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SESEMAT Pedagogical Approaches and Physics Teacher Effectiveness in Kigezi Sub-Region, Uganda

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Abstract

Effective physics teachers in secondary schools in Kigezi Sub-Region are a focus to improve the scientific skills, competences and students' academic knowledge to the required content. There are however, increasing concerns among stake holders about teacher ineffectiveness which has caused dismal performance of students in science subjects particularly physics. The study investigated the influence of Secondary Science and Mathematics Teachers (SESEMAT) pedagogical approaches on physics teacher effectiveness in secondary schools in Kigezi Sub Region, Uganda. Guided by Cognitive Constructivist theory, the study adopts a perspective that views learning as an active process, where contexts of learners are fully considered and learners being motivated and then collaborative learning takes place. Out of a population of 620, a sample of 234 Physics teachers was drawn from secondary schools of Kigezi Sub-Region. Data collection tool comprised of a questionnaire. Collected data was analysed descriptively using statistical software programs SPSS and SPSS AMOS. The findings showed that physics teacher effectiveness is highly influenced by SESEMAT pedagogical approaches in all aspects. The analysis results of structural equation model (SEM)/path analysis showed that SESEMAT pedagogical approaches influenced teacher effectiveness. Hence the causal relationship between SESEMAT pedagogical approaches and teacher effectiveness was positive and significant. The tested hypotheses state that there is a significant influence of SESEMAT pedagogical approaches on physics teacher effectiveness. It was concluded that SESEMAT Pedagogical approaches (active learning, motivation of students, contextual learning, and collaborative learning) are important to physics teacher effectiveness. Therefore, it was recommended that Physics teachers in Kigezi Sub-Region should apply SESEMAT pedagogical approaches while teaching in a good environment for better performance of learners and skills acquisition.

Keywords: Active, motivation, contextual, collaborative, poor performance

Original Article

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Introduction

Highly effective teachers in the system are important because they significantly improve skills, values and the students' academic knowledge relevant to the desired content (Laraib, 2014; Muijs & Renold, 2011). Therefore, effective teachers are required for science subjects because the quality of science, mathematics and technological education is highly needed for the development goals of industrialisation and globalisation to be realised (Snider, 2003; MOES, 2006). Globally, the challenge about teacher ineffectiveness is a problem that has been on-going. According to reports by Organisation for Economic Co-operation and Development (OECD) (2015), best classroom practices that govern all schools have been a true focal point for all the nations to implement. In Western World countries, the concern has been about teacher ineffectiveness. For instance, around 1960 in USA, the issue of teacher ineffectiveness became a major concern and there were increased demands from the publican accountability from teacher about the achievement of students and to clear the issue about ineffective teachers that was a challenge to the education department for long and a hot debate in many states. The policy makers sought of how to improve by design an evaluation system that caters for student assessment data as well (Mathesz, 2014).

In the studies carried out in Europe, Wim (2013) and OECD (2005), it was revealed that teacher ineffectiveness was a challenge to several European countries. Planners in education in Europe started thinking about measures and a number of strategies for improving teaching quality through enhancing quality teachers by encouraging them to be more of practical while teaching. To enhance teacher effectiveness, policy makers advocated for focus on teacher effectiveness, teacher evaluation and issues related to teachers learning to learn in order to improve teacher policy and quality (Reynolds, Muijs & Treharne, 2003). However, a report by Trends in International Mathematics and Science Study (TIMSS, PISA (2014), and TALIS international surveys carried out in 2013, reported that Japan's education system was a success partly because of teachers' effectiveness due to the professional and occupational culture that contributed to higher academic achievement of students.

In sub-Saharan Secondary schools, teacher ineffectiveness has also been a common problem. For instance, in Kenya, it is revealed that there are twenty (20) notable behaviours of ineffective teachers in secondary schools. For instance, some of the examples of salient characteristics include; poor mastery of subject content, teachers' wastage of students' time, teachers disrespect students, low esteem, poor teaching methods, failure to restrain one's emotions, ineffective feedback (Kodero et al., 2011). According to secondary schools in Nigeria, many setbacks affect teachers' effectiveness and these reduce the performance levels expected of an average learner. Some of the examples of setbacks that challenge teacher education in Nigeria include;

teachers' professionalism, social-economic and political environments, quality and quantity of personnel (staff), instructional and infrastructural resources (Bada, Ariffin & Nordin, 2020).

In South Africa, teacher ineffectiveness has been a challenge for long. For example, the country has been struggling with many schools in poor areas. For instance, TIMSS report of 2015, shows that about 10% of teachers in the country are absent from school each day. It is also reported that 79% Mathematics teachers and their content knowledge is quite below the level of standard required (TIMSS, 2015). Poor performance of sciences including physics in Africa persists in spite of the availability of the requisite teaching materials for the subject in schools. For example, the International Student Assessment (PISA, 2014) survey carried out on physics performance in secondary schools from 65 countries, on the whole, revealed an under performance of the subject in most countries.

In Uganda, the national development goals in the context of industrialisation, self-reliance and globalisation require quality science, mathematics and technological education (MOES, 2006). According to a report by Uganda National commission for United Nations Educational, Scientific and cultural Organisation (UNESCO, 2017), indicate that, general performance in physics like other science subjects is dismal in developing countries. Uganda National Examinations Board (UNEB) reports for Uganda Certificate of Education (UCE) (2016, 2017 and 2018) link this to teachers' ineffectiveness because of theoretical handling of science subjects. Accordingly, science teachers handle sciences theoretically without hands-on approaches applied for students (Fauth et al., 2019). In view of this, the study sought to examine if Secondary Science and Mathematics Teachers (SESEMAT) approaches introduced to enhance pedagogical skills of teachers handling science subjects relate to physics teacher effectiveness at the Uganda Certificate of Education level, in Kigezi Sub-region.

To solve the problem of teacher ineffectiveness in science subjects, the government, in 2005 introduced the SESEMAT programme which was trial-run in some districts of Butaleja, Tororo, and Masaka, where notable positive impacts were realised. The programme started to enhance teaching effectiveness of science teachers with the general conviction in government circles that science and technology are the springboard of economic growth and development (Government of Uganda, 1992). This belief is rooted in the Education white paper of 1992, which stressed the possible role of science and technology in boosting development (Black & William, 2003). The SESEMAT programme is an in-service training programme (INSET) of serving teachers of Mathematics and Science in secondary schools in Uganda (MOES, 2006; Komakech & Osuu, 2014). This was because of the Science Education Policy of 2006 that made all sciences (Physics, Chemistry, Biology and Mathematics) compulsory for ordinary level secondary schools following poor performance in these subjects (Tinkamanyire, 2010). SESEMAT mainly emphasises hands - on and minds - on approaches for both teachers and learners when handling sciences and mathematics. This is because effective science and mathematics teaching requires understanding the learners' needs so that teachers can support them (MOES, 2006; Komakech & Osuu, 2014).

Despite the implementation of

SESEMAT, the Basic Education Statistics of Uganda [BES]) (2019) report showed a declining trend in performance of students in Physics in secondary schools between 2002 and 2015 (MOES, 2016). In addition, the Uganda Certificate of Education (UCE) results from 2005 to 2015 released by Uganda National Examinations Board (UNEB) every year show that the pass rate of physics subject had never exceeded 50% (Ahimbisibwe, 2015). According to UNEB results for UCE 2016, 2017 and 2018, students' performance in sciences were poor. This casts a lot of doubt on the significance of the SESEMAT programme on enhancing teacher effectiveness, hence, the need for this study in particular to examine the influence of SESEMAT pedagogical approaches and physics teacher effectiveness.

Study objectives

1. To establish the influence of active learning on Physics teacher effectiveness.
2. To establish the influence of contextual learning on physics teacher effectiveness.
3. To find out the influence of motivation of students on physics teacher effectiveness.
4. To find out the influence of collaborative of students on physics teacher effectiveness.

Study hypotheses

H_{01} There is no statistically significant influence of active learning on Physics teacher effectiveness.

H_{02} There is no statistically significant influence of contextual learning on physics teacher effectiveness.

H_{03} There is no statistically significant influence of motivation of students on physics teacher effectiveness

H_{04} There is no statistically significant influence of collaborative learning on physics teacher effectiveness

Literature review

Theoretical review

This study was guided by Cognitive Constructivist Theory (CCT) which was developed by Jean Piaget in 1936. Cognitive Constructivist Theory (CCT) proposes that the awareness gained by experience of a fact and meaning are generated from interaction between the individuals' experiences and their ideas (Mascolo and Fischer, 2005). This indicates that by exposing the learner to new experiences, the learner is put in a state of building new knowledge upon the foundation of the previous learning. Thus, cognitive development takes place when the learner is demanded to use experiences and knowledge in order to have an in depth understanding and come up with the new information, confirming the acquisition of new knowledge (Mugizi et al., 2020). The CCT encourages a student- centred approach where learners construct their own reality (Tandon, 2017). The CCT assumes every learner needs to construct his/her own knowledge basing on the learner's previous knowledge (Ritland et al., 2002). Thus, knowledge developed from learners' interactions with others. According to CCT, reality is basically created by individual learners since there is no objective reality. Therefore, in relation to the classroom setting, CCT encourages learners to be active, use prior experiences and hence become autonomous learners in an environment According to the constructivist learning ideas, learning is taken to be an active process, where contexts of learners are fully considered, learners being motivated and then collaborative learning takes place (Bada & Olesegun, 2015). Therefore, in line with this study, SESEMAT pedagogical approaches relates to the constructivist (student-centred) teaching approaches of active learning, contextual learning, motivation of learners and collaborative learning to physics teacher effectiveness.

Active learning and teacher effectiveness

Active learning is taken to be an approach or a strategy in education where the emphasis is on student participation, awareness and engagement (Yaser, 2016). It emphasizes mainly to learners in the learning process, to always discuss, with fellow learners, and deeply use cooperative learning. This therefore improves learning outcomes, critical thinking and increases students' motivation (Dogani, 2023). With active teaching, it allows learners to participate in class with emphasis on skills like critical thinking and problem- solving (Demirci, 2017). In teaching - learning process, learners are encouraged to freely express their views while in a lesson and share their experiences (Gifkins, 2015). There are scholars that related active learning and teacher effectiveness. For instance, Millers & Metz (2014) sought to highlight the role of active learning amongst active learners and professional level. Several studies have attempted to relate active learning approaches to teacher effectiveness. For example, Miller & Metz (2015), describe active learning as an institutional method where learners become engaged participants in a classroom through debates and class discussions. Hendrickson, (2021), defines active learning as an approach that allows students to play an active role in their own learning, which enables teachers to lead their lessons like conductors. Mattson (2005) and Robson (2017), calls learning where teachers encourage students to take responsibility for their learning. Ayan and Dursun, (2022), looks at the effect of active learning techniques on academic performance. Findings indicated that among the two groups that were tested, experimental group had higher academic performance and high retention than the control group. However, as the studies suggest, they were not in the context of Kigezi Sub-Region. This thus led to this study in the context of secondary schools in Kigezi sub-region to test the hypothesis to the effect that; H_{01}: There is no statistically significant influence of active learning on physics teacher effectiveness.

Contextual learning and teacher effectiveness

Contextual learning is a method of instruction that enables students to apply new knowledge and skills to real-life situations (Pritchett, 2008). Contextual learning is where learning takes place when teachers are able to present information in such a way that students are able to construct meaning based on their own experiences (Surdin, 2017). With contextual learning, teachers relate learning materials presented in class to the real- world situations of the learners and this encourages learners to interpret and link them to their knowledge and apply them in daily lives (Aithal, Kumar & Suresh, 2016). Contextual learning involves leaners applying new knowledge and skills in real life situations, learners involving other learners which makes them active and discovering new concepts, reflection or activity flush back (Roza et al., 2019). Thus, learning becomes enjoyable which most likely promotes students' academic performance. Some scholars have examined the relationship between contextual learning and teacher effectiveness. For example, Khaefiatunnisa (2015), carried out an investigation on the effectiveness of Contextual Teaching and Learning (CTL) approach in improving students' reading skill in procedural text in learning process. The study found out that, CTL approach could improve students' reading skill in procedural texts. The study gives a hint on the existence of a relationship between contextual learning and teacher effectiveness, literature revealed that the context of this study was never handled. This thus attracted this study to test whether; H_{02}: There is no statistically significant influence of contextual learning on physics teacher effectiveness.

Motivation of students and teacher effectiveness

Motivation is the force that keeps learners going, even when they face challenges. It charges them with the energy required to fulfil their potential. A learner who is motivated is committed, energetic, and innovative: they see the value in what they are learning, and are determined to achieve their set goals (Wood, 2019). Motivation in the classroom is the willingness and desire of a student to learn. Motivating the learner to learn is very important to curriculum implementation. This is because motivation is an influential factor in teaching-learning situation (Filgon et al., 2020). Motivation of learners is taken to mean the students energy and how it drives and prepares them to learn, work hard and achieve a lot while at school (Theobald,2006). Motivation is either intrinsic or extrinsic. Intrinsic motivation comes from within while extrinsic motivation arises from external factors (Taylor, 2000). Motivation of students is reflected in students' way of selecting learning tasks in the time and effort they devote to tasks in their persistence on the learning tasks, in their copying with challenges they encounter in the learning. Therefore, motivation of students might influence teachers' effectiveness. Scholars have related motivation and teacher effectiveness. For instance, Ofoegbu (2004) investigated the issue of teacher motivation as an essential factor for classroom effectiveness and school improvement. Results showed that teacher motivation is a vital factor for classroom effectiveness and school improvement. Kiwale & Muteti (2020) carried out a study on effectiveness of teacher motivation in influencing pupils' performance in standard seven National Examinations in public and private primary schools in Tanzania. Results showed that there is a positive relationship between levels of teachers' motivation and pupils' performance. The literature showed that there is an influence of motivation of students on teacher effectiveness. However, the studies show a context gap where the study was not carried out in Uganda. Thus, this study in the context of Uganda tested the influence to the effect that: H_{03}: There is no statistically significant influence of motivation of students on physics teacher effectiveness.

Collaborative learning and teacher effectiveness

Collaborative learning approach involves learners working together on activities or learning tasks in a group small enough to ensure that everyone participates, and in the process the learners optimise their own and each other's learning (Le et al., 2018). Collaborative learning involves small groups of learners sharing responsibility with a common goal, taking collective decisions and working together in order to learn together. Collaborative learning is important because research shows that educational experiences that are active, social, contextual, engaging, and student-owned lead to deeper learning.

Collaborative learning promotes; development of higher-level thinking, oral communication, self-management, and leadership skills (Loes & Pascarella, 2017). There are scholars that have related collaborative learning and teacher effectiveness. For example, Chong & Konge, (2012), investigated Teacher collaborative learning and teacher self-efficacy. Results indicated that collaborative contexts have an impact on teacher efficacy, an outcome that has been empirically linked to improved student achievement, and teacher adaptability and adjustment. Fakomogbon & Bolaji, (2017) made an investigation on effects of collaborative learning styles on performance of students in secondary schools in Nigeria. Results showed that collaborative learning styles have an influence on students' performance. Literature above suggests that collaborative teaching has an influence on teacher effectiveness. However, there is lack of studies interrogating the same in the context of a secondary schools in Kigezi Sub Region, Uganda. Thus, this study tested the hypothesis to the effect that: H_{03}: There is no statistically significant influence of collaborative learning on physics teacher effectiveness.

Methodology

This study adopted survey research design. The study population target comprised of 620 physics teachers, were selected from six (06) districts which make Kigezi Sub-Region. These districts include Kabale, Rubanda, Rukiga, Rukungiri, Kanungu and Kisoro. The sample size was determined by using Krejie and Morgan Table where the population of 620 corresponds to 234 as the sample size. A sample comprised of 234 physics teachers from Kigezi Sub-Region were selected using simple random. Questionnaires were administered to physics teachers to obtain their independent views. The questionnaire for Physics teachers is divided into four sections: A, B, C Section A- was for background information: characteristics of teachers, B- was specifically for SESEMAT pedagogical approaches, C- was to capture teacher effectiveness. A 5-point Likert scale was to be answered as follows ;1 for strongly disagree (SD), 2 for Disagree (D), 3 for Not Sure (NS), 4 for Agree(A) and 5 for strongly agree (SA). Validity of the instrument was observed by submitting instruments to the experts for review and there after piloted. Reliability of the instrument was ensured by using Cronbach's Alpha (α) test, whose values were 0.7, Reliabilities for different constructs were obtained at $\alpha =$ 0.70 above which the ideal. The CVIs for the different constructs was attained at above 0.78. The validity and reliability results are presented in section of results.

Quantitative analysis involved descriptive and inferential analyses. Descriptive analysis for the influence of SESEMAT pedagogical approaches on teacher effectiveness involved calculation of frequencies, percentages and means using SPSS AMOS V23. Data analysis was carried out using descriptive statistics and structural equation modelling (SEM)/Path analysis AMOS V23. SPSS AMOS V23 provides the path model, which is able to describe the interrelationship between the variables and indicators (Sander & Lee, 2014). Testing the hypotheses was done using Structural Equation Model (SEM). Ethical issues like informed consent, privacy of all respondents and confidentiality were all observed.

Results

Background characteristics

The results in Tables 1 and 2 show that respondents were males (88.1%) and females 11.9%, above 25 years of age were 95.4%, 87.1% of 5 years and above of experience in teaching physics and 53.1% who have attended at least a training in SESEMAT approaches.

Descriptive Statistics for SESEMAT pedagogical approaches

SESEMAT pedagogical approaches was conceptualized using 89 items on the questionnaire. The items required each respondent to provide their opinion about active learning, contextual learning, motivation of students and collaborative learning. The rating of the respondents was based on the Likert's scale using the scale range of one to five, where one strongly disagree, two disagree, three not sure, four agree and five strongly agree. Therefore, physics teachers' views are therefore given and elaborated in the following sections according to the respective sub constructs.

Table 1: Descriptive Results for SESEMAT pedagogical approaches

	Mean	Cronbach α
Active learning	4.104	0.95
Contextual learning	3.999	0.95
Motivation of students	4.223	0.95
Collaborative learning	4.135	0.95

Source: Primary data 2021

Table 1, revealed that Physics teachers rated their use of SESEMAT pedagogical approaches as good (overall means for active learning = 4.104, contextual learning =3.999, motivation of students = 4.223 and collaborative learning = 4.235). According to the Likert scale these means are close to 4 which correspond to agree. The Cronbach's alpha values of 0.95 for each construct. This implies that the items are reliable.

Table 2: Descriptive results for teacher effectiveness

	Mean	Cronbach α
Effective communication	3.60	0.972
Subject matter expertise	4.29	0.972
Professional competence	4.29	0.972
Teaching style	4.08	0.972

Source: Primary data 2021

Overall means for the constructs are 3.60, 4.29, 4.29 and 4.08. The value of mean is approximately equal to 4, implying normality. The value of Cronbach α is 0.972 for every construct, an indication that the items were reliable.

SESEMAT Pedagogical Approaches Structural Model

In figure 1 the results of the complete SEM for SESEMAT pedagogical approaches and physics teacher effectiveness were illustrated to address hypotheses (H_{01} – H_{03}) of the study.

Structural model

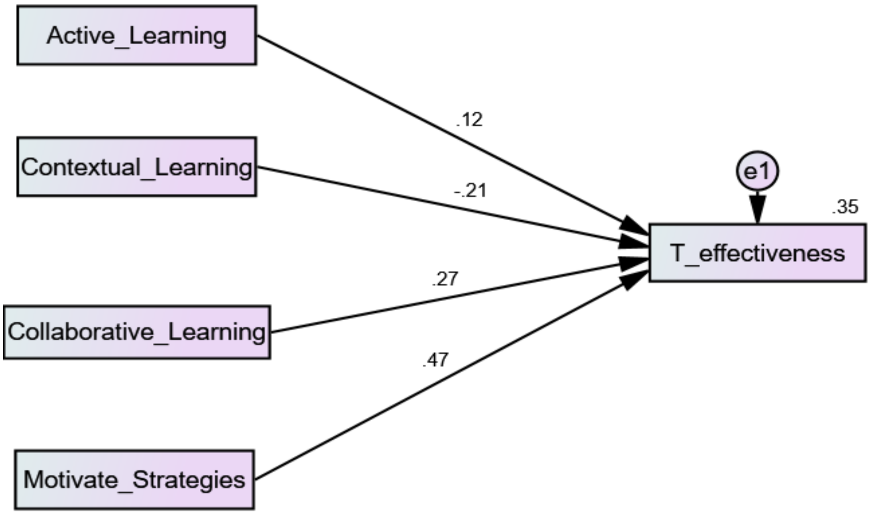

Figure 1: Pedagogical approaches and teacher effectiveness structural model
Source: Primary data 2022

In order to test hypothesis, the hypotheses on the SESEMAT pedagogical approaches and physics teacher effectiveness, the path coefficients of the structural model were examined. As seen in Figure 1 and regression weights of the causal paths were found to be statistically significant and relevant.

Considering the casual paths;
T_Effective <--- Active learning with (β= 0.12, $p < 0.045$), T_Effective <--- Contextual learning with (β= -0.21, $p < 0.001$), T_Effective <--- Collaborative learning with (β= 0.27, $p < 0.001$), T_Effective <--- motivation of students with (β= 0.47, $p < 0.001$), which are positive, significant. Thus, the Null hypotheses ($H_{01} – H_{03}$) were not supported and alternative hypothese were accepted. Figure 1 further reveals that 35% of physics teacher effectiveness with SESEMAT pedagogical approaches could be estimated by using the exogenous constructs of active learning, contextual learning, motivation of students and collaborative learning.

Table 3: Regression weights for pedagogical approaches and teacher effectiveness

			Estimate	S.E.	C.R.	P
T_effectiveness	<---	Active_Learning	.117	.036	2.007	.045
T_effectiveness	<---	Contextual_Learning	-.206	.047	-3.544	.001
T_effectiveness	<---	Collaborative_Learning	.266	.059	4.574	.001
T_effectiveness	<---	Motivate_Strategies	.475	.061	8.157	.001

T_effectiveness = Teacher effectiveness.
S_Approach = Sesemat pedagogical approach.

The causal relationship between SESEMAT pedagogical approaches, and physics teacher effectiveness (T_Effective ←·········· S_Approach) was positive and significant.

The four constructs of Sesemat pedagogical approaches namely, active learning (β= 0.12, p< 0.001, contextual learning (β= -0.21, p < 0.001), motivation of students (β= 0.47, p< 0.001) and collaborative learning (β= 0.27, p < 0.001) had a positive significant influence on teacher effectiveness.

According to the study, characteristics of SESEMAT pedagogical approaches that contributed to teachers' effectiveness were skills and knowledge to allow learners participate freely, delving hypothesis alone, encouraging learners to be responsible of their learning process, allowing learners to apply new skills to real life, and encouraging learner to work together, and take decisions as a group.

Discussion

The results for the hypothesis (H_{01}) to the effect that there is an influence of active learning on Physics teacher effectiveness was positive and significant. The findings of this study are not contrary to Millers & Metz (2014), whose study found out that active learning as an institutional method makes learners become engaged participants in a classroom through debates and class discussions. Furthermore, the findings of Ayan and Dursun, (2022), about the effect of active learning techniques on academic performance agreed with the findings of the study about the two groups that were tested, experimental group had higher academic performance and high retention than the control.

With respect to H_{02} stating that there is no statistically significant influence of contextual learning on physics teacher effectiveness, the results indicated that the influence was positive and significant. This finding was supported by the findings of previous scholars. For instance, Khaefiatunnisa (2015), who found out that, CTL approach could improve students' reading skill in procedural texts. Also, Aithal, Kumar & Suresh, 2016 who confirmed that when teachers relate learning materials presented in class to the real- world situations of the learners, then it encourages learners to interpret and link them to their knowledge and apply them in daily lives. With support from the previous scholars supporting the findings, it is therefore concluded that contextual learning had a positive significant influence on teacher effectiveness.

The results for the third hypothesis (H_{03}) to the effect that there is an influence of motivation of students on teacher effectiveness, also revealed that the influence was positive and significant. This finding agreed with the findings of previous scholars. The study showed that motivational variables had a potential influence on teacher effectiveness. Results from Ofoegbu, (2004)'s study, agreed that teacher motivation is a vital factor for classroom effectiveness and school improvement.

Lastly, the results from the H_{04} hypothesis, testing the influence of collaborative learning on teacher effectiveness also indicated that the relationship was positive and significant. The finding agreed with the previous scholars such as Chong & Konge, (2012), whose results indicated that collaborative contexts have an impact on teacher efficacy, an outcome that has been empirically linked to improved student achievement, and teacher adaptability and adjustment. Also, Fakomogbon & Bolaji, (2017) established that collaborative learning styles have an influence on students' performance. Thus, with the findings of the study agreeing with the findings of the previous scholars, it sis concluded that collaborative learning has a positive significant influence on teacher effectiveness.

Conclusion

The discussion above led to the conclusion that SESEMAT pedagogical approaches and physics teacher effectiveness have a strong positive significant correlation. From the analysis of all these SESEMAT pedagogical approaches (active learning, motivation of students, contextual learning and collaborative learning) using self-administered questionnaires, it is concluded that SESEMAT pedagogical approaches are relevant and important to improve physics teacher effectiveness. In addition, the outcomes of this study on SESEMAT pedagogical approaches, and teacher effectiveness offer a novel direction for research on these aspects in Uganda.

Recommendations

Based on the findings, the study made the following recommendations;

1. Physics teachers should employ the SESEMAT pedagogical approaches (active learning, contextual learning motivation of students and collaborative learning) when conducting physics lessons.
2. Government policies should try to intensify support supervision, regular workshops, in-service training in pedagogical approaches by involving all the relevant bodies in the tools they (teachers) use to set goals to improve the performance of learners, become a resource, hold staff accountable, and train in assessment criteria.
3. Training programmes should not only be on in-service teachers but should also be emphasised to preservice teachers as well, so that as they leave colleges/university, they are aware of the best practices to apply in physics lessons.

References

Ahimbisibwe, P. (2015, June 8). 40% fail sciences, says UNEB, *The Daily Monitor.*

Aithal, P. S., & Kumar, P. M. (2016). Student performance and learning outcomes in higher education institutions. *International Journal of Scientific Research and Modern Education (IJSRME)*, *1*, 674-684.

Andiema, N. C. (2016). Effect of Child Centred Methods on Teaching and Learning of Science Activities in Pre-Schools in Kenya. *Journal of Education and Practice* ,7(27).

Aykan, A., & Dursun, F. (2022). The Effect of Active Learning Techniques on Academic Performance and Learning Retention in Science Lesson: An Experimental Study. *Journal of STEM Teacher Institutes*, *2*(1), 42-48.

Bada, H. A., Tengku Ariffin, T. F., & Nordin, H. B. (2020). The effectiveness of teachers in Nigerian secondary schools: The role of instructional leadership of principals. *International Journal of Leadership in Education*, 1-28.

Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education*, *5*(6), 66-70.

Bain, K. (2004). *What the best college teachers do*. Harvard University Press.

Basic Education statistics of Uganda (BES). (2019). Annual report by Ministry of Education and Sports.

Berry, K., O'bryan, D., & Cummings, M. (2004). Teacher effectiveness and related characteristics: A systematic review. *An International Journal of Nursing Educ. Scholarship*, 1(1) 1-26.

Black, P., & Wiliam, D. (2003). Assessment and classroom learning. *Assessment in Education: principles, policy & practice*, *5*(1), 7-74.

Chong, W. H., & Konge, C.A. (2012). Teacher collaborative learning and teacher self-efficacy: the case of lesson study. *The journal of experimental education*, 80(3), p 263 - 283.https://doi.org/10.1080/00220973.2011.596854

Demirci, C. (2017). The Effect of Active Learning Approach on Attitudes of 7th Grade Students. *International Journal of Instruction*, 10(4) , p129 -144.

Dogani, B. (2023). Active learning and effective teaching strategies. *International Journal of Advanced Natural Sciences and Engineering Research*

Fauth, B., Decristan, J., Decker, A. T., Büttner, G., Hardy, I., Klieme, E., & Kunter, M. (2019). The effects of teacher competence on student outcomes in elementary science education: The mediating role of teaching quality. *Teaching and teacher education*, *86*, 102882.

Ferlazzo, L. (2015, September 14). *Strategies for helping students motivate themselves*. Retrieved October 6, 2016, from http://www.edutopia.org/blog/strategies-helping-students-motivate-themselves-larry-ferlazzo.

Gifkins, J. (2015). What is Active Learning and why is it important? E- international Relations.

Government of Uganda. (1992). Government White paper on the education policy review commission report.

Hoover, J. D., & Giambatista, R. C. (2009). Why have we neglected vicarious experiential learning?. In *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference* (Vol. 36).

Khaefiatunnisa. (2015). The Effectiveness of Contextual Teaching and Learning in Improving Students' Reading Skill in Procedural Text (A Quasi-Experimental Study of the Second Grade Students at One Vocational School in Bandung), *Journal of English and Education,* 3(1), 80-95.

Kiwale, A. J & Muteti, C. M. (2020). Effectiveness of Teacher Motivation in Influencing Pupils' Performance in Standard Seven National Examinations in Public and Private Primary Schools. *International Journal of Innovative Research and development*, 9(1).

Kodero, H. M., Misigo, B. L., Owino, E. A., & Simiyu, C. K. (2011). The salient characteristics of trained ineffective teachers in secondary schools in Kenya. *Sage Open*, *1*(3), 2158244011434102.

Komakech, R. A., & Osuu, J. R. (2014). Uganda SESEMAT programme: Impact and challenges in its implementation. *International Journal of Education and Research*, *2*(6), 133-146.

Laraib, N. J. (2014). The Impact of Effective Teaching Strategies on the Students' Academic Performance and Learning Outcome, Munich, GRIN Verlag, https://www.grin.com/document/300046.

Le, H., Janssen, J., & Wubbles, T. (2018). Collaborative learning practices: teacher and student perceived obstacles to effective student collaboration. Cambridge Journal of Education, 48 (1), 103 -122. https://doi.org/10.1080/0305764X.2016.1259389.

Loes, C. N., & Pascarella, E. T. (2017). Collaborative learning and critical thinking: Testing the link. *The Journal of Higher Education*, *88*(5), 726-753.

Mascolo, M. F., & Fischer, K. W. (2005). *Constructivist theories*. Cambridge Encyclopedia of Child Development, pp. 49-63. Cambridge, England: Cambridge University Press.

Mathesz, M. J. (2014). An historical perspective to examine how federal policy influenced the definition and evaluation of teacher effectiveness since 1950.

Mattson, K. (2005). Why "Active Learning" can be perilous to the profession. Academe, 91(1), 23-26. [Online] Available: http://aaup.org/AAUP/CMS_Templates/AcademeTemplates/AcademeArticle.aspx?NRMODE

Miller, C. J., & Metz, M. J. (2014). A comparison of professional-level faculty and student perceptions of active learning: its current use, effectiveness, and barriers. *Advances in physiology education*, *38*(3), 246-252.

Ministry of Education and Sports (MOES). (2006). Teaching guidelines for science and mathematics teachers in secondary schools. ISBN 9970 575-00-7. SESEMAT project, Uganda.

Ministry of Education and Sports (MOES). (2016). Report on performance in science and mathematics.

Mitchel, K. J., Robinson, D.Z., Plake, B. S., & Knowels, K. T.(eds). (2001). Testing teacher candidates: *The role of licensure* *tests in improving teacher quality*. Washington, DC: National Academy Press.

Mugizi, W., Katuramu, A.O, Dafiewhare, A.O. (2021). Student-centred approach and student engagement at a private university in Western Uganda. *Educational Journal*, 10(5), pp.193 -203.

Muijs, D., & Reynolds, D. (2011). *Effective teaching: evidence and practice.* Sage 3rd ed. London:

OECD (2005). Teachers matter. Paris: OECD.

OECD (2009). Creating effective teaching and learning environment. *First results from TALIS.*

Ofoegbu, F.I. (2004). "Teacher motivation: a factor for classroom effectiveness and school improvement in Nigeria." *College Student Journal*, 38 (1), pp. 81+. *Gale Academic OneFile*, link.gale.com/apps/doc/A115034778/AONE?u=anon~aececbad&sid=googleScholar&xid=a6422920.

Patton, M.Q. (2014). *Qualitative research and evaluation methods* (3rd Ed). Thousand Oaks, C.A: Sage.

Piaget, J. (1936). Origins of intelligence in the child. London: Routledge & Kegan Paul.

PISA, (2014). Performance in international student assessment. Retrieved on 3rdJuly, 2014 from http://www.oecd.org.

Pritchett, C. (2008). Implementation of the Ford PAS Web-Based Curriculum. In *Handbook of Research on Instructional Systems and Technology* (pp. 670-681). IGI Global.

Reynolds, D., Muijs, D., & Treharne, D. (2003). Teacher evaluation and teacher effectiveness in the United Kingdom. *Journal of Personnel Evaluation in Education*, *17*, 83-100.

Robson, K. (2017). Review of the literature on the Reggio Emilia approach to education with a focus on the principle of the environment as the third teacher. The International Journal of Holistic Early Learning and Development, 4, 35-44.

Roza, A. S., Rafli, Z., & Rahmat, A. (2019). The Implementation of contextual teaching learning (CTL) to improve the students' speaking ability in Islamic studies course. *International Journal of Applied Linguistics and English Literature*, *8*(4), 45-50.

Schiefele, U., & Schaffner, E. (2015). Teacher interests, mastery goals, and self-efficacy as predictors of instructional practices and student motivation. *ScienceDirect*, *42*, 159-171.

Surdin (2017). The effect of contextual teaching and learning (CTL) models on learning outcomes of social sciences of the material of forms the face of the earth on class Vii of Junior high school. International Journal of Education and Research, 6(3), 57 – 64.

Tandon, T. (2017). Constructivist approach: A child cantered pedagogy. EDULIGHT, Journal, 6(11), 1-3.

Taylor, P. G. (2000). Changing Expectations: Preparing students for Flexible Learning. The *International Journal of Academic Development*, 5(2), 107–115.

Theobald, M. A. (2006). *Increasing student motivation: Strategies for middle and high school teachers.* Thousand Oaks, CA: Corwin Press.

Tinkamanyire, D. (2010, April 13). New science policy unfair, *New Vision*, p.3.

UNEB (2016 -2018). Report on poor performance in science on Uganda Certificate examination results.

UNESCO. (2017). A report on recommendation on science and scientific researchers.

Wim, J. C.M. (2013). Measuring teaching quality in several European countries. An international journal of research, policy and practice, 25(3), 295 – 311. https://doi.org/10.1080/09243453.2013794845.

Wood, R. (2019). Students' motivation to engage with science learning activities through the lens of self-determination theory: Results from a single-case school-based study. *EURASIA Journal of Mathematics, Science and Technology Education*, *15*(7), em1718.

Yaser A. O (2016). Effectiveness of active learning strategy in improving the acoustic awareness skills and understanding what is heard by the basic stage students in Jordan. Academic Journals Vol. 11(20), pp. 1896-1905.