring a pretest-posttest control group, the lack of random assignment may result in biases and constraints in determining

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causal connections between the e-portfolio application and the measured results. Random assignment is important for ensuring that participants are assigned to experimental and control groups fairly, thus minimizing the impact of confounding variables on the results. The absence of random assignment in the study hinders the ability to definitively prove a direct cause-and-effect relationship between e-portfolio use and outcomes. This restriction could have an indirect effect on how teacher portfolios demonstrate teaching strategies in the process of teaching and learning.

Beka and Kulinxha (2021) in Southern Europe, specifically Kosovo, conducted research on how portfolios can be used by pre-service teachers for self-reflection and professional development. The study aimed to investigate how portfolios help pre-service teachers reflect on themselves and develop professionally. Qualitative research design was utilized in the study, along with semi-structured interviews. Specific sampling technique was used to select 20 respondents from graduate students. Semi-structured interviews were used as the tool for gathering data. Thematic analysis was conducted on the data to discover patterns and themes that are connected to the significance of portfolio preparation, reflection, and how they influence professional growth. The study emphasizes the different perspectives of pre-service teachers on portfolio development, showing varied levels of comprehension and involvement. The research does not fully discuss how teacher portfolios showcase teaching tactics. Although the study intended to investigate how portfolios contribute to professional development, it primarily concentrated on the general aspects of portfolio creation and self-reflection, neglecting to thoroughly examine how portfolios capture, analyze, and enhance teachers' teaching strategies. Hence, it is necessary to carry out research to delve deeper into how portfolios can record, assess, and enhance teachers' instructional approaches.

Garrido (2023) in Chile examined how science teachers incorporate reflection into their teaching methods in different educational programs. Through purposive sampling, the study examined science teachers in higher education using a qualitative method. Data was gathered through interviews, observation, and stimulated recall interviews in order to show how teachers evaluate their approaches. Despite aiming to offer in-depth insights, the study's impact is weakened by the absence of implementation details and findings. The literature review focuses mainly on the methodology, excluding any concrete results. Diversifying participant samples in various institutional contexts or science education fields could enhance the study's relevance. In general, there is a need for a comparable research project to assess how teachers' portfolios showcase their teaching methods, especially in the Tanzanian setting.

Ndomba (2021) conducted research on the development of reflective skills in teacher trainees in Kilimanjaro and Ruvuma Regions, Tanzania, utilizing a case study approach. Results from structured interviews with 10 teachers showed different strategies like participatory techniques, inquiry-based learning, and portfolios to develop reflective abilities. The research highlighted the popularity of participatory methods as they are easy to use and implement, underscoring the unique benefits of each method for developing skills. While Ndomba's (2021) research uncovered the evaluation of reflective abilities in education, the results cannot be applied broadly as it focused on a specific entity through a case study. According to Cohen et al. (2018), case studies do not mainly aim for generalization, but rather, they signal to researchers the potential for similar results in alternate contexts. Hence, it is necessary for the present research to be carried out to acquire a more comprehensive insight into the Development and Assessment of Reflective Skills among Teacher Trainees in Tanzania.

Generally, numerous reviewed studies emphasized the significance of teachers' portfolios in the instruction and education of Physics subjects (Ayaz & Gök, 2022; Martínez et al., 2022). Nevertheless, it is crucial to take into account restrictions and predispositions in particular research. Chye et al. (2019) conducted a study showing that e-portfolios are challenging to introduce in countries like Tanzania because of technology and financial limitations. In Kosovo, Southern Europe, a study was conducted by Beka and Kulinxha (2021) on using Portfolios for self-reflection and professional development among Pre service teachers. Moreover, Tshering et al. (2022) carried out research investigating the reflective practices and challenges faced by physics teachers. Moreover, Ndomba (2021) investigated the growth and evaluation of reflective abilities in teacher candidates in Kilimanjaro and Ruvuma Regions, Tanzania. To fill this void, the current study utilized a convergent design, suitable sampling methods, and appropriate data collection tools. Nevertheless, it is important to mention that the existing literature did not fully address the significance of teacher portfolios in showcasing the teaching methods employed by physics teachers in public secondary schools in Moshi District, Tanzania. Hence, the study examined how extensively teacher portfolios are utilized to improve reflection on physics teaching methods in public secondary schools in Moshi District Council, Tanzania.

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IV. METHODOLOGY

This study employed convergent design under mixed methods research approach. The purpose of using this design was to collect both quantitative and qualitative data simultaneously and compare the results to obtain a more complete understanding of the research problem (Creswell & Creswell, 2018). The sample group included 61 school Head of Schools, 123 teachers of Physics, 2,745 students from 61 public high schools, and 1 Quality Assurance Officer from the district. This study included 338 students, 12 Physics Teachers, 12 Head of schools, and 1 DSQAO, totaling 363 respondents, selected through a combination of probability and non-probability sampling methods. Information was gathered through surveys for Physics educators and students, interviews for School Principals and Quality Assurance Officers, and document evaluation for Physics Teachers. Research experts from the department of education in Assessment and Evaluation at MWECAU validated data collection instruments to ensure the validity of both quantitative and qualitative tools, with the participation of MWECAU research experts. Pilot testing was conducted in three public high schools to detect any uncertainties or challenges in understanding the tools, guaranteeing they are clear and understandable to participants. Cronbach's Alpha Coefficient was used to evaluate the reliability of the teacher and student questionnaires in the research, showing values of 0.84 and 0.79, respectively, which demonstrate strong internal consistency. Peer debriefing and triangulation were used to confirm the reliability of qualitative instruments in interview guides. The research process was conducted in accordance with ethical considerations. Quantitative analysis of data for descriptive statistics was conducted through SPSS version 22, utilizing frequencies, percentages, and mean scores. Thematic analysis was used to analyze qualitative data, involving the processes of becoming familiar with the data, organizing it, coding, reducing and presenting it in its original form.

V. FINDINGS

This section presents research findings on the role of teacher portfolios in reflecting Physics teaching strategies in Moshi District Council, Tanzania. Data collected through questionnaires interviews and analysis of documents is analyzed to assess the extent of reflection of teaching and learning.

Research question for this study aimed to assess the extent to which teacher's portfolio help in reflecting Physics teaching strategies in public secondary schools in the Moshi district council, Tanzania., Data was obtained through questionnaires which provided items to teachers and students to rate the extent Likert scale. Head of schools, and District School Quality Assurance were interviewed. The five-level Likert scale was employed to make the unit of analysis in which 1= (VLE) Very Low Extent, 2= (LE) Low Extent, 3=(M) Moderate, 4=(HE) High Extent, 5=(VHE)Very High Extent, F=frequencies, P=Percentages. The rate of percentage described as ≤ 20=extremely minority; 21-49= minority; 50-59=moderate; 60-69= majority; 70-89= very high majority; 90-99=extremely majority; 100= overwhelming majority (Taherdoost, 2019). A mean score greater than 3 for the item indicates that the portfolio helps in reflecting teaching strategies in the teaching and learning of the Physics subject. A mean score less than 3 indicates that the portfolio does not help in reflecting teaching strategies in the teaching and learning of the Physics subject. An exactly mean score of 3 implies uncertainty regarding whether the portfolio helps or not in reflecting teaching strategies in the teaching and learning of the Physics subject.

Response for teachers and students are summarized in Table 2.

Table 2:- Teachers (TRs) Responses on The Extent to which Teachers' Portfolio Help in Reflecting Teaching Strategies in Teaching and Learning of Physics Subject in Public Secondary Schools in the Moshi District Council, Tanzania (n=12)

	VSE		SE		ME		LE		VLE		M
	f	%	f	%	f	%	f	%	f	%	
i.My portfolio demonstrates my teaching strategies.	0	0.0	0	0.0	0	0.0	4	33.3	8	66.7	4.67
ii.The portfolio accurately represents my instructional approaches.	0	0.0	0	0.0	0	0.0	12	100.0	0	0.0	4.00
iii.The portfolio displays a variety of teaching and learning strategies.	0	0.0	0	0.0	0	0.0	0	0.0	12	100.0	4.00
iv.The portfolio captures the progression of teaching throughout the year.	0	0.0	0	0.0	0	0.0	8	66.7	4	33.3	4.33
v.The portfolio is used to analyze the effectiveness of teaching and learning strategies.	0	0.0	0	0.0	0	0.0	0	0.0	12	100.0	5.00
vi.The portfolio reflects the integration of technology in teaching and learning.	0	0.0	0	0.0	0	0.0	4	33.3	8	66.7	4.67
vii.The portfolio shows efforts to create an inclusive learning environment.	0	0.0	0	0.0	4	33.3	0	0.0	8	66.7	4.33

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viii.Portfolios show that active learning techniques are being used.	0	0.0	0	0.0	0	0.0	0	0.0	12	100.0	5.00
ix.The portfolio is used to reflect the alignment of teaching with learning goals.	0	0.0	0	0.0	0	0.0	4	33.3	8	66.7	4.67
x.The portfolio is used to show the effectiveness of classroom management strategies	0	0.0	0	0.0	4	33.3	0	0.0	8	66.7	4.33
Grand mean .											**4.5**

Source: Field Data (2024) 1=Very Small Extent (VSE), 2= Small Extent (SE), 3=Moderate Extent (M)E, 4=Large Extent (LE), 5=Very Large Extent (VLE), F=frequencies, P=Percentages.

Data in Table 2, indicates that an overwhelming majority (100%) of teachers rated the portfolio as displaying a variety of teaching and learning strategies to a large extent and very large extent. The mean score is 4.00, indicating that teachers perceive the portfolio as highly effective in showcasing diverse instructional methods. The data implies that the portfolio is a valuable tool for teachers, providing them with a comprehensive and flexible resource to enhance their teaching practices and support student learning. Teachers perceive portfolios as effective tools for reflecting teaching strategies in the teaching and learning of physics. This indicates a broad consensus among teachers regarding the utility of portfolios in showcasing diverse instructional approaches and methods used in their teaching practices. The portfolios are viewed not only as repositories of teaching strategies but also as reflective tools that support professional growth and instructional improvement among educators in the district. The researcher during a face-to-face interview with head of school (HoS) had this to say:

A toolbox with only one tool – it wouldn't be very effective; our teachers understand this. Their physics portfolios act as a treasure trove of different teaching strategies, highlighting their commitment to engaging students in a variety of ways. These portfolios aren't just a collection of lesson plans; they're a reflection of the teacher's pedagogical toolbox (Personal communication with HoS "12": April 23, 2024).

- *The District School Quality Assurer (DSQA) had this to say:*

These portfolios offer a unique window into a teacher's pedagogical toolbox. They're not just a collection of lesson plans; they're a reflection of the teacher's approach to instruction. By incorporating diverse methods - group projects, simulations, interactive games these portfolios demonstrate the teacher's ability to cater to different learning styles and keep students actively engaged in the complexities of physics (DSQA personal Communication, April 24, 2024).

The information from the interview implies that the physics teacher's portfolios serve as comprehensive repositories of diverse teaching strategies, reflecting their commitment to engaging students in varied ways. These portfolios go beyond mere lesson plans, showcasing the teacher's pedagogical toolbox and approach to instruction. These findings are in line with the study by Aras (2021) who affirmed that, portfolios contribute to reflecting on teachers' instructional approaches, needs assessment, and professional development plans, portraying professional growth.

Data in Table 2 shows that an overwhelming majority (100%) of teachers rated the portfolio as being used to analyze the effectiveness of teaching and learning strategies to a large extent and very large extent. The mean score is 5.00, indicating that teachers find portfolio as a critical tool for evaluating and improving instructional methods, ultimately enhancing the educational outcomes for students. This implies the underscores of widespread that portfolios not only document teaching strategies but also serve as systematic frameworks for evaluating their impact on student learning outcomes. This reflective process not only enhances teaching effectiveness but also supports professional growth by fostering a culture of self-assessment and evidence-based pedagogy among educators in the district. Portfolios play a vital role in shaping and refining teaching strategies to better meet the educational needs of students in physics education. The researcher during a face-to-face interview with Head of School had this to say:

Their portfolios aren't just a collection of strategies; they're a dynamic toolbox that fuels a cycle of continuous improvement. The strong portfolios are a cornerstone of effective teaching, and using them for analysis is key. By reviewing student work, assessments, and feedback within their portfolios, teachers can see firsthand how their chosen strategies are impacting student learning (Personal communication with HoS "3": March 15 ,2024).

The head of school "1" had this to say: portfolios serve as a comprehensive tool for both teachers and students. They not only help in planning and implementing diverse teaching strategies but also in reviewing and improving them. Our teachers regularly update their portfolios with new techniques, assessment results, and feedback, which facilitates ongoing professional development and instructional refinement (Personal communication with HoS "1": March 12, 2024).

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Information from the interview implies that the portfolios maintained by teachers are not static collections of strategies, but dynamic tools that drive continuous improvement in teaching. These strong portfolios are essential for effective teaching practices, serving as a foundation for analysis and reflection. The teacher portfolios go beyond passive documentation - they actively shape and guide the teachers' professional practice. The portfolios serve as living, evolving records that enable teachers to assess their impact, identify areas for improvement, and make adjustments to better meet the needs of their students. These findings from this study are consistent with those of the study conducted by Babaee et al. (2021) who affirmed that, portfolios are effective as an evidence-based strategy for demonstrating effective teaching and learning strategies and supporting lifelong learning. These portfolios are not static collections, but dynamic tools that drive the teachers' continuous improvement and reflective practice. The in-depth nature of the portfolios allows for a nuanced understanding of the educators' skills, decision-making, and professional growth over time.

During document analysis, the study revealed several key issues. Firstly, some documents, such as lesson plans, are primarily prepared to fulfill the employer's requirements, rather than being effectively utilized for teaching. These plans are often influenced by follow-up from administrators, leading teachers to focus on the preparation process rather than its practical application in the classroom.

Secondly, the portfolio documents are not well-organized, making it difficult for teachers to track student progress. The documents are scattered and not compiled in a single file, making them cumbersome to use when needed. This poor organization hinders the potential of portfolios as a tool for effective student assessment and reflection.

Lastly, due to heavy workloads, some physics teachers are unable to plan effectively, resulting in inconsistencies in document preparation. This is further supported by Bakaira (2023), who found a problematic understanding of portfolios among teachers, leading to inconsistencies in content organization and evaluation. However, to improve the effectiveness of portfolios, teachers need to plan thoroughly and utilize them appropriately, ensuring that they serve as valuable tools for student reflection and learning.

Data in Table 2 indicates that, an overwhelming majority (100%) of teachers rated that portfolio reflects the integration of technology in teaching and learning. The mean score is 4.67 for teachers. This implies the importance placed on integrating technological resources to enhance teaching strategies and student engagement in physics education. By documenting technology integration through portfolios, teachers not only highlight their use of digital tools but also demonstrate how these tools support learning objectives and promote innovative teaching methods. This reflection process supports professional development by encouraging educators to explore and leverage technology effectively, ultimately fostering a dynamic and responsive learning environment for students in physics education. Thus, portfolios serve as instrumental resources for teachers to demonstrate and continuously improve their approach to integrating technology in teaching and learning practices. During a face-to-face interview with the Head of School "7", the Hos stated:

Portfolios are not just showcases of traditional teaching methods; they actively reflect the integration of technology to enhance student engagement and learning. Technology is a powerful tool that can revolutionize education, especially in science subjects like physics. By documenting their use of technology within their portfolios, our teachers achieve two key things (Personal communication with HoS "7": April 15, 2024).

- *About integrating technology, Head of School (HoS 8) had this to say:*

The focus on integrating technology, documenting its use, and reflecting on its effectiveness fosters a culture of continuous learning and professional growth among our educators. We actively encourage teachers to explore new tools, share best practices, and find innovative ways to leverage technology to create dynamic and responsive learning environments (Personal communication with HoS "8": April 19, 2024).

The information from the interviews points toward that teachers are actively integrating technology into their teaching practices to enhance student engagement and learning in subjects like physics. Portfolios serve as reflections of this integration, showcasing how technology is leveraged to revolutionize education. Through documenting the use of technology and reflecting on its effectiveness within their portfolios, teachers not only enhance student learning but also cultivate a culture of continuous learning and professional growth. This focus on integrating technology fosters innovation, encourages the exploration of new tools, and promotes the creation of dynamic and responsive learning environments that benefit both educators and students alike. The findings from the study are in line with the Reflective Practice Theory (RPT), which emphasizes the importance of teachers engaging in ongoing reflection on their practices to improve their teaching effectiveness. The high ratings from both teachers and students regarding the integration of technology in teaching and learning through the use of portfolios suggests that the portfolio is an effective tool for facilitating reflective practice. The RPT's emphasis on using tools and strategies that enable teachers to critically examine their teaching methods and make informed adjustments to enhance student learning.

Data in Table 2 indicates that an overwhelming majority (100%) of teachers rated that portfolios demonstrate the use of active learning techniques to a large extent and very large extent. The mean score is 5.00, indicating extensive consent

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among teachers regarding the extensive utilization of these techniques. This indicates that teachers rely on portfolios not only to document their implementation of active learning strategies such as group activities, experiments, and problem-solving exercises but also to provide tangible evidence of their effectiveness in enhancing student participation and understanding. During a face-to-face interview with the head of school "3," the following statement was made:

Portfolios serve as dynamic repositories where teachers document and highlight their use of active teaching strategies in physics. These portfolios include examples of interactive demonstrations, hands-on experiments, and collaborative projects that engage students actively in learning scientific concepts. By showcasing these techniques, our teachers illustrate their commitment to fostering a deeper understanding of physics through experiential learning (Personal communication with HoS "3": March 15, 2024).

- *Another head of schools "4" shared:*

Portfolios play a pivotal role in demonstrating the application of active teaching and learning techniques in physics. Our teachers utilize portfolios to capture moments of student engagement during laboratory sessions, simulations, and real-world applications of physics principles. These documented experiences not only showcase the effectiveness of active learning but also encourage continuous improvement and innovation in our instructional practices (Personal communication with HoS "4": March, 19. 2024).

Information from the interview implies that portfolios serve as dynamic platforms showcasing teachers' commitment to active learning strategies such as group activities, experiments, and problem-solving exercises in physics education. Emphasizing active learning as essential, the portfolios document the implementation of these strategies, highlighting a hands-on approach to teaching that engages students and fosters deeper understanding of physics concepts. These findings are in line with the study by Marinho et al., (2021) who affirmed that, portfolios are used as an assessment of active learning techniques in schools to generate learning, enhance knowledge reconstruction, and develop students' reflective capacity. This approach suggests a focus on experiential learning and student engagement, with portfolios serving as evidence of effective teaching methods that prioritize interactive and collaborative learning experiences in physics education.

Data in Table 1 indicates that a majority (66.7%) of teachers rated the portfolio as effectively demonstrating classroom management strategies to a large extent and very large extent. Conversely, a minority (33.3%) of teachers indicated moderate extent in their perception of the portfolio's effectiveness in showcasing these strategies. The mean score is 4.33, indicating a generally positive assessment by teachers regarding the portfolio's role in illustrating effective classroom management practices. This implies that while there is acknowledgment of portfolios as tools for demonstrating successful classroom management, there may be varying degrees of clarity or consensus among teachers regarding the extent to which portfolios effectively capture and portray these strategies. The use of portfolios to highlight classroom management strategies underscores their multifaceted role in documenting comprehensive teaching practices and promoting effective learning environments in physics education within the district. During a face-to-face interview with the district school quality assurance officer, the researcher made the following statement:

Effective communication and education are crucial when it comes to utilizing Portfolios to demonstrate successful classroom management strategies. They highlighted the need for collaborative efforts between teachers, students, and administrators to ensure that everyone has a clear understanding of the purpose and benefits of using Portfolios in this context (Personal communication with DSQAO Interview, March 24, 2024).

- *The head of school "5" also shared:*

At our school, physics teachers used their portfolio to highlight a classroom organization system that included visual schedules, designated learning areas, and structured routines. The portfolio documented how these strategies contributed to a calm and focused learning environment, fostering student independence and responsibility. It provided concrete evidence of effective classroom management practices that support student success (Personal communication with HoS "5": March 21, 2024).

The information implies that effective communication and education are essential for implementing successful classroom management strategies using portfolios. It emphasizes the importance of collaboration among teachers, students, and administrators to ensure that everyone comprehends the purpose and advantages of utilizing Portfolios in the educational context. This suggests that clear communication and shared understanding are crucial for the successful implementation of Portfolios as a tool for demonstrating classroom management strategies. It also indicates that all stakeholders need to be actively involved and informed to maximize the benefits of using Portfolios in this context. The findings from this study align with those of Lestari et al. (2021), who confirmed that portfolios are effective in enhancing learning outcomes, motivating learning, and improving the quality of student learning. Portfolios serve as comprehensive tools for students to reflect on their progress, showcase their achievements, and engage actively in their own learning process.

Generally, portfolios are used by physics teachers to reflect the teaching strategies employed in the teaching and learning of Physics subject. These portfolios serve as a valuable tool for both teachers and quality assurers to monitor the effectiveness of instructional approaches. However, the

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study revealed that due to heavy workloads, some physics teachers are unable to plan effectively, resulting in inconsistencies in document preparation. Additionally, the portfolios are not well-organized, making it difficult for teachers to track student progress and utilize them as intended. These challenges hinder the full potential of portfolios as a means to enhance reflection in Physics teaching strategies.

The students also were asked to respond on the Extent Teacher's Portfolio Help in Reflecting Teaching Strategies in Teaching and Learning of Physics Subject in Public Secondary Schools in the Moshi District Council and their responses were presented in Table 3.

Table 3 Students (STs) Responses on The Extent Teacher's Portfolio Help in Reflecting Teaching Strategies in Teaching and Learning of Physics Subject in Public Secondary Schools in the Moshi District Council, Tanzania (n=338)

	VSE		SE		ME		LE		VLE		M
	f	%	f	%	f	%	f	%	f	%	
i.The teacher explains what students will learn in a physics lesson and why it's important to students.	0	0.0	10	3.0	9	2.7	83	24.6	236	69.8	4.61
ii.The teacher helps to clear up any wrong idea's students might have about physics subject.	0	0.0	7	2.1	17	5.0	168	49.7	146	43.2	4.34
iii.The teacher uses really good ways to teach physics that make it easy to understand.	6	1.8	9	2.7	12	3.6	95	28.1	216	63.9	4.50
v.The teacher uses different ways to teach physics, like doing experiments and showing videos.	9	2.7	10	3.0	20	5.9	180	53.3	119	35.2	4.15
v.The teacher's teaching methods make students feel creative and think of new ideas in physics.	0	0.0	3	0.9	21	6.2	114	33.7	200	59.2	4.51
vi.The teacher uses technology, like computers and tablets, to teach physics in a simple way.	0	0.0	17	5.0	12	3.6	63	18.6	246	72.8	4.59
vii.The teacher talks with the students and asks them questions to make physics class more interesting.	0	0.0	6	1.8	17	5.0	70	20.7	245	72.5	4.64
viii.The teacher uses real-world examples and applications in teaching physics	0	0.0	1	0.3	9	2.7	216	63.9	112	33.1	4.30
ix.The teacher helps students learn physics by teaching them how to solve problems step by step.	0	0.0	3	0.9	10	3.0	157	46.4	168	49.7	4.45
x.The teacher lets students do simple experiments with their hands to learn physics.	0	0.0	0	0.0	5	1.5	79	23.4	254	75.1	4.74
Grand Mean											**4.58**

Source: Field Data (2024) 1=Very Small Extent (VSE), 2= Small Extent (SE), 3=Moderate Extent (ME), 4=Large Extent (LE), 5=Very Large Extent (VLE), F=frequencies, P=Percentages.

Data in Table 3 indicates that an overwhelming majority (94.4%) of students rated that the teacher explains what students will learn in the physics lesson and why it's important to them to a large extent and very large extent. In contrast, a small minority (3.0%) of students rated this aspect to a moderate extent. The mean score is 4.61, indicating a highly positive perception among students regarding the clarity and significance of lesson objectives explained by their teachers. This implies that most students appreciate and benefit from understanding the relevance of their physics lessons, which likely contributes to their engagement and learning outcomes. This appears to be a key strength that fosters student engagement, supports learning, and reflects the teachers' commitment to effective instructional practices. Maintaining this level of clarity and relevance is likely a critical factor in the students' physics learning experience and outcomes. During face-to-face interview with the heads of schools about teacher explains what students will learn in the physics lesson and why it's important to them, the head of school "11" said:

We emphasize the importance of teachers clearly articulating the learning objectives in physics lessons and their relevance to students. This practice is fundamental to ensuring that students understand the purpose and goals of each lesson. Our teachers use various strategies, such as outlining learning outcomes at the beginning of class, connecting concepts to real-world applications, and engaging students in discussions about why understanding these principles is essential for their future academic and personal growth (Personal communication with HoS "11" April, 2024).

- *Another head of school "6" commented:*

Our physics teacher understands the importance of making the subject relevant for students. Their portfolio likely contains a wealth of lesson plans that prioritize explaining the "why" behind the "what." Physics education goes beyond just

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memorizing formulas. It's about fostering understanding and engagement. By capturing this approach in their portfolios, the teacher showcases a valuable strategy (Personal communication with HoS "6": March 25, 2024).

Information from the interviews implies a shared commitment among the heads of school "6" to ensuring that physics teachers effectively communicate lesson objectives and their relevance to students. This commitment is reflected in their emphasis on strategies such as outlining learning outcomes, connecting concepts to real-world applications, and fostering discussions about the broader significance of physics principles. This approach aims to foster understanding and engagement among students by emphasizing the "why" behind the "what" in physics education. By capturing this student-centered and explanatory approach in their portfolios, the teacher demonstrates a valuable strategy that enhances the learning experience and promotes deeper comprehension of physics principles. These findings of the study are in line with the study by Chao, (2023) who affirmed that, cultivating students' ability in junior high school physics teaching can strengthen discipline thinking and improve teaching effectiveness. Empowering students with strong foundational skills in physics not only enhances their academic performance but also enriches their overall learning experience by fostering critical thinking and analytical skills essential for future academic success.

Data in Table 3 indicates that an overwhelming majority (92%) of students rated that the teacher uses highly effective methods to teach physics, making it easy to understand to a large extent and very large extent. In contrast, a very small minority (4.5%) of students rated this aspect to a moderate extent. The mean score is 4.50, suggesting that most students perceive the instructional approaches in physics as clear and accessible, which likely contributes to enhanced learning outcomes and overall satisfaction with their educational experience. The strong student agreement points to the teachers' mastery of pedagogical techniques that facilitate meaningful, engaged learning of physics. This foundation of clarity and relevance likely contributes significantly to the students' overall physics learning experience and outcomes. The researcher during a face-to-face interview with DSQA had this to say:

Teaching methods are essential for effective science education, especially in a subject like physics. Imagine a student confronted with a barrage of complex physics concepts without clear explanations or engaging activities. That would not be a recipe for success. Feedback from students indicates that the Physics teacher's portfolio likely reflects a commitment to providing clear and engaging instruction (DSQA personal communication, April 24, 2024).

- *The head of school "7" also shared:*

Our teachers utilize a variety of strategies such as interactive demonstrations, hands-on experiments, and multimedia presentations to make complex physics concepts accessible to students. These methods not only engage students actively in the learning process but also cater to diverse learning styles, ensuring that all students have the opportunity to grasp and apply physics principles effectively (Personal communication with HoS "7": March 15, 2024).

Evidence from the interview infers that effective teaching methods play a crucial role in science education, especially in physics. The feedback from students suggests that the teacher's physics portfolio likely demonstrates a commitment to providing clear explanations and engaging activities in instruction. This emphasis on clear and engaging teaching strategies reflected in the portfolio indicates a proactive approach by the teacher to ensure that students receive comprehensible explanations and interactive learning experiences, ultimately fostering success in understanding complex physics concepts. The findings of the study are consistent with those by Geelan (2019), who affirmed that teachers who exemplify high-quality physics teaching contribute to high-quality understanding in students. Effective teaching practices in physics, characterized by clarity, engagement, and depth of understanding, significantly enhance students' comprehension and mastery of the subject matter.

Data in Table 2 indicates that a vast majority (88.5%) of students rated that the teacher uses various methods to teach physics, such as conducting experiments and showing videos, to a large extent and very large extent. In contrast, a small minority (5.7%) of students rated this aspect to a moderate extent. The mean score is 4.15, suggesting a strong consensus among students regarding the effectiveness and diversity of teaching methods employed. This implies that most students perceive the use of experiments and multimedia presentations as beneficial, likely enhancing their engagement and understanding of physics concepts. The teachers are not relying on a single, one-size-fits-all teaching method, but rather drawing from a toolkit of different techniques. This caters to diverse learning preferences and styles within the student population. During the face-to-face interview with heads of schools about teachers uses various methods to teach physics, such as conducting experiments and showing video, the head of school "8" commented that:

… we prioritize hands-on learning experiences in physics education. Our teachers actively engage students by conducting experiments that demonstrate theoretical concepts in action. Additionally, they incorporate multimedia resources like videos and simulations to provide visual and interactive representations of complex physics principles. By utilizing these diverse methods, our teachers cater to different learning styles and enhance students' understanding through experiential and visual learning (Personal communication with HoS "8": April 17, 2024).

- *Another head of school "9" shared:*

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Think back to your own school days. Did you ever have a subject where the teacher just talked and talked? It wouldn't be very inspiring, would it? Our physics teacher understands the importance of keeping students actively involved. Their portfolio likely showcases a treasure trove of diverse teaching methods (Personal communication with HoS "9": April 18, 2024).

The information from the interview implies that the physics teacher values student engagement and employs diverse teaching methods to keep students actively involved in the learning process. By acknowledging the importance of interactive and varied teaching approaches, the teacher's portfolio likely reflects a range of strategies aimed at enhancing student participation and interest in physics. This approach suggests a commitment to creating an inspiring and dynamic learning environment where students are actively engaged and motivated to participate in their own learning experiences These findings of the study are consistent with those of Hua (2018), who affirmed that students prefer instructional videos featuring the teacher's hands, and these videos can enhance their success in passing introductory physics courses. Hua's research underscores the effectiveness of visual learning tools, such as videos that demonstrate physical concepts through direct manipulation and explanation by the teacher.

Data in Table 2 Indicates that, an extremely majority (91.4%) of students rated that the teacher uses technology, like computers and tablets, to teach physics in a simple way to a large extent and very large extent. Conversely, extremely minority (5.0%) of students rated that the teacher uses technology, like computers and tablets, to teach physics in a simple way. The mean score of 4.59 indicates most students perceive the use of computers and tablets as beneficial, likely enhancing their understanding and engagement with physics concepts through interactive and innovative learning experiences. This suggests that students highly value and appreciate teachers who leverage technology, such as computers and tablets, to simplify the teaching of physics. The majority of students acknowledge the effectiveness of integrating technology into their learning experience, enhancing their understanding of physics concepts. During the face to face interview with head of school "10" shared:

I embrace the integration of technology in physics education as a means to enhance learning experiences. Our teachers leverage computers and tablets to present interactive simulations, virtual labs, and multimedia resources that make complex physics concepts more accessible and comprehensible to students. By using technology effectively, our teachers create dynamic lessons that cater to diverse learning styles and foster deeper engagement with the subject matter (Personal communication with HoS "10": April 19, 2024).

- *Another head of school "12" said:*

… we recognize the importance of utilizing technology to facilitate learning in physics. Our teachers utilize computers and tablets to deliver interactive lectures, access online databases for research, and collaborate on projects using digital platforms. These technological tools not only support personalized learning but also empower students to explore physics concepts through hands-on activities and digital simulations, enhancing their understanding and application of scientific principles (Personal communication with HoS "12": April 23, 2024).

The information from the interviews implies a strong endorsement of technology integration in physics education across both schools. These insights suggest a shared goal of leveraging technology to enrich student engagement, deepen understanding, and foster application of scientific principles in physics education. This emphasis on technology aligns with the study by Masatu et al. (2022), which similarly underscores the benefits of using digital tools to enrich learning experiences and support personalized learning in physics education.

The data from Table 2 reveals that an overwhelming majority (96.1%) of students rated that the teacher assists in learning physics by teaching them step-by-step problem-solving methods to a large extent and very large extent. In contrast, a minimal minority (0.9%) of students rated this aspect to a moderate extent. The mean score of 4.45 indicates a strong consensus among students regarding the effectiveness of the teacher's approach in guiding them through problem-solving processes. This high rating suggests that most students perceive the step-by-step method as beneficial, likely enhancing their understanding and proficiency in tackling physics problems systematically. The step-by-step guidance likely goes beyond just teaching rote algorithms. It helps students develop a deeper, more holistic comprehension of the underlying physics principles and the logic behind the problem-solving process. The researcher during a face-to-face interview with DSQA had this to say:

Problem-solving approach are a key part of our focus on student success in our schools. These portfolios empower our teachers to be masters of their craft, ensuring they have the tools and approaches needed to create confident problem-solvers in the exciting world of physics (DSQAO, personal communication, April 24, 2024).

- *The head of school "11" shared:*

I recognize the value of teaching step-by-step problem-solving methods in physics education. Our teachers provide clear explanations and demonstrations that outline each stage of problem-solving processes. By scaffolding learning experiences, our teachers support students in applying theoretical knowledge to practical scenarios, enhancing their problem-solving abilities and promoting analytical thinking in physics (HoS 11, personal communication, April 22, 2024).

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The statement implies that problem-solving approaches are integral to the focus on student success in schools. The portfolios provided to teachers serve as tools to enhance their skills and expertise, empowering them to cultivate confident problem-solvers in the field of physics. By emphasizing problem-solving skills and providing teachers with the necessary tools and approaches through portfolios, the educational institutions aim to equip students with the capabilities to tackle challenges and excel in the dynamic realm of physics. The finding of the study are in line with those by Ernita, (2022) who affirmed that, a participatory learning model using critical problem-solving techniques significantly impacts students' learning achievement in physics.

Generally, the data in Tables 1 and 2 indicate that the grand mean scores for teachers and students are 4.50 and 4.58 respectively, which implies that teacher portfolios help in reflecting teaching strategies in the teaching and learning of physics in public secondary schools in the Moshi District Council, Tanzania to a large extent as indicated by the average grand mean (4.54) for students and teachers. Teachers rated portfolios as potential tools for clearly demonstrating their teaching strategies, accurately representing their instructional approaches, and displaying a variety of teaching and learning strategies. Contrary, the study underscores improper organization of portfolio that distorts its significant role in capturing the progression of teaching throughout periodically. This hampers the process of analyzing the effectiveness of teaching and learning strategies, integrating technology, and promoting active learning techniques among Physics students. It was also noted that, there are indications of varying perspectives among students on certain aspects, such as the use of real-world examples and the opportunity for hands-on experiments, highlighting the need for continued evaluation and refinement of teaching strategies.

In summary, the study found that portfolios are viewed positively by both teachers and students as reliable and comprehensive tools for documenting and enhancing instructional practices in secondary school Physics education. There is a strong consensus that portfolios accurately represent teachers' approaches and showcase a diverse range of teaching and learning strategies. Teachers also rated portfolios as effective for integrating technology and demonstrating active learning strategies. The data indicates that portfolios are seen as important for assessing teaching effectiveness and showcasing active learning techniques. Overall, the portfolio is successfully utilizing technology, facilitating reflective practices, and comprehensively capturing key elements of the teaching-learning process, according to both teachers and students. Continued efforts to align understanding around their use, especially for classroom management, could further enhance their value and implementation. The study found that although teachers are preparing portfolio documents, doubts regarding the organization and timely accessibility of these documents hinder their ability to enhance physics teaching reflection.

VI. CONCLUSION

Based on the findings, the researcher concludes that teachers' portfolios are effective in planning and delivering the physics subject, as they help in organizing and prioritizing instructional content, thereby enhancing teaching effectiveness and improving the overall quality of the subject. However, the study also reveals that while teachers tend to prepare various documents to support the teaching and learning of physics, the improper organization and utilization of the portfolio remains a significant challenge. This shortcoming limits the potential for providing meaningful and constructive feedback to students, ultimately posing a threat to their overall physics achievement.

RECOMMENDATION

Based on the conclusions, the study recommended that, The School Quality Assurer should put more emphasis on the proper organization of portfolio documents. Additionally, the Government through the Ministry of Education should conduct capacity-building training for physics teachers on how to organize and utilize portfolios. Furthermore, physics teachers should familiarize themselves with and utilize portfolios to provide proper feedback and track the learning progress of their students. Finally, Heads of Schools should monitor and report on the resources needed for the preparation and compilation of portfolios to enable effective tracking of student learning progress.

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