TRAINEE ENTRY BEHAVIOR AS A DETERMINANT OF ACADEMIC PERFORMANCE IN SELECTED NATIONAL POLYTECHNICS IN KENYA

Dr. Zipporah Jerop[1] and Wasike Jacqueline Pamela[2]

[1]Research and Development Coordinator, Kitale National Polytechnic, Kenya.

[2]Head of Business Department, Kitale National Polytechnic, Kenya.

Corresponding Author: +254-0727559092/+254-0202380086 berutzipporah@gmail.com

Abstract

The purpose of the study was to investigate trainee entry behaviour as a determinant of academic performance in selected national polytechnics in Kenya. Specific objectives were: to examine the extent to which trainee entry behaviour determines academic performance in skilled secretarial subjects and to determine the extent to which training engagement moderates the relationship between trainee entry behaviour and academic performance in skilled secretarial subjects. Academic performance of the secretarial course has been of great concern and skilled subjects have affected the overall academic performance. The study adopted a mixed research design whereby a questionnaire was designed to collect both qualitative and quantitative data from trainers. The study targeted three national polytechnics in Kenya with a total population of 27 trainers. Census technique was applied in collecting data. The data was analysed using Statistical Package for Social Sciences (SPSS) version 26. The model with a trainee engagement moderator was better in explaining the academic performance in skilled secretarial subjects than the one without the moderator. This research recommended that the Kenya Ministry of Education should harmonize the entry point for the secretarial courses and review requirements to enhance academic performance.

Keywords; Trainee Entry Behaviour, Training Engagement, Academic Performance, Skilled Secretarial Subjects

1.0 Introduction

Technical and Vocational Education and Training (TVET) is described as the cornerstone in developing a skilled workforce across the globe (Marope et al. 2015). Despite its promising future, the academic performance of trainees in different programs in TVETs varies depending on diverse factors such as curriculum alignment, access to preparatory programs, quality of instructions, support services, economic and social contexts and diversity of the trainees' entry behaviors. In Kenya, accounting for trainees' academic performance has become a critical issue across the country's TVET institutions. Many studies have been done on students' entry behaviour in relation to academic performance. Unfortunately, several scholarly articles have focused on entry behaviour in other fields like engineering, applied mathematics, and medicine. More so, the studies on training engagement and institution outcomes have not concentrated on secretarial studies in skilled subjects. Kahu and Nelson (2018). All institutional policies and practices like class

schedules, rules on class turnout, academic discipline measures, participation in class activities, policies on workplace hours for trainers, trainee orientation, and encouragement are likely to have an impact on the way trainees use their time as well as the extent of effort devoted to academic work[1]. As a result, institutional policies and practices have an effect on trainees' outcomes such as academic performance, transition to another level and graduation (Bratton, 2020). Institutional administrators can use the results or findings from this study to aid them create services, policies, or programs that can improve trainees' academic performances.

Secretarial examination candidates in Kenya have been performing poorly in final Shorthand and Computerized Document Processing (CDP) Examinations (Appendix A). The poor performance shows that the primary and much needed technical skill for professional secretaries is not grasped as required. The poor performance has been noted for several years and the institutions offering the secretarial course are in a dilemma on how to improve academic performance on skilled subjects (KNEC, 2020-2022). As shown in Appendix A, the total number of candidates failing each year has been extremely higher than the number of trainees passing. Global studies in Shorthand training focuses much on the areas which students should focus on for them to achieve excellent performance. Studies have been done on training techniques employed in Shorthand training and ways of improving performance (Hoefler, 2021), impact of teacher knowledge and skills (Baran, 2019) and entry behaviour of trainees in practical work (Oughdi, 2019). Regardless of the poor trainees' performance in Shorthand examinations, little research has been done to investigate the underlying issues in the area, specifically in Kenya National Polytechnics. The study, therefore, addressed the academic lacuna by examining trainee entry behaviour as a determinant of academic performance. Two objectives were used: to examine the extent to which trainee entry behaviour determines academic performance in skilled secretarial subjects and to determine the extent to which training engagement moderates the relationship between trainee entry behaviour and academic performance in skilled secretarial subjects. The objectives were used to test two null hypotheses: H_O Trainee entry behaviour has no significant effect on academic performance in skilled secretarial subjects and H_O Training engagement has no significant moderating effect on relationship between entry behaviour and academic performance in skilled secretarial subjects. The study focused on three national polytechnics in Kenya offering secretarial course. These include Kisii, Kabete and Kisumu National Polytechnics.

2.0 Materials and Methods

2.1 Literature Review

2.1.1 Constructivism Theory

The study was guided by constructivist theory which generally explains the nature of knowledge, its theoretical perspective and how humans learn (Abdal-Haqq, 1998). One of the dominant tenets of the constructivism is the focus on the socio-cultural embeddedness of knowledge and learning. This employs framework and methods of cultural anthropology

1

of examining how cognition and learning are majorly distributed in the surroundings rather than being stored minds of individuals (Duffy, 2009). Constructivists argues that humans generate meaning and knowledge from interactions between ideas and experiences. In this study, an examination of how trainees' entry behaviour impact their academic performance with training engagement as the study moderator. As a result, the constructivism theory remains relevant in this study; hence, the study's guiding theory.

2.2 Trainee Entry Behaviour

Trainee entry behaviour entails his/her past results in secondary school, especially the performance in English and Math as well as prior exposure to vocational training. Spurk et al., (2019) studied the role of vocational training on improving the students' ultimate professional success. In the study, they collected data from literature and conducted surveys to collected information from students with prior vocational training and their subsequent freshman results. They found a positive association between individual subject performance and future success. This was also a conclusion made by Fadeyi et al., (2019) in the study "perception of staff and students on factors that influence performance of science laboratory technology in institutes of technology in Kenya." Blotnicky et al., (2018) used a correlational study and found out that in engineering fields, students with strong positive judgement in mathematics achieved better grades than their counterparts who had poor performance and judgement in mathematics. They concluded that strong previous academic performance increases the probability of engineering students to complete school. Moores (2019) conducted a study to examine the impact of the quality of teaching on the performance of university students in the United Kingdom. He found that students with better entry behaviour or grades performed better than those with poor entry behaviour. This finding differed with Liu's (2020) findings that depicted a weak correlation between performance of university students and their previous academic performances. On his end, Boakye (2015) found a strong correlation between trainees' past performance specially in mathematics and performance in engineering course. This contradicts Liu (2020) who found a weak association between performances of engineering students and their past performance. This study aims at exploring this contradiction.

2.3 Training Engagement

In literature, the research on trainer engagement and its importance has been neglected in many academic fields. Despite this, trainee engagement is a vital element in enhancing student success. As a motivational construct, teacher engagement helps in reflecting the intentional allocation of trainers' energy and resources across diverse teaching-related undertakings (Klassen et al., 2012). In regard to this importance, the interest in teacher or trainer engagement has seen a surge. This paradigm shift can be attributed to the need for understanding the challenge of professional attrition that arises from low satisfaction and engagement with work. Trainer engagement can be seen as devotion depicting their own initiatives to allocate personal resources and strength towards training-related activities. There have been increased debates on trainer engagement as an important facet of measuring antecedents that influence trainee outcomes. According to Lai (2015); Perra and John (2020), students are likely to show increased academic motivation, engagement,

and better performance if their trainers exhibit personal engagement, beliefs, and feelings in training activities. Trainer engagement in training activities is relatively firm, with some changes over time, reflected in state and trait like components. Most recent model of teacher engagement has been described to have three dimensions: social, emotional and cognitive aspects. The cognitive facet is when the trainer is engrossed in individual work and involves cognitive resources in training-related tasks. The emotional facet addresses trainers' positive emotional replies to their occupation/work while the social dimension refers to trainers' investment of vigour/energy in establishing networks with and concern for trainees and other trainers.

Teacher engagement concept in training can be traced to the level of conceptualization of training engagement. Scholarly materials suggest work engagement as being physically, emotionally, and cognitively involved in the training. Schaufeli et al. (2017), defines training engagement as a "positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption." Klassen et al. (2013) opined that the cognitive aspects relate to the vigor and absorption rate, and the emotional aspect relates to the dedication measure. Klassen et al. (2013) bring in a new phenomenon related to the social dimension of training engagement. Klassen argues that the models forget to capture trainers' investment of effort in maintaining relationships with trainees and fellow trainers. Greenberg and Jennings (2019) support the notion of maintaining a multidimensional conceptualization of engagement. According to Bao et al. (2021), keeping trainees motivated and engaged to attain educational success calls for increased levels of trainers' self-efficacy and engagement.

Other understanding takes student engagement as how institutional directors, managers, education officers, trainers, and other stakeholders might fully involve trainees in the management and decision-making processes about academics in issues relating to designing programs for learning purposes and getting involved in the city being of the community (Briggs et al., 2019). Some illustrative examples of school-based programs include engaging trainees in public service provision to learning through public, student-organizing symposiums and competitions in academic-related work, and any other constructive student-related groups, forums, presentations, and events.

Various research studies about education have shown that there are connections between non-cognitive individual factors, including personal motivations, interests, curiosity, responsibilities, focus, perseverance, attitudes, work-related habits, self-monitoring, and social skills and cognitive education outcomes, including improved academic performance, test scores, information recall, and skills acquisition (Zhang et al., 2022). The aspect of trainee engagement primarily comes when education officers and stakeholders prioritize education strategies and teaching techniques to address the factors influencing social development, intellectual development, emotional intelligence, behavioural change, and general trainee performance. The factors greatly affect the trainee's overall performance and thus require much consideration. Therefore, the study focused on determining the extent to which training engagement moderates performance of skilled secretarial subjects in selected national polytechnics in Kenya.

2.4 Academic Performance

Academic performance is among the most frequently researched aspects concerning college education. The overall mean grade is the most commonly used indicator used to measure trainee's academic performance. Mean grade earned during the earlier stages of learning can be a better pointer of continued performance and academic achievement than other measures. Trainees are required to meet specific requirements in terms of performance for them to graduate. According to Pascarella and Terenzini (2017) individual subject grades are the keys to trainees' enrolment and transition from one level to another through to the employment opportunities.

Positive Academic performance in skilled secretarial units (subjects) important during the college study because they determine if one will be termed as a secretary or not. According to Mille et al. (2018) factors like trainees' academic ability, nature of motivation, effort invested in study, and demographic characteristics (age, sex) contributes to student performance. Trainees' support program, amount of preferences given can also impact trainees' academic performance. Pascarella and Terezini's model (1991) highlights some factors relating to academic performance among college students. The factors include background features, socialization agents, structural characteristics, college environment, and trainee determination. In their study, Bauer and Liang (2003) indicated a positive relationship between trainees' effort in learning activities and trainees' first year school performance. These characteristics cannot be the only determinants of college academic outcomes. Sometimes external factors like use of college facilities for practice and study effort invested contributes to academic performance. For instance, trainees' use of library materials, their involvement in discussion, and involvement in extracurricular activities can contribute to their performance.

Studies have been done on the association between trainees' learning styles/modes and their educational performance (Sivarajah et al., 2019). Results indicate that academic performance is likely to improve when trainers use instructional strategies addressing varying learning techniques. The instructional styles also enhance student retention (Caruth, 2018). More research indicated that college learning activities, classroom experiences, and out-of-class experiences do not necessarily determine academic performance (Millunchick et al., 2021). Gurcay-Ferah (2018) discovered that class attendance contributes to the improvement of critical thinking skills amongst trainees. Finally, out-of-class experiences can have a contribution towards gaining critical thinking skills as well as trainees' satisfaction with their institutions which contributes to academic performance. Johnson & Stage (2018) posit that there is a significant association between educational performance and trainees' institutional services and program satisfaction levels. This study was done to examine the extent to which trainee entry behaviour determines academic performance in skilled secretarial subjects and to determine the extent to which training engagement moderates the relationship between trainee entry behaviour and academic performance in skilled secretarial subjects which is different from the above empirical evidence.

2.4 Methodology

The total target population of trainers were 27 trainers in three national polytechnics in Kenya. Data were collected by the use of a structured questionnaire. The questionnaire was designed to collect both qualitative and quantitative data using Likert scale. The respondents were required to rate their perceptions on entry behaviour and training engagement. Each response was scored on a 5-point Likert scale, where "1" Strongly disagree, "2" disagree, "3" neutral, "4" agree and "5" strongly agree for assessing the expectations and perceptions of the users. The questionnaires were created on google forms whereby a link extracted from the internet platform carrying the information was shared through social media platforms and email addresses of the respondents. Quantitative response was summarized in excel. The data was coded and analysed in the statistical package for social sciences (SPSS) version 26. Simple descriptive statistical techniques and inferential statistics were used in analysing the quantitative data. Pearson correlation coefficient was determined to assess the strength of the relationship between the independent and the dependent variables while R-Squared (R^2) was used to describe the extent to which the variance of the independent variable can explain, predict or determine the variance of the dependent variable in the model.

Direct model	**Moderation model**
$Y=\beta_0+\beta_1*X_1+\epsilon$ Where; Y =Academic Performance X = Trainee Entry behaviour β_1, β_0 = Regression coefficients to be estimated Ɛ = Error term	$Y=\beta_0+ Z *\beta_1*X_1 +\epsilon$ Where; Y =Academic performance Z =Training Engagement (Moderator) X = Trainee Entry Behaviour β_1, β_0 = Regression coefficients to be estimated Ɛ = Error term

3.0 Results

3.1 Background Information

Table 1 summarizes the descriptive statistics of the 26 participants. The results show that the age of the participants is positively skewed, hence the mean of the data is greater than the median.

Table 1: Descriptive Statistics

	Age	KCSE Requirement
Median	2.50	2.00
Std. Deviation	1.134	.000
Variance	1.286	.000
Skewness	.042	
Std. Error of Skewness	.456	.456
Kurtosis	-1.407	
Std. Error of Kurtosis	.887	.887
Range	3	0
Minimum	1	2

Table 2 summarizes the descriptive statistics on socio-demographic features (gender, age and qualifications) and Pearson's correlation between the Trainee Entry Behaviour (TEB) and Academic performance. The study respondents comprised 26 trainers from three Kenya National Polytechnics (Kisumu, Kisii and Kabete). The gender composition of the study comprised of 57.7% (15) female and 42.3% (11) male trainers. The trainers age varied with 8 (30.8%) for both 25-35 years and 45-55 years' age groups while 5 (19.2%) for both the 35-45 years and over 55 years' age groups.

Table 2: Socio-Demographic Features of Participants

Gender		**Frequency**	**Percent**
	Male	11	42.3
	Female	15	57.7
	Total	26	100.0
Age		**Frequency**	**Percent**
	25-35 Years	8	30.8
	35-45 Years	5	19.2
	45-55 Years	8	30.8
	Over 55 Years	5	19.2
	Total	26	100.0
Qualifications		**Frequency**	**Percent**
	Diploma	2	7.7
	Higher Diploma	8	30.8
	Degree	12	46.2
	Masters & PhD	4	15.4
	Total	26	100.0
KCSE Requirement		**Frequency**	**Percent**
	Yes	26	100.0

3.2 Entry Behaviour without Moderator Correlations Results				
3.2.1 Entry Behaviour without Moderator Correlations Results			KNEC Performance	Entry Behaviour
Pearson Correlation	KNEC Per		1.000	-.171
	Entry B		-.171	1.000
Sig. (1-tailed)	KNEC Per		.	.202
	Entry B		.202	.
N	KNEC Per		26	26
	Entry B		26	26
3.2.2 Entry Behaviour with Moderator Correlations Results		KNEC	Entry B	Training
Pearson Correlation	KNEC Per	1.000	-.171	.109
	Entry B	-.171	1.000	-.019
	Training Engage	.109	-.019	1.000
Sig. (1-tailed)	KNEC P	.	.202	.299
	Entry B	.202	.	.463
	Training Engage	.299	.463	.
N	KNEC P	26	26	26
	Entry B	26	26	26
	Training Engage	26	26	26

In determining whether performance in KNEC will change with trainee engagement (TE) as a moderator, it was found that the TE moderator slightly changes the R-square of the model from 0.029 without the moderator (Table 2) to 0.040 with the moderator (Table 3). The improvement in the R-square can be attributed to increased satisfaction, reduced isolation, and improved motivation to learn. The study by Martin and Bolliger (2018) found that strategies that aimed at student/learner engagement greatly improves the performance of students. Martin and Bolliger (2018) further describes TE as the basis of improving trainees' ability to acquire new skills, attitudes and knowledge which agrees with the findings in this study.

Table 3: Summary of Model without TE Moderator

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.171[a]	.029	-.011	.28510	.029	.724	1	24	.403	1.701

a. Predictors: (Constant), Entry Behaviour

Table 4: Summary of the Model with TE Moderator

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.201[a]	.040	-.043	.28956	.040	.484	2	23	.622	1.679

a. Predictors: (Constant), Training Engagement, Entry Behaviour

b. Dependent Variable: Academic Performance

3.3 Analysis of Variance

The ANOVA analysis was used to test the null hypothesis that the means of the data sets are equal using a significance P-value of 0.05 (5%). Table 5 and 6 summarize the One-way ANOVA analysis for the models without and with the moderator. In the model without the moderator, the sig. value is 0.403 (40.3%) which is more than the p-value; hence, the model value was not significant in improving ability to predict the outcome. Also, in the model with the moderator, TE, the sig. value is 0.622 (62.2%) which is more than the standard 0.05 (5%); hence, the predictors variables are not significant.

Table 5: One-way ANOVA without TE Moderator

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.059	1	.059	.724	.403[b]
	Residual	1.951	24	.081		
	Total	2.010	25			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Trainee Entry Behaviour

Table 6: One-way ANOVA with TE Moderator

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.081	2	.041	.484	.622[b]
	Residual	1.928	23	.084		
	Total	2.010	25			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Training Engagement, Trainee Entry Behaviour

Table 7: Regression Coefficients without TE Moderator

Model	B	Unstandardized Coefficients Std. Error	Beta	Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound	Collinearity Statistics Tolerance	VIF
1	(Constant)	4.286	.230		18.666	.000	3.812	4.759		
	Entry B	-.052	.061	-.171	-.851	.403	-.178	.074	1.000	1.000

a. Dependent Variable: KNEC Performance

Table 7 above shows the model without the TE moderator. The direct model $Y=\beta_0+\beta_1*X_1+\epsilon$ was interpreted $Y=4.286-0.052X_1+ 0.230$

Table 8: Regression Coefficients with TE Moderator

Model	B	Unstandardized Coefficients Std. Error	Beta	Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound	Collinearity Statistics Tolerance	VIF
1	(Constant)	4.169	.325		12.836	.000	3.497	4.841		
	Entry B	-.051	.062	-.169	-.828	.416	-.179	.077	1.000	1.000
	Training	.039	.075	.105	.516	.611	-.116	.194	1.000	1.000

a. Dependent Variable: KNEC Performance

Table (3.8) above shows Moderation Model $Y=\beta_0+ Z *\beta_1*X_1 +\epsilon$ was interpreted as $Y=4.169+ (*0.039-0.051) X_1 +0.325$. Hence $Y=4.169 -0.01989X_1 +.325$ i.e. $Y=4.169 -0.020X_1 +.325$.

4.0 Discussion

Entry behavior can be taken as prior knowledge, attitudes and aptitude acquired by the trainee that is relevant to the training tasks required to be demonstrated by trainees before embarking on a new education cycle (Johnson & Stage, 2018). For this study, entry behavior denotes final secondary school grade. It included the secondary education performance mostly in Mathematics and English that the trainees bring to the tertiary education context.

The main aim is to help the trainees to advance from secondary level to higher level of learning after having acquired understanding, aptitudes and attitudes. The first null hypothesis was H_O Trainee entry behaviour has no significant effect on academic performance in skilled secretarial subjects. On whether KCSE grade determines the performance of students in KNEC exams, 26 (100%) of the respondents agreed. A correlation of -0.171 exists between TEB and the KNEC performance. This weak negative correlation implies a change in trainee entry behaviour leads to a slight change in the KNEC performance in the opposite direction. This finding agrees with the findings established by Obwoge et al. (2017) that a low relationship exists between KCSE performance and KNEC performance in technical disciplines. On the other hand, trainee engagement (TE) as a moderator exhibits a weak positive correlation of 0.109 with the KNEC performance. Hence, an increase in training engagement will lead to a slight increase/improvement in the trainees' academic performance. This finding agrees with the findings by Baran et al. (2019) that established

that trainee engagement through adoption of student-centered teaching methods have a positive impact on the trainees' performance. TE is described as one of the key factors that impact perceived student learning outcomes (Caruth, 2018; Johnson & Stage, 2018; Zepke, 2018). With shorthand and CDP being the major technical fields in business studies, the poor performance of students in these study areas can, thus, be attributed to other factors excluding the entry behaviour aspect. In applying descriptive statistics, it can said that trainees' entry behaviour does not have positive impact on quality of performance of tertiary trainees. Subjecting the results ANOVA analysis, it was discovered further that trainees' entry behaviour had a slight influence on performance in skilled secretarial subjects with an accumulation of 40.3 percent. The findings were in line with the study done by Obwoge et al. (2017) who found that entry behaviour had a moderate effect of 0.452 at a significance level of 0.05.

5.0 Conclusions and Recommendations

5.1 Conclusions

This study aimed at investigating a trainee entry behaviour as a determinant of academic performance in three selected national polytechnics in Kenya. 26 participants took part in the study. The study findings showed that the model with trainee engagement (TE) as a moderator was better in explaining the academic performance in skilled secretarial subjects than the one without the TE moderator.

5.2 Recommendations

From this finding, the study recommended that Kenya Ministry of Education should harmonize the entry point for the secretarial courses and review requirements to enhance academic performance in the selected technical secretarial subjects. Furthermore, Kenya Ministry of Education and KNEC should harmonize the syllabus, setting of final exams, marking and awarding of grades in skilled secretarial subjects.

Author Contributions: All authors have read and agreed to the published version of the manuscript.

Informed Consent Statement: The study was conducted in accordance with (2021) Kitale National Research Innovation Policy.

Acknowledgments: Acknowledge Kitale National Research Conference Editorial team for technical support. Be blessed

Conflicts of Interest: The authors declare no conflict of interest

References

Abdal-Haqq, I. (1998). Constructivism in Teacher Education: Considerations for Those Who Would Link Practice to Theory. ERIC Digest.

Baran, E., Canbazoglu Bilici, S., Albayrak Sari, A., & Tondeur, J. (2019). Investigating the impact of teacher education strategies on preservice teachers' TPACK. *British Journal of Educational Technology*, *50*(1), 357-370.

Blotnicky, K. A., Franz-Odendaal, T., French, F., & Joy, P. (2018). A study of the correlation between STEM career knowledge, mathematics self-efficacy, career interests, and career activities on the likelihood of pursuing a STEM career among middle school students. *International journal of STEM education*, *5*(1), 1-15.

Bratton, J. (Ed.). (2020). *Organizational leadership*. Sage.

Briggs, S. J., Robinson, Z. P., Hadley, R. L., & Pedersen, R. L. (2019). The importance of university, students and students' union partnerships in student-led projects: A case study. *International Journal of Sustainability in Higher Education*.

Caruth, G. D. (2018). Student engagement, retention, and motivation: Assessing academic success in today's college students. *Participatory Educational Research*, *5*(1), 17-30.

Duffy, T. M. (2009). Building lines of communication and a research agenda. *Constructivist instruction*, 363-379.

El Aissaoui, O., EL MADANI, Y. E. A., Oughdir, L., & EL ALLIOUI, Y. (2019). Combining supervised and unsupervised machine learning algorithms to predict the learners' learning styles. *Procedia computer science*, *148*, 87-96.

Fadeyi, O., Maresova, P., Stemberkova, R., Afolayan, M., & Adeoye, F. (2019). Perspectives of University-Industry technology transfer in African emerging economies: Evaluating the Nigerian scenario via a data envelopment approach. *Social sciences*, *8*(10), 286.

Gurcay, D., & Ferah, H. O. (2018). High School Students' Critical Thinking Related to Their Metacognitive Self-Regulation and Physics Self-Efficacy Beliefs. *Journal of Education and training Studies*, *6*(4), 125-130.

Hoefler, T., Alistarh, D., Ben-Nun, T., Dryden, N., & Peste, A. (2021). Sparsity in Deep Learning: Pruning and growth for efficient inference and training in neural networks. *J. Mach. Learn. Res.*, *22*(241), 1-124.

Johnson, S. R., & Stage, F. K. (2018). Academic engagement and student success: Do high-impact practices mean higher graduation rates?. *The Journal of Higher Education*, *89*(5), 753-781.

Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: understanding the mechanisms of student success. *Higher education research & development*, *37*(1), 58-71.

Liu, J., Liao, X., Qian, S., Yuan, J., Wang, F., Liu, Y., ... & Zhang, Z. (2020). Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. *Emerging infectious diseases*, *26*(6), 1320.

Marope, P. T. M., Chakroun, B., & Holmes, K. P. (2015). Unleashing the potential: Transforming technical and vocational education and training. UNESCO Publishing.

Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, *22*(1), 205-222.

Millea, M., Wills, R., Elder, A., & Molina, D. (2018). What matters in college student success? Determinants of college retention and graduation rates. *Education*, *138*(4), 309-322.

Millunchick, J. M., Brennan- Wydra, E., Henderson, T., Johnson, A., & Finelli, C. J. (2021).

The role of college knowledge and proactive behaviour on participation in cocurricular activities. *Journal of Engineering Education*, *110*(1), 114-142.

Moores, E., Birdi, G. K., & Higson, H. E. (2019). Determinants of university students' attendance. *Educational Research*, *61*(4), 371-387.

Obwoge, R. O., Priscah, M. J., Mohamed, E. A., Keraro, F. N., & Kangethe, S. (2017). Medical Students' KCSE Grade and Their Relationship to Academic Performance: A Case of Egerton and Moi Universities, Kenya. *Science*, *5*(2), 34-44.

Si, W., Yan, Q., Wang, W., Meng, L., & Zhang, M. (2022). Research on the Influence of Non-Cognitive Ability and Social Support Perception on College Students' Entrepreneurial Intention. *International Journal of Environmental Research and Public Health*, *19*(19), 11981.

Sivarajah, R. T., Curci, N. E., Johnson, E. M., Lam, D. L., Lee, J. T., & Richardson, M. L. (2019). A review of innovative teaching methods. *Academic radiology*, *26*(1), 101-113.

Spurk, D., Hirschi, A., & Dries, N. (2019). Antecedents and outcomes of objective versus subjective career success: Competing perspectives and future directions. *Journal of Management*, *45*(1), 35-69.

Zepke, N. (2018). Student engagement in neo-liberal times: What is missing? *Higher Education Research &* Development, 37(2), 433-446.