Effects of Age on Teachers' Self-Efficacy: Evidence from Secondary Schools

The study investigated the effects of age on self-efficacy among teachers in secondary schools in Kenya. The concurrent triangulation design was adopted. A sample size of 327 teacher participants was obtained using both stratified and simple random sampling techniques. The Teacher Self-Efficacy Scale (TSES) was used to collect quantitative data. In addition, semi-structured interview was used to collect qualitative data. The reliability coefficient for the TSES was α = 0.996. The Multivariate Analysis of Variance (MANOVA) was used to test the hypothesis. Qualitative data was analyzed using thematic analysis. The MANOVA results indicate that the effect of age on teachers' self-efficacy was not significant, Wilk's λ (6, 320) = 0.947, p = 0.498. Qualitative results reported a significant effect of age on teachers' self-efficacy in classroom management. The Kenyan Teachers' Service Commission should carry out periodical assessment of teachers' self-efficacy to identify teachers that are vulnerable to low self-efficacy.

Keywords: *effects; age; self-efficacy; teachers; secondary schools; Kenya*

Introduction

Self-efficacy is defined as a person's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives (Bandura, 1994). However, Alnoor, Al Abrrow, Abdullah and Abbas (2020) defined self-efficacy as an individual's appreciation of his or her ability to perform occupational challenges successfully by mobilizing knowledge resources and pathways to meet professional requirements. Subsequently, Cheng, Cui, Chen, Ye, Liu, and Zhang (2020) defined self-efficacy as one's evaluation of his or her capability to perform professional tasks and the expectation of performing such professional behaviours successfully. Therefore, self-efficacy is the belief an individual has about himself or herself that the individual has the ability to successfully carry out an activity. Self-efficacy beliefs are very helpful as they determine both task performances among individuals. In addition, self-efficacy is associated with key motivational constructs such as causal attributions, self-concept, optimism, achievement goal orientation, academic help-seeking, anxiety, and value (Usher & Pajares, 2008). Self-efficacy is also connected to self-regulate learning, including students' decision to stay in school (Caprara, Fida & Vecchione, 2008), and academic procrastination (Klassen, Krawchuk & Rajani, 2008). According to Bandura (1997), people with low self-efficacy tend to doubt their capabilities and often avoid circumstances where they think they will fail. Self-efficacy and positive psychology both seek to evoke human strengths such as optimism, perseverance, and interpersonal skills (Seligman & Csikszentmihalyi, 2000).

Teachers' self-efficacy has been defined as teachers' beliefs in their ability to effectively handle their professional tasks, obligations, and challenges (Barni,

Danioni & Benevene, 2019). According to Skaalvik and Skaalvik (2016), teacher's self-efficacy is the teacher's personal belief that they possess the ability to perform professional tasks of the teaching-learning process with mastery. Teachers' self-efficacy is important because it affects teachers' instructional quality and student motivational beliefs because it is positively related to instructional quality, which in turn is positively related to student motivational beliefs (Achurra and Villardón (2020). In addition, teachers' self-efficacy plays a key role in influencing important academic outcomes, such as students' achievement and motivation (Barni, Danioni and Benevene (2019); and it also affects the levels of commitment, enthusiasm, persistence and innovativeness in teaching (Berg & Smith, 2016). Tschannen-Moran and Hoy (2001) identified three domains in the construct of teachers' self-efficacy, which are self-efficacy in instructional strategies, student engagement and classroom management. Instructional strategies are techniques teachers use to help learners become independent and strategic (Motsa, Bhebhe & Nxumalo, 2019) while student engagement is the capacity of the teacher to organize and utilize resources such as time and institutional materials to induce optimal academic participation (De Villiers & Werner, 2018). However, classroom management refers to the actions teachers take to create an environment to achieve multiple learning goals for students by supporting and facilitating effective teaching and learning (Korpershoek, Harms, de Boer, van Kuijk & Doolaard, 2014).

Although, Künsting (2016), Smith (2016) and Ullah (2010) posited that it is expected of teachers to have high levels of self-efficacy, Odongo (2011) and Oginga, Muola and Mwania (2014) reported that teachers' self-efficacy was low in Kisumu East Sub-County and Kisumu Municipality in Kenya. In addition, the low self-efficacy among teachers in Kisumu County in Kenya was evidenced by the statistic that 253 out of 1790 (14.1%) teachers had either resigned or sought transfers between 2014 and 2018 in Kisumu County. This was suggestive of low teachers' self-efficacy because Machin and Fogarty (2008) and Tsang, Sham, Law, Chan and Sze (2016) found intention to transfer, resignation and persistence in teaching on one hand and self-efficacy on the other hand, to be related. Very scanty literature was available on effects of age and teachers' self-efficacy in Kenya. Therefore, the study investigated the effects of age on teachers' self-efficacy in Kisumu County of Kenya.

Literature Review

This study was informed by Bandura's Social Cognitive Theory. The theory adopts an agentic perspective where people intentionally influence their functioning through self-directed goal tendency to achieve self-development (Bandura, 2005). Literature on age and self-efficacy among teachers exists. For example, in Turkey, Top, Acet, Kalkavan and Ozturk (2016) showed that there were significant differences in personality variables, including self-efficacy, of teachers according to age groups. In addition, Gkolia, Dimitrios and Koustelios (2016) study in Greece and other European countries indicated that teachers' age affect their self-efficacy factors. Moreover, Authier (2012) study in Canada

revealed that the younger teachers had higher sense of teacher self-efficacy. Another study in USA by Bausch, Michel and Sonntag (2014) confirmed that there was a significant relationship between age and self-efficacy in favor of the aged.

Batool and Shah (2018) in USA indicated that there is a significant difference between the mean score of experienced teachers (M=11.24, SD=2.93) and the mean score of less experienced teachers (M=31.75, SD=1.61), i.e., t = -20.51, p = 0.001. In South Africa, Motshidisi (2013) study revealed that the teachers who were older and had many years of teaching experience had significantly higher teaching efficacy beliefs scores as compared to the younger teachers' or those with few years of teaching experiences. Similarly, Raath and Hay (2016) study is south Africa indicated that as the age of teachers increased, their self-efficacy level too increased in a linear relationship. However, Iran by Arbabisarjou, Zare, Shahrakipour and Ghoreishinia (2016) revealed that the relationship between age and self-efficacy was not significant. Similarly, Schwartz (2010) in USA reported that a teacher's age was not predictive of teacher self-efficacy. Sharma and Rani (2014), study in India also found that university postgraduates' self-efficacy did not differ significantly by age groups, that is, both young and old post-graduates had similar levels of self-efficacy. Subsequently, Salami (2007) and Mensah and Lebbaeus (2013), study in Nigeria and Ghana indicated that age had no statistically significant influence on self-efficacy. This implied that there were no consistent differences in self-efficacy among teachers of different ages. Similarly, Hofman and Kilimo (2014) study in Tanzania showed that teachers' age did not relate significantly to teachers' self-efficacy towards inclusive education.

From the previous studies focused on teachers' self-efficacy and omitted the domains of teachers' self-efficacy. Moreover, methodological gaps in literature also arose because the previous studies employed either qualitative or quantitative approaches, with some studies using secondary data. The hypothesis of the study was stated as follows:

Ho: *Age does not influence teachers' self-efficacy and its domains*

Methods

Design

The concurrent triangulation design was adopted. This design involves a single study containing qualitative and quantitative data collection which is conducted at the same time. The purpose of this type of investigation was to validate the findings generated by each method through evidence produced by the other (Kroll & Neri, 2009).

Participants

A sample size of 327 teacher participants was obtained using both stratified and simple random sampling techniques. This ensured the representation of respondents with different characteristics from various sub-groups (Castillo, 2009).

Instruments

The Teacher Self-Efficacy Scale (TSES) was used to collect quantitative data. The TSES was developed by Tschannen-Moran and Hoy (2001) to measure teachers' self-efficacy and its domains. The TSES consists of 24 items on a summated scale with eight items measuring each of the three domains of teacher efficacy such as student engagement, instructional strategies and classroom management. The questionnaire had a response format on a 5-point Likert scale. In addition, semi-structured interview was used to collect qualitative data, because of the focus and freedom it accords the researcher in data collection, gives rich data and captures inner feelings of respondents (McKenzie & Hannan, 2007). Then two experts in Educational Psychology from a Kenyan university examined the Teacher Self-Efficacy Scale for face and content validities. Cronbach's reliability coefficient, alpha (α) was used to establish questionnaire internal reliability by testing how closely related the set of TSES items were (Johnson & Christensen, 2004).The reliability coefficients for the TSES questionnaire was $\alpha = 0.996$. This was considered a high reliability coefficient since $\alpha = 0.7$ and above is acceptable (Gliem & Gliem, 2003).

Procedure

Ethical clearance to conduct the study was obtained from the National Council for Science, Technology and Innovation in Kenya. Thereafter, researcher visited the selected secondary schools, met the principals, and informed them of the nature and purpose of the research. Finally, on the dates agreed, the researcher visited the concerned schools to collect data from the sampled teachers. The quantitative data was collected through self-report questionnaire that consisted of two sections of demographic variables and Teacher Self-Efficacy Scale. The researcher administered the questionnaire personally to the respondents and waited as the respondents filled them. Each questionnaire took about 20 minutes to be completed by participants. In addition, 12 teachers were interviewed. This number of interviewees fell between the recommended 6 and 20 that was sample size for an interview in educational research (Mason, 2010). Each of the interview sessions lasted about 35 minutes.

Ethical Considerations

Ethical considerations were adhered to in this research. Anonymity of participants was upheld in the research as the researchers used pseudonyms to

represent participants but not their actual names in the questionnaires. Participation was voluntary and participants signed informed consent forms before participating in the study. Confidentiality was maintained since the interviews were carried out in a secluded room in school.

Data Analysis

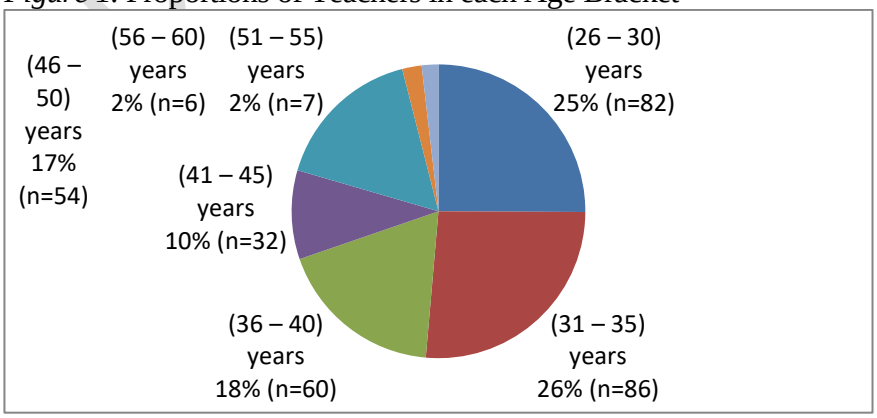
Quantitative data on teachers' self-efficacy was determined by computing the unweighted means of the scores from the Teachers' Self-Efficacy Scale (TSES) items. The hypothesis was tested at the 95% level of confidence (Hirpara, Jain, Gupta & Dubey, 2015). The Multivariate Analysis of Variance (MANOVA) was used to test the hypothesis because there were multiple dependent variables of teacher self-efficacy. Therefore, MANOVA tested for the difference in two or more vectors of means, which were linear combinations of the measured dependent variables (Harland, 2015). The tests that are found in MANOVA are Pillai's Trace, Wilk's λ, Hotelling's Trace and Roy's Largest Root (Garson, 2015). The present study used Wilk's λ to find out the effect of age on teachers' self-efficacy. This is because Wilk's λ should be used when dealing with multivariate effects of more than two groups (French, Macedo, Poulsen, Waterson & Yu, 2008). The hypothesis was tested by computing MANOVA for the difference across age on teachers' self-efficacy and its domains. The categories for age were 26 – 30, 31 – 35, 36 – 40, 41 – 45, 46 – 50, 51 – 55 and 56 – 60. Qualitative data was analyzed using thematic analysis, which is a method for identifying, analyzing and reporting patterns, called themes, within data by organizing and describing the data set in rich detail (Braun & Clarke, 2006).

Results

Distribution of Teachers according to Age

The study sought to establish the effects of age on teachers' self-efficacy. The descriptive result in pie chart is as shown in Figure 1.

Figure 1. Proportions of Teachers in each Age Bracket



The results in Figure 1 shows that the in the age groups 26 – 30 years' old (n = 82; 25%), 31 – 35 years' old (n = 86; 26%), 36 – 40 years' old (n = 60; 18%), 41 – 45 years' old (n = 32; 10%), 46 – 50 years' old (n = 54; 17%), 51 – 55 years' old (n = 7; 2%) and 56 – 60 years' old (n = 6; 2%). From the results, almost half of the respondents were below 35 years of age.

Age and Teachers' Self- Efficacy

The current study hypothesized that there was no significant effect of age on teachers' self-efficacy and its domains. Table 1 shows descriptive statistics for age and teachers' self-efficacy.

Table 1. Descriptive Statistics of Age and teachers' self-efficacy

Domains of Teachers' Self-Efficacy	**Age**	**N**	**Mean**	**S.D.**
Teachers' Self-Efficacy in Student Engagement	26 – 30	82	33.79	3.046
	31 – 35	86	33.56	2.848
	36 – 40	60	33.53	2.182
	41 – 45	32	33.06	3.151
	46 – 50	54	34.37	2.844
	51 – 55	7	34.14	4.140
	56 – 60	6	33.17	4.446
	Total	**327**	**33.70**	**2.880**
Teachers' Self-Efficacy in Classroom Management	26 – 30	82	33.40	3.175
	31 – 35	86	34.09	2.781
	36 – 40	60	34.20	2.510
	41 – 45	32	33.25	2.929
	46 – 50	54	34.52	3.810
	51 – 55	7	34.71	2.870
	56 – 60	6	32.67	5.715
	Total	327	33.91	3.263
Teachers' Self-Efficacy in Instructional Strategy	26 – 30	82	33.95	2.973
	31 – 35	86	34.16	2.938
	36 – 40	60	34.30	2.727
	41 – 45	32	34.09	2.333
	46 – 50	54	34.98	3.224
	51 – 55	7	32.86	3.761
	56 – 60	6	32.67	5.502
	Total	**327**	**34.21**	**2.988**

The results in Table 1 shows the means, standard deviations and sample sizes the domains of teachers' self-efficacy across the age groups. The teachers in the 31 – 35 and 26 – 30 years brackets had the highest frequencies (N = 86; N = 82 respectively) while the 51 – 55 and 56 – 60 age groups had the lowest frequencies (N = 7; N = 6 respectively).The table also gives the descriptive results for the domains of teachers' self-efficacy, that is, student engagement (M = 33.70; SD = 2.880), classroom management (M = 33.91; SD = 3.263) and instructional strategies (M = 34.21; SD = 2.988). The 46 – 50 age group of teachers had the highest mean scores in teachers' self-efficacies in student engagement and

instructional strategy (M = 34.37; M = 34.98) while the 56 – 60 years age group of teachers had the lowest mean scores in teachers' self-efficacies in classroom management and instructional strategy (M = 32.67; M = 32.67). The 41 – 45 age group had the lowest mean score (M = 33.06) in teachers' self-efficacy in student engagement while the 51 – 55 age group had the highest mean score (M = 34.71) in teachers' self-efficacy in classroom management. The 56 – 60 years age group of teachers had the highest standard deviations in teachers' self-efficacies in student engagement, instructional strategy and classroom management (SD = 4.446; SD = 5.715; SD = 5.502 respectively). In addition, the 36 – 40 age group of teachers had the lowest standard deviations for teachers' self-efficacies in student engagement and classroom management (SD = 2.182; SD = 2.510 respectively). However, the 41 – 45 years age group of teachers had the lowest standard deviation in teachers' self-efficacy in instructional strategy.

The MANOVA was then used to determine the effects of age on teachers' self-efficacy. The results are presented in Table 2.

Table 2. MANOVA Test results for Age and teachers' self-efficacy

Effect		Value	F	Hypothesis df	Error df	Sig	Partial eta squared	Noncent. parameter	Observed Power
Age	Pillai's Trace	.054	.969	18.000	960.000	.493	.018	17.449	.714
	Wilk's λ	**.947**	**.966**	**18.000**	**899.925**	**.498**	**.018**	**16.378**	**.677**
	Hotelling's Trace	.055	.962	18.000	950.000	.503	.018	17.311	.709
	Roy's Largest Root	.027	1.449	6.000	320.000	.196	.026	8.692	.562

Computed using alpha = 0.05

The results in Table 2 shows the values of each multivariate test, their F-scores, degrees of freedom, significance levels and observed power. The MANOVA results indicate that the effect of age on teachers' self-efficacy was not significant, Wilk's λ (6, 320) = 0.947, p = 0.498. Therefore, it was concluded that null hypothesis which stated that *"there is no significant effect of age on teachers' self-efficacy and its domains"*, was accepted. Thus, it can be concluded that there was no significant effect of age on teachers' self-efficacy.

Univariate tests were performed to determine between-subjects effects of age on the domains of teachers' self-efficacy as is shown in Table 3.

Table 3. Between-Subjects Effects of Age on teachers' self-efficacy

Source	Dependent variable	df	F	Sig	Observed Power
AGE	Teachers' Self-Efficacy in Student Engagement	6	.891	.501	.352
	Teachers' Self-Efficacy in Instructional Strategy	6	1.235	.288	.485
	Teachers' Self-Efficacy in Classroom Management	6	1.206	.303	.474

Computed using alpha = 0.05

The results in Table 3 show the degrees of freedom, F-score and significance levels for the tests of between-subjects influence of age on the domains of teachers' self-efficacy. Furthermore, the results show that the effects of age on teachers' self-efficacy in student engagement, F (6, 320) = .891, p = 0.501, instructional strategy, F (6, 320) = 1.235, p = 0.288, and classroom management, F (6, 320) = 1.206, p = 0.303, were all not statistically significant.

Qualitative findings obtained from interviews with teachers indicated that teacher self-efficacy was dependent on the age of teachers. Most of the teacher respondents reported that self-efficacy increased with teachers' age up to middle age of 40 years and after which it begins to decline. His meant that as teachers began their careers, their self-efficacy increased significantly till they reached around 40 years of age. Some teacher respondents reported that: "*The self-efficacy goes up from 21 to 40 and then it goes down after 40. After 40, they seek transfer or promotion because the work has become too much*" (Teacher, 12). Another teacher added that, "*self-efficacy increases with age of teachers until they get used to the system at around 47. They start being affected at 40 and they get worse at 50 when they start to wait for retirement* (Teacher, 7).

From the interview excerpts by teachers 7 and 12, it can be concluded that teachers' self-efficacy is dependent on physical vigor which begins to decline when teachers are about 45 years of age. Teachers' self-efficacy, therefore, increases up to about 45 years of age because their physical strength remains high up to when they are about 45 years of age. Teachers' self-efficacy then goes down as teachers become older than 45 because their physical strength goes down.

The reason given for the increase in self-efficacy up to about 45 and then decline thereafter was that teacher self-efficacy increases because of better content mastery and then declines due to decreasing physical vigor and competing interests. Teacher respondents reported that, "*As teachers age, you become a better teacher because of experience, better understanding of students* (Teacher, 9), and another added that, "*Performance goes down after 50 because the teachers get tired and become more engaged outside school*" (Teacher, 3). The interview excerpts from Teacher 9 and Teacher 3 imply that high teachers' self-efficacy is accompanied by high levels physical energy, understanding students and less engagement in competing interests from life outside school.

The respondents also reported that as teachers increased in age, teachers' self-efficacy in student engagement increased due to maturity. For instance a teacher respondent, said*, "With age, they know how to handle the students. They become even more mature and relate better with the students"* (Teacher, 7). This could be interpreted to mean that teachers' self-efficacy in student engagement increased with age because the teachers gained more experience in engaging students after a long period of interacting with younger people.

The qualitative results also indicated that the older the teachers got, however, the lower their self-efficacy in instructional strategies became. For example, teacher respondents said*, "Above 40 are very resistant to innovative instructional strategies*," (Teacher, 4) and "*The old teachers can't come up with new ways of teaching, and only have old methodology"* (Teacher, 5). These interview excerpts could be interpreted to mean that the teachers' self-efficacy in instructional

strategy went down due to familiarity with old ways that have worked for them for a long time. Thus, the teachers are, therefore, resistant to change that is required to develop more innovative instructional strategies.

Qualitative results also reported that, there was increase in self-efficacy in classroom management with age. This was because the old teacher was experienced enough to know the important things that should be stressed in class. A teacher respondent said that, "*They become better at classroom management because they know how to handle the syllabus to achieve certain results unlike the younger teachers who are still learning. This makes the students to be more manageable for them*" (Teacher, 6). The respondents' views as reported in the interview excerpts might be interpreted to mean that teachers' self-efficacy is dependent on their ability to achieve effective curriculum implementation with students. Teachers who can implement the curriculum more effectively with students, therefore, have higher self-efficacy than teachers who do not do so. Therefore, from qualitative results, it was found that there is a significant effect of age on teachers' self-efficacy in classroom management.

Discussion

The study sought to establish the effects of age on teachers' self-efficacy and its domains among in secondary schools in Kisumu County in Kenya. Quantitative results indicated that there was no significant effect of teachers' age on teachers' self-efficacy. This quantitative finding concurred with the findings of Schwartz (2010) in the USA and Sharma and Rani (2014) in India which had found that the influence of age on teachers' self-efficacy was not significant. However, it disagreed with the findings of Top et al., (2016) in Turkey, Gkolia, et al., (2016) in Greece and Authier (2012) in Canada which reported that there was a significant influence of age on teachers' self-efficacy.

Qualitative data analysis, however, revealed that the teachers' self-efficacy increased with age up to the optimum of 40-50 years then it declines. The teachers reported that self-efficacy increases because of experience, better content mastery and achievement of better student performance in examinations. Then it declines because of loss of physical vigor and competing interests. On the domains of teachers' self-efficacy, the respondents indicated that as teachers age, their self-efficacy in student engagement remained constant, their self-efficacy in instructional strategies went down and teachers' self-efficacy in classroom management increased with age until teachers reach middle age then teachers' self-efficacy began to decrease. This finding agreed with the findings of Bausch, Michel and Sonntag (2014) in the USA, Gkolia, et al., (2016) in Greece and Top et al., (2016) in Turkey which had indicated that teachers' age affect their self-efficacy factors. On the other hand, this qualitative finding disagreed with the findings of Hofman and Kilimo (2014) in Tanzania, Salami (2007) in Nigeria and Mensah and Lebbaeus (2013) in Ghana which reported that there was no influence of teachers' ages on their self-efficacy.

Conclusion & Recommendation

The study sought to establish the effects of age on teachers' self-efficacy. Quantitative data analysis indicated that there was no statistically significant effect of age on teachers' self-efficacy and its domains. Qualitative analysis further revealed that teachers' self-efficacy depends on age. The current study, therefore, concludes that age influences teachers' self-efficacy in a curvilinear manner. Teachers' self-efficacy and its domains increase from the time of employment until they reach middle age and then it plateaus. Thereafter, the teachers' self-efficacy declines as the teachers age beyond middle age and approach retirement because of the demands life outside. The Kenyan Teachers' Service Commission should carry out periodical assessment of teachers' self-efficacy to identify teachers that are vulnerable to low self-efficacy.

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