Problem-Solving Personality Characteristics as Predictors of Academic Achievement among Gifted and Talented Learners in Public Primary Schools in Nairobi County

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ABSTRACT

Gifted and talented learners exhibit personality characteristics that make them manifest different competencies to undertake tasks that their peers cannot. However, in Nairobi County, learning competencies of talented and gifted pupils in public primary schools are below average. Thus, the purpose of this study was to determine the personality characteristics as predictors of academic achievement among gifted and talented learners in public primary schools in Nairobi City County, Kenya. The study adopted a field survey research design. Target population comprised 3,247 teachers and 19,863 learners in classes VI-VIII totalling 23, 110 participants from which a sample of 391 respondents was determined using Yamane's Formula. Stratified sampling was used to create 17 strata based on number of sub-counties in Nairobi County. From each sub-county, 13 teachers and 10 gifted and talented learners in classes were randomly selected. This procedure realized a sample of 221 teachers and 170 gifted and talented learners in classes VI-VIII. Questionnaires were used to collect data from teachers and learners. A pilot study was conducted among 40 respondents from a sample of public primary schools in Nairobi County to establish validity and reliability. Validity was ascertained based on the views of experts in educational psychology and special needs. Reliability was determined using split-half technique and reliability coefficient, r = 0.725, was obtained using Cronbach's Alpha Method which indicated high reliability. Qualitative data were analysed thematically along the objectives and presented thematically in narrative forms. Quantitative data were analysed descriptively using frequencies and percentages and inferentially using Pearson's Product Moment Correlation Analysis with the help of Statistical Packages for Social Sciences (SPSS 23) to test the hypotheses. Quantitative findings were presented using tables and charts. Results indicated that gifted learners in Nairobi County public schools exhibited positive self-concept characteristics, practiced self-regulated learning, engaged in problem-solving frequently, and benefitted from achievement motivation. Also, analysis of the results addressing the null hypothesis showed that problem-solving has a statistically significant influence on academic achievement among gifted and talented learners in public primary schools in Nairobi County. The variable is positively correlated with number work activities (r = .508, p = .005), language activities (r = .538, p = .003), and essential life skills (r = .500, p = .006). It was recommended that Teachers and parents should create an appropriate learning environment for gifted pupils in public schools to create a positive self-concept, motivation, regulated learning, and problem-solving approach to improve their academic achievement.

Keywords: *Problem-Solving Characteristics; Personality Indicators; Academic Achievement; Gifted and Talented Learners; Public Primary Schools; Nairobi County*

I. INTRODUCTION

This study conceptualizes that personality indicators such as problem-solving characteristics contribute to academic achievement among gifted and talented learners. Daminabo (2013) asserts that such personality indicators include, but not limited to, self-efficacy, self-esteem, self-concept, emotional regulation, problem-solving capabilities and above all, achievement motivation, which are key determinants of academic achievement among gifted and talented learners. According to Reusen (2013), academic achievement entails the ability of learners in task completion and competencies. For example, in Yemeni, any learner in primary school who manifest ability to complete tasks, identify academic problems and solve them, high communicative competency, innovativeness and creativity, team-building with peers and leadership skills is considered to be high achievers (Agran, 2012).

This is the case in countries such as the Netherlands, Germany and United Kingdom (Agran, 2012). Despite these postulations, many learners are still low achievers and manifest poor competencies in different tasks while at school. However, the extent to which such personality indicators or traits of gifted and talented learners influence their academic achievement still remains fully unexplored. According to Barrick and Mount (2015), self-concept, emotional

regulation, achievement motivation and problem-solving capabilities of gifted and talented learners prepare them for different worldviews and thus for behaving differently in various social and educational settings.

In Nairobi County, a study by Karimi (2020) revealed that learners in public primary schools have low learning outcomes and competencies in numeracy as well as literacy education programmes. Karimi (2020) noted that, despite the introduction of initiatives such as Tusome Literacy Project, the majority of learners in public primary schools show inability to complete tasks, inability to identify problems and solve them, poor communicative competency, lack of creativity, poor team building with peers and low leadership skills. Similarly, in their needs assessment primary level report, Uwezo (2016) noted that, in Nairobi County, many learners aged between 7-13 years manifest low competencies in basic numeracy, language and essential life skills such as team building with peers and leadership skills. Uwezo (2016) asserts that only 26.92% of learners aged between 7-13 years manifest improved literacy and communicative competency in English and Kiswahili, 18.74% can undertake basic numeracy and number work activities while only 20.8% have mastered essential life skills such as team building and leadership competencies. To address this, the Government of Kenya introduced competency-based curriculum (CBC) to tap on the learner competencies through talent identification. Despite these initiatives, much is still yet to be done to assess the extent to which personality characteristics such as problem-solving characteristics influence academic achievement of gifted and talented learners in public primary schools, hence this study.

1.1 Objectives of the Study

The study sought to determine whether problem-solving characteristics predict academic achievement among gifted and talented learners in public primary schools in Nairobi County;

1.2 Research Hypotheses

The study tested the following research hypotheses;

H_{01}: There is no statistically significant relationship between problem-solving and academic achievement characteristics among gifted and talented learners in public primary schools in Nairobi County.

II. LITERATURE REVIEW

Gifted and talented learners also exhibit problem-solving skills which often manifest itself in the early grades as potential and needs to be stimulated. Bingham (2014) asserts that problem-solving skills are cognitive, affective and social abilities which learners use in the process of overcoming difficulties they encounter in achieving a goal. These skills are acquired in development periods and have effects on social adaptation of a learner and success in daily life. According to Bingham (2014), problem-solving skills provide for a learner to overcome his/her own difficulties.

Durmaz and Mutlu (2014) assert that problem-solving skills of an individual are significantly affected by personal experiences, personality traits, attitudes and morals. In other words, core knowledge, skills and habits the child will acquire in early ages by means of problem-solving experiences shape social and emotional life in addition to later education life. These postulations indicate that the main goal is to get overcoming skill to learners so that they solve when they encounter other problems out of school life. In a study carried out in India, Gick (2015) established that, for gifted and talented learners, learning about the world and how things work as they experience them, problem-solving is a natural process.

The objective of a research by Ewies et al. (2021) was to determine the degree of problem-solving abilities among talented children at King Abdullah II Schools for excellence. The researchers also intended to determine if the intellectual level of the parents had any influence on the problem-solving abilities of talented youngsters. Descriptive and analytical methods were employed to fulfill the aims of the research. It was determined that around two-thirds of talented kids were unable to answer issues at an acceptable level, whereas one-third were able to do so at an acceptable level. No statistically significant differences were found between the academic level of the talented student's father and mother and his or her ability to solve the challenge. Based on the findings of the study, the researchers provided suggestions for teaching talented kids, their instructors, and their parents in problem-solving abilities.

Gick (2015) found that many academic activities they encounter each day at school are a puzzle and require gifted and talented learners to try different strategies to solve the problem before becoming frustrated. According to Gick (2015), in many primary schools where learners manifested problem-solving traits, registered impressive grades in their assessment tests. In line with these findings, Houtz and Selby (2016) conducted a similar study in Colombia,

which established that primary education advocates support problem-solving in curricula through inquiry-based explorations that require gifted and talented learners to think critically and creatively.

Houtz and Selby (2016) further indicated that this developmentally appropriate best practice for primary has parallel support in the gifted education literature as one hallmark of gifted learners is their ability to think critically and process information. These findings are indicative of the fact that problem solving skills, which help gifted and talented learners to overcome difficulties well they encounter, see an effective way for improving individual abilities. This further implies that determining in which level gifted children have these abilities that can be learned or improved and especially are seen as a necessary to be acquired in early ages has a key importance in terms of enhancing education quality given them in addition to improving these skills in children.

In many primary schools in Sub-Saharan Africa, problem-solving attributes are the most noticeable among gifted and talented learners. For example, in a study conducted in Egypt, Lee (2015) noted that many learners in elementary schools exhibit excellent abilities devise strategies to solve a problem during play, classwork activities and some number work concepts. Lee (2015) indicated that such learners tend to perform better than their peers who lack problem-solving characteristics. In other words, such thinking among gifted and talented learners has the task of devising some action which may mediate between the existing and the desired situations. In Liberia, Lang (2016) found that teaching strategies that support problem-solving skills, critical and creative thinking skills, and enhancing achievement are the key points of the education of gifted and talented learners. In many primary schools in Kenya and informal settlements in Nairobi County, gifted and talented learners are considered to own higher potential to achieve topics and abilities as compared to normal learners and, due to this potential, it is expected that their problem-solving skills, creative and analytical thinking skills are also at high levels.

A study carried out in Nairobi County by Odundo, Kinyua and Ganira (2018) revealed that there is a need to prepare learners to make informed choices, think critically, solve problems, build healthy interpersonal relationships and succeed in life; these aspects of cognition can be acquired through instruction, mentorship and practice. However, Odundo et al (2018) as did other empirical studies have not articulated how specific problem-solving skills influence academic achievement of gifted and talented learners.

2.1 Theoretical Framework

This study was anchored on the theory of giftedness which was postulated by Renzulli (1978). This theory holds that gifted behavior among people occurs when there is an interaction among three basic clusters of human traits, that is, above-average general and/or specific abilities, high levels of task commitment (motivation) and high levels of creativity. This theory is further premised on the overlap and interaction between and among the three clusters of traits that create the conditions for making giftedness. In other words, giftedness is not viewed as an absolute or fixed state of being, that is, the 'state of having and not having'. Rather, it is viewed as a developmental set of behaviors that can be applied to problem-solving situations. Varying kinds and degrees of gifted behaviors can be developed and displayed in certain people, at certain times, and under certain circumstances. In the education context, Renzulli (1978) holds that gifted and talented children are those who possess or are capable of developing this composite of traits and applying them to any potentially valuable area of human performance.

According to Renzulli (1978), each characteristic plays an important role in the development of gifted behavior. Well above-average ability is defined by Renzulli as either general ability that can be applied across all domains and/or specific ability, which consists of the ability to perform at a high level within a specific domain. Renzulli (1978) defines well above-average ability as that possessed by those individuals performing in the top 15-20% of any domain. This view differs from the traditional view of giftedness as comprising those scoring in the top 3-5% on a standardized measure of intelligence (Marland, 1972). In his study on the applicability of the components of Renzulli's model, Delisle (2010) found that non-intellective factors are just as important for creative production as intellectual factors are.

The model is also supported by the work of Gubbins (2010), who showed through stepwise multiple regression that above-average ability is a necessary but not sufficient condition for high-level creative productivity. However, Delisle (2010) criticized Renzulli's model has been criticized for not demonstrating correlations between later life achievements and the traits or experiences of children with various levels of IQ. Nonetheless, this theory fits this study due to the fact that personality traits of gifted and talented learners enable them to undertake different activities under different circumstances. In this study, this theory was relevant in that, as indicated by Renzulli (1978), learners in a schoolhouse are best described as test-taking or lesson-learning giftedness and is the form of giftedness most often emphasized in school. In other words, learners in schoolhouse giftedness who display characteristics such

as self-concept, problem-solving, self-regulated learning and achievement motivation personality traits are excellent consumers of knowledge manifested through excellent performance in examinations.

The study was also guided by the academic achievement theory whose proponent was Walberg (2012). This theory posits that the psychological characteristics of individual learners and their immediate psychological environments influence educational outcomes, that is, cognitive, behavioral, and attitudinal. Walberg (2012) identified nine key variables that influence educational outcomes as: learners' prior achievement, motivation, developmental level, quantity and quality of instruction, classroom climate, parental involvement, home environment, peer group and exposure to mass media outside of school.

Walberg (2012) further asserts that psychosocial characteristics such as self-concept, attitudes, behaviors, intrinsic motivation, and overall learner engagement in learning are useful in curriculum evaluation studies and can provide teachers with useful information to arrange more optimally functioning classrooms. In this study, to improve academic achievement and educational productivity of students, educational process goals as well as achievement goals must be considered. Thus, the relevance of this theory is that learning outcome goals are interpreted to include learner perceptions of the social environment, creativity, self-concept, participation in extra-curricular activities, and interest in the subject matter. In other words, ignoring these perceptions and experiences in favour of traditional goals measured by test scores decrease motivation and lower achievement.

III. METHODOLOGY

3.1 Research Design

In this study, a field research design was adopted to execute interpretative procedures by using quantitative and qualitative methods. This approach was suitable since this study involved collection and analysis of both quantitative and qualitative data in a single study. According to Creswell (2014), in quantitative method, the researcher asks specific questions and collects quantifiable data from a large number of participants. In this case, data are collected using questionnaires. At the same time, qualitative data were collected by relying on the views of participants and collecting data consisting largely of words from the participants. In this case, data were collected using observation schedules.

Thus, the study adopted two research designs to address both quantitative and qualitative methods. These included descriptive survey and phenomenological research designs. Descriptive survey research design was applied to implement the quantitative methods. This is because, according to Creswell (2014), to address the quantitativeness aspect, descriptive survey research design uses a quantitative research method by collecting quantifiable information to be used for statistical analysis of the sample. This design was suitable in this study since it resulted in well-validated and substantiated quantitative findings. In this case, data were collected using questionnaires. However, to implement the qualitative method, the phenomenological research design was applied for this was an approach to qualitative research that focuses on the commonality of a lived experience within a particular group. According to Creswell (2014), the fundamental goal of the approach is to arrive at a description of the nature of the particular phenomenon. In this study, this design was relevant in that respondents had the opportunity to express their views and lived experiences with regard to the influence of personality characteristics on the academic achievement of gifted and talented learners in primary schools. In this case, data were collected using observation schedules. The results of quantitative and qualitative methods were then merged and triangulated to provide adequate interpretations of the variables under investigations.

3.2 Location of Study

The study was carried out in Nairobi County. According to Kenya National Bureau of Statistics (KNBS, 2019), the county has an approximate population of 4, 397, 073 persons and covers an area of 696 km^2, that is, a population density of 6, 318 persons per $km.^2$ The main economic activities in Nairobi County include; business activities, tourism and subsistence agriculture among others. Nairobi County boasts of a high number of primary school learners who manifest giftedness and talentedness while undertaking different academic activities. However, this has not reflected in their academic achievement. As indicated earlier, a study undertaken in Nairobi County by Karimi (2020) found that, despite different initiatives such as Tusome Literacy Project, majority of learners in public primary schools show inability to complete tasks, inability to identify problems and solve them, poor communicative competency, lack of creativity, poor team building with peers and low leadership skills. Despite this state of affairs, few empirical studies have interrogated the extent to which personality characteristics influence academic

achievement of gifted and talented learners in public primary schools; thus, the focus on Nairobi County as the location of study.

3.3 Target Population

Nairobi County has 225 public primary schools and thus, the target population will be 23, 110 participants, which comprised 3247 teachers and 19, 863 learners in classes VI-VIII as shown in Table1:

Table 1: Target Population of the Study

Categories	Target Population
Teachers	3247
Learners in Classes VI-VIII	19, 863
Total	**23, 110**

3.4 Sampling and Sampling Techniques

To obtain a sample size that has an adequate size relative to the goals of the study, the researcher adopted Yamane's Formula as follows:

$N_0 = N/ (1 + N (e^2))$

Where, N_0 = desired sample size at 95% confidence interval
N= Target Population
e = Confidence level of 5% (decimal equivalent is 0.05)
Thus, desired sample was:

$N_0 = 23, 110 / (1 + 23, 110(0.05)^2)$
$N_0 = 391$ respondents

Stratified sampling was used to create 17 different strata based on the number of sub-counties in the Nairobi County to ensure homogeneity during sampling. This ensured that all sub-counties are proportionately represented. From each sub-county, 13 teachers were selected using simple random sampling to avoid bias and 10 gifted and talented learners in classes VI-VIII identified using observation checklist. This sampling procedure enabled the researcher to realize a sample of 34 headteachers, 188 teachers and 170 gifted and talented learners in classes VI-VIII as shown in Table 2;

Table 2: Sampling Grid

Categories	Target Population	Sample Size	Sampling Techniques
Teachers	3247	221	Simple random sampling
Learners in Classes VI-VIII	19, 863	170	Purposive sampling
Total	**23, 110**	**391**	

3.5 Data Collection Instruments

These are tools which were used to gather information about the specific set themes of research objectives. These included questionnaire for teachers and an observation checklist for the researcher. The researcher also undertook a document analysis of school records to ascertain the academic achievement of the screened gifted and talented learners from the general group of learners in public primary schools.

3.6 Pilot Study

Piloting of research instruments was conducted among 40 respondents from a sample of public primary schools in Nairobi County since according to Kothari (2005), pilot sample should constitute 10% of the study sample (10.0% of 391). The purpose of piloting was to check for suitability and the clarity of the questions on the instruments designed, relevance of the information being sought and the appropriateness of the language used. The results of the piloting were also used to pretest the research instruments in order to validate and ascertain their reliability.

It also anticipates the problems the respondents encounter such as interpretation while filling the questionnaires and time management for the data collection. The observation schedules were given trial runs to ensure that questions are clearly worded and draw an appropriate range of responses which assisted the researcher to identify areas of revision. The respondents in the piloting were not involved in the main study.

3.6.1 Validity

In order to test the validity, items were analyzed to check for content validity where the researcher with the help of experts in educational psychology and special needs education went through each item and the responses given to establish whether the items generated the required information. Test items that were not adequate in terms of generating the required information were dropped and others suggested that were appropriate in generating the information. In this study, therefore, soon after interviewing, the researcher transcribed the observation checklist results for approval of the interpretations made.

The suggestions given thereafter were accommodated in the study on improving the validity of the conclusions to be made. This is because according to Creswell (2014), researchers evaluate the content validity by going to a panel of experts and have them identify whether the questions are valid. Creswell (2014) further asserts that validity means that the individual's scores from an instrument make sense, are meaningful and enable the researcher to draw good conclusions from the sample being studied to the population.

3.6.2 Reliability

The researcher, with the help of University Supervisors, critically assessed the consistency of the responses on the pilot questionnaires to make a judgement on their reliability. The researcher examined the research instruments for appropriateness of items so as to identify any ambiguous and unclear items. Such items were restated to ensure that the respondents clearly understood them. The split - half technique was used to establish the reliability of the test items. In this case, the test items were administered once to a group of respondents and results divided into two equal categories known as 'halves' Reliability coefficient, $r = 0.725$, between the two 'halves' was obtained using Cronbach Alpha Method, which indicated high internal reliability. According to Kothari (2005), any Cronbach Alpha value between 0 and 1 implies high internal consistency.

3.7 Data Analysis and Presentation

Data analysis began by identifying common themes. The relevant information was broken into phrases or sentences, which reflected a single, specific thought. The responses to the close-ended items were assigned codes and labels. Frequency counts of the responses were obtained to generate information about the respondents and to illustrate the general trend of findings on the various variables that were under investigation. Qualitative data was analyzed thematically along the study objectives and presented in narrative forms. Quantitative data were analyzed using descriptive statistics and inferentially using Pearson's Product Moment Correlation Analysis with the help of Statistical Packages for Social Science (SPSS Version 23) and to test all the research hypotheses. To find out if there is no statistically significant relationship between self-concept characteristics and academic achievement among gifted and talented learners in public primary schools in Nairobi County, statistical averages and Pearson Correlation were used to analyze the relationships. The same statistical methods were used to test if there is no statistically significant relationship between self-regulated learning characteristics and academic achievement among gifted and talented learners in public primary schools in Nairobi County. The hypothesis regarding if there is no statistically significant relationship between problem-solving and academic achievement characteristics among gifted and talented learners in public primary schools in Nairobi County was also tested using the statistical averages and Pearson Correlation. Finally, similar approaches were used to find out if there is no statistically significant relationship between achievement motivation and academic achievement characteristics among gifted and talented learners in public primary schools in Nairobi County. Pearson's Analysis was suitable since it allowed the researcher to undertake a correlation test between independent variable and each of the indicators of the dependent variables (competency in number work, language and essential life activities). The quantitative findings of the study were presented using tables and charts.

IV: RESEARCH FINDINGS AND DISCUSSIONS

4.1 Response Rate

In this study, 221 questionnaires were administered to teachers in 29 public primary schools out of which 185 questionnaires were filled and returned. At the same time, the researcher undertook observation of 150 learners in Classes VI-VIII (five per school). This yielded response rates shown in Table 3:

Table 3: Response Rates

Respondents	Sampled Respondents	Those Who Participated	Achieved Return Rate (%)
Teachers	221	185	83.7
Learners in Classes VI-VII	170	150	88.2
Total	**391**	**335**	**85.7**

Table 3 shows that teachers registered a response rate of 83.7% whereas learners in classes VI-VIII registered a response rate of 88.2%. This yielded an average response rate of 85.7%. This confirmed the findings of Creswell (2014) that a response rate above 75.0% is adequate to allow for generalization of the outcomes to the target population.

4.2 Respondents' Demographic Information

The research instruments solicited for demographic information of the respondents. These included gender and level of education.

4.2.1 Gender of Surveyed Learners and Teachers

Information about the distribution of the respondents by gender was collected and the results are shown in Figure 2:

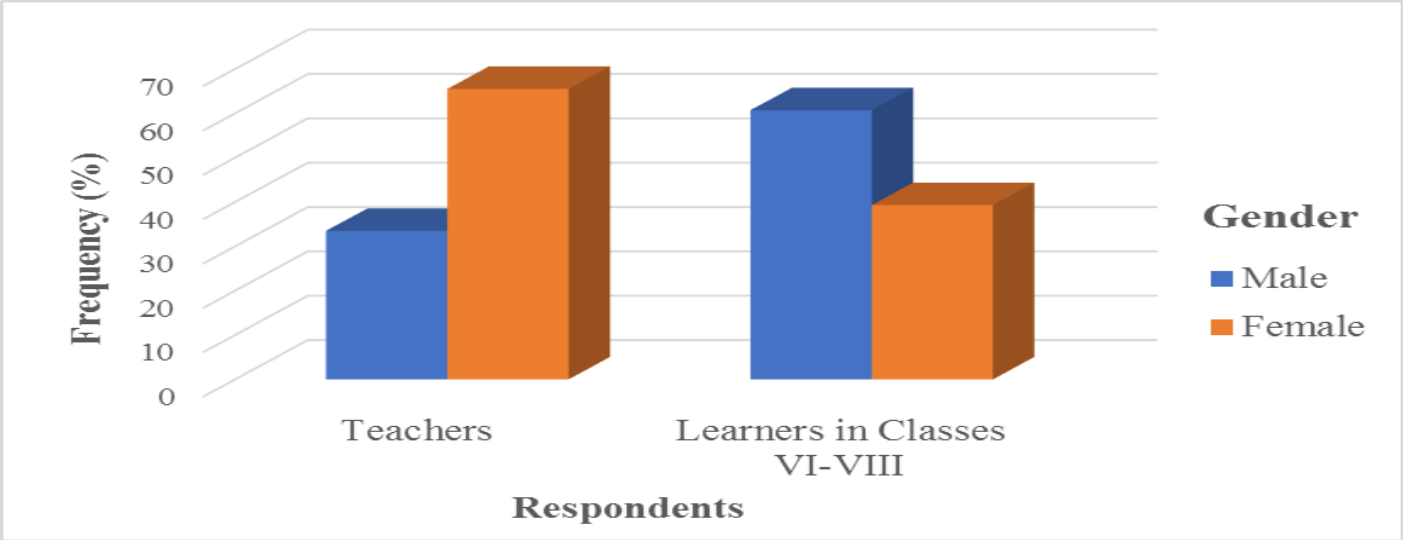

Figure 1: Distribution of the Respondents by Gender

Figure 1 indicates that majority, 123(66.5%), of the teachers were female whereas their male counterparts constituted 62(33.5%). Most, 91(60.7%), of the learners in Classes VI-VIII were male whereas their male counterparts constituted 59(39.3%) of the sample. This information shows that there was adequate gender parity at all levels of the study and that the extent to which personality characteristics predict academic achievement of gifted and talented learners in public primary schools' concerned both male and female stakeholders.

4.2.2 Level of Education of Teachers

The research instruments also elicited information on level of education of teachers. Results are shown in Figure 3:

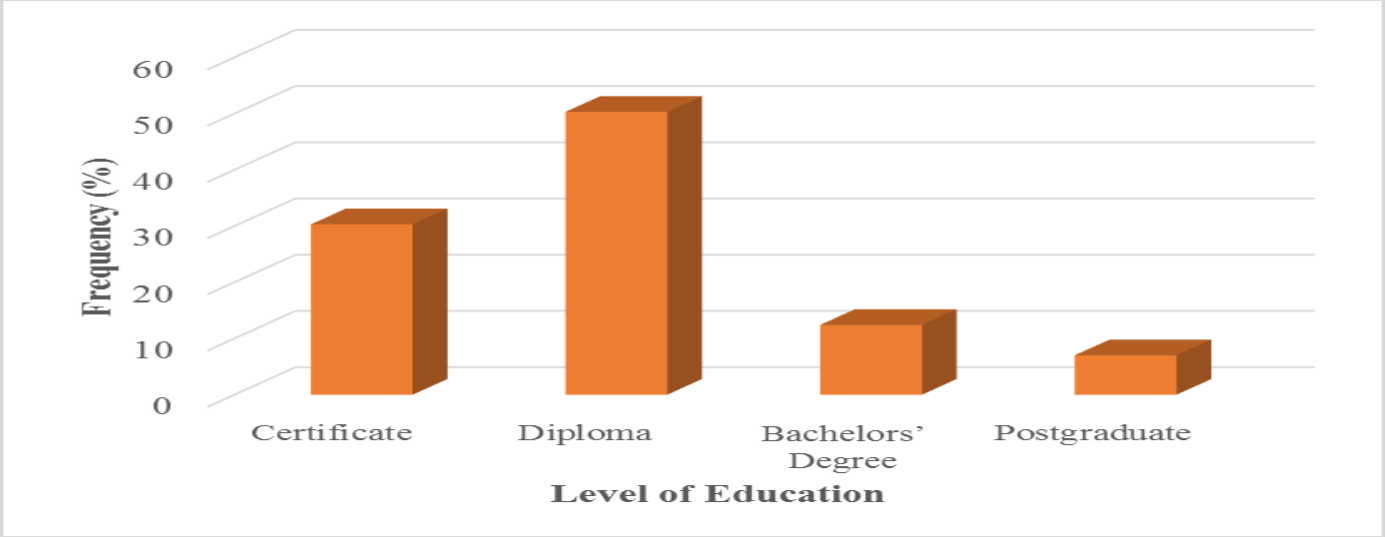

Figure 2: Level of Education of Teachers

Figure 2 shows that slightly more than half, 93(50.3%), of the teachers had Diplomas, 56(30.3%) had certificate qualifications, 23(12.4%) had Bachelors' Degrees whereas 13(7.0%) had postgraduate qualifications. This information reveals that the respondents had the required qualifications as teachers which thus, reinforced the expectations of being competent to respond to the research questions about the extent to which personality characteristics predict development of academic achievement of gifted and talented learners in public primary schools.

4.3 Problem-Solving Characteristics of Gifted and Talented Learners

The study sought to establish the extent to which problem-solving characteristics influence academic achievement of gifted and talented learners in public primary schools. Descriptive data were collected and the results are shown in Table 4.

Table 4: Teachers' Views on Learners' Problem-solving Characteristics

Test Items	Ratings				
	SA	A	U	D	SD
	%	%	%	%	%
Gifted and talented learners usually observe and evaluate situations before seeking solutions to a problem	51.4	7.0	2.7	26.0	12.9
To solve any task, gifted and talented learners usually identify and analyze patterns of the problem before seeking a solution to it	66.5	10.3	4.3	12.9	6.0
On many occasions, gifted and talented learners work hard to find solutions to low competencies	73.5	7.0	9.7	5.9	3.9
Gifted and talented learners rarely identify opportunities for immediate solution to a problem	22.2	2.7	6.5	57.3	11.3
Gifted and talented learners persist in seeking a solution to a problem	70.8	10.8	3.8	11.9	2.7
When faced with a difficult personal problem, gifted and talented learners usually decide on their own solve rather than to follow the advice of others	53.0	16.8	4.3	18.9	7.0
Gifted and talented learners devise different ways to academic tasks	57.8	19.5	3.8	10.3	8.6
Gifted and talented learners do not ask their peers or anybody to help them solve problems	44.3	7.6	2.7	33.5	11.9
In order to perform well in class, gifted and talented being apply several approaches to understand concepts	70.3	2.2	3.2	21.1	3.2
On many occasions, gifted and talented learners keep to themselves	56.2	8.6	5.9	23.2	6.1

Table 4 reveals that only 95(51.4%) of the teachers strongly agreed with the view that gifted and talented learners usually observe and evaluate situations before seeking solutions to a problem as did 13(7.0%) who agreed.

However, 48(26.0%), disagreed whereas 24(12.9%) strongly disagreed. Majority, 123(66.5%) of the teachers strongly noted that, to solve any task, gifted and talented learners usually identify and analyze patterns of the problem before seeking a solution to it while 19(10.3%) agreed. However, 24(12.9%) disagreed whereas 11(6.0%) strongly disagreed. A record majority, 135(73.5%), of the teachers strongly agreed with the view that, on many occasions, gifted and talented learners work hard to find solutions to low competencies with only 13(7.0%) in agreement. However, 11(5.9%) disagreed whereas 8(3.9%) strongly disagreed. This was supported when only 41(22.2%) of the teachers stated that gifted and talented learners rarely identify opportunities for immediate solution to a problem while 5(2.7%) agreed.

Most of them, 106(57.3%), disagreed whereas 21(11.3%) strongly disagreed. Most of the teachers, 131(70.8%), strongly agreed with the view that gifted and talented learners persist in seeking a solution to a problem while 20(10.8%) agreed. At the same time, 7(3.8%) were undecided, 22(11.9%) disagreed whereas 5(2.7%) strongly disagreed. The study also found out that 98(53.0%) of the teachers strongly agreed that, when faced with a difficult personal problem, gifted and talented learners usually decide on their own solve rather than to follow the advice of others with a paltry 31(16.8%) in agreement. Only 35(18.9%) disagreed whereas 13(7.0%) strongly disagreed.

Majority, 107(57.8%) of the teachers strongly agreed with the view that gifted and talented learners devise different ways to academic tasks while 36(19.5%) agreed. Only 19(10.3%) disagreed whereas 16(8.6%) strongly disagreed. During observation schedules, it was noted that gifted and talented learners are keen in identifying strategies to solve problems. The researcher observed;

> *Many gifted and talented learners are able to break down a problem into manageable steps and then follow up to get a solution. For example, a learner would request a teacher to begin solving a particular problem first before embarking on others so that he or she can connect the solutions to other mor challenging problems.*

This indicates that gifted and talented learners have the ability to understand the magnitude of every problem at hand and are ready to brainstorm on how to solve them from different angles. This agrees with the findings of a study carried out in India in which Gick (2015) established that many academic activities encountered each day at school are a puzzle and require gifted and talented learners to try different strategies to solve the problem before becoming frustrated. This implies that success of gifted and talented learners in their academic undertakings is predicated on their ability to apply different strategies to solve daily academic problems.

A fair proportion, 82(44.3%), of the teachers strongly agreed with the view that gifted and talented learners do not ask their peers or anybody to help them solve problems while 14(7.6%) agreed. However, 62(33.5%) of them disagreed with 22(11.9%) strongly disagreeing. The study further revealed that 130(70.3%) of the teachers noted that, in order to perform well in class, gifted and talented being apply several approaches to understand concepts while 4(2.2%) agreed, however, 39(21.1%) disagreed while 6(3.2%) strongly disagreed.

This was further supported by 104(56.2%), of the teachers who noted that, on many occasions, gifted and talented learners keep to themselves while 16(8.6%) agreed. However, 43(23.2%) disagreed while 11(6.1%) strongly disagreed. This was noted during the observations that many gifted and talented learners believe in their abilities to solve problems without involving others. The researcher observed;

> *Many gifted and talented learners prefer individual tasks where their capabilities are manifested. They do not like comparing their work with those of their peers. Even in group work, they prefer their work being marked first before everybody else.*

This implies that gifted and talented learners value and believe in themselves in solving their tasks with little input from their agemates. This supports the findings of a study carried out in Colombia in which Houtz and Selby (2016) found that the problem-solving skills, which help gifted and talented learners to overcome difficulties they encounter, are seen as an effective way for improving individual abilities.

4.4 Influence of Problem-Solving Characteristics on Academic Achievement

To test the null hypothesis, **H_0:** *There is no statistically significant relationship between problem-solving characteristics and academic achievement among gifted and talented learners in public primary schools in Nairobi County,* data were collected from one gifted and talented learner per school (totaling 29) from the sampled public primary schools on how often (Often = 3, Rarely = 2 and Never = 1) the learners manifest problem-solving characteristics (observe and evaluate situations, identify and analyze patterns, identify opportunities and persist in seeking solution to tasks) and the levels of academic competencies and achievement (Excellent = 4, Good = 3, Fair = 2 and Below Average = 1). The results are shown in Table 5:

Table 5: Frequency of Manifestation of Problem-Solving Characteristics

How Often Gifted and Talented Learners Manifest Problem-solving Characteristics	Competency in Number Work Activities	Competency in Language Activities	Competency in Life Activities
2	1	1	2
1	3	2	3
1	1	2	3
2	2	3	4
3	3	3	4
3	2	4	2
2	3	4	4
3	4	4	4
2	2	4	4
1	3	2	2
2	2	2	3
1	2	2	1
2	2	2	3
1	2	3	2
3	4	2	4
3	3	3	4
1	2	3	1
3	4	4	3
2	3	2	4
2	3	2	3
1	2	1	1
1	3	2	2
1	2	2	4
2	2	2	4
2	4	3	4
1	1	1	2
2	3	2	3
1	2	2	4
2	2	3	4

Table 5 shows that gifted and talented learners who always exhibit problem-solving characteristics are likely to register excellent academic competencies and achievement. This indicates that gifted and talented learners who regularly, observe and evaluate situations, identify and analyze patterns, identify opportunities and persist in seeking solution to tasks, score highly in number work, language and essential life skills. These results were subjected to Pearson's Product Moment Correlation Analysis and results are shown in Table 6:

Table 6: Correlation: Problem-Solving Versus Academic Achievement

		X1	B	C	D
X1	Pearson Correlation	1	.508**	.538**	.500**
	Sig. (2-tailed)		.005	.003	.006
B	Pearson Correlation	.508**	1	.416*	.371*
	Sig. (2-tailed)	.005		.025	.047
C	Pearson Correlation	.538**	.416*	1	.355
	Sig. (2-tailed)	.003	.025		.059
D	Pearson Correlation	.500**	.371*	.355	1
	Sig. (2-tailed)	.006	.047	.059	
N=29					

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Key: X_1-Problem-solving Characteristics; B-Competency in Number work Activities; C-Competency in Language Activities; D-Competency in Essential Life Skills

Table 6 shows that there is a strong correlation between problem-solving characteristics as a personality trait and academic achievement of gifted and talented learners in public primary schools (r (29) = 0.508, 0.538, 0.500, p = 0.005, 0.003, 0.006 at $\alpha = 0.05$). Thus, hypothesis, H_0, is rejected since the p-values are less than α (0.05). As indicated earlier, these findings thus attest to the fact that gifted and talented learners with greater abilities to observe and evaluate situations, identify and analyze patterns, identify opportunities and persist in seeking solution to tasks register improved number work, language and essential life skills more than their peers.

The findings of this research indicate that gifted and talented learners also exhibit problem-solving skills. This is in line with literature because problem-solving as a skill manifests itself in the early grades as potential and needs to be stimulated. Bingham (2014) asserts that problem-solving skills are cognitive, affective and social abilities which learners use in the process of overcoming difficulties they encounter in achieving a goal. These skills are acquired in development periods and have effects on social adaptation of a learner and success in daily life. According to Bingham (2014), problem-solving skills provide for a learner to overcome his/her own difficulties.

As per the research findings, previous experience influences one's problem-solving capabilities. Previous findings are in agreement with the current study's findings. For instance, Durmaz and Mutlu (2014) assert that problem-solving skills of an individual are significantly affected by personal experiences, personality traits, attitudes and morals. In other words, core knowledge, skills and habits the child will acquire in early ages by means of problem-solving experiences shape social and emotional life in addition to later education life. These postulations indicate that the main goal is to get overcoming skill to learners so that they solve when they encounter other problems out of school life. In a study carried out in India, Gick (2015) established that, for gifted and talented learners, learning about the world and how things work as they experience them, problem-solving is a natural process. Also, Ewies et al. (2021) sought to determine the degree of problem-solving abilities among talented children at King Abdullah II Schools for excellence. The researchers also intended to determine if the intellectual level of the parents had any influence on the problem-solving abilities of talented youngsters. Descriptive and analytical methods were employed to fulfill the aims of the research. It was determined that around two-thirds of talented kids were unable to answer issues at an acceptable level, whereas one-third was able to do so at an acceptable level. No statistically significant differences were found between the academic level of the talented student's father and mother and his or her ability to solve the challenge. Based on the findings of the study, the researchers provided suggestions for teaching talented kids, their instructors, and their parents in problem-solving abilities.

Gifted learners are good problem-solvers, compared to others. Literature shows that talented learners can easily resolve problems and remove barriers to effective learning for instance, Klein (2020) shows that a clear distinction can be found between gifted and non-talented youngsters by examining problem-solving behavior. Twenty-five normal and twenty-two talented primary school pupils were given the identical "laser maze" challenge. Gifted students exhibited greater inquisitive conduct prior to solving a problem, which was strongly correlated with a quicker answer. No further differences were detected between talented and normal youngsters. The findings of a Latent Class Analysis (LCA) revealed a distinction between behaviorally active and passive pupils. It is proposed that further study be conducted on the diverse problem-solving approaches. There was no difference between groups in the amount of time spent planning, and more study into the notion of planning and how to assess it is proposed.

There is an issue when it is unclear how to go from the present condition to the intended target state. Once this disparity between states has been identified, a problem-solving method may be used to reach a solution. Metacognition, information acquisition, and performance are the three fundamental components associated with problem solving (Klein, 2020). Metacognition is the activation and management of the other cognitive processes. In the component of knowledge acquisition, problem-related information is obtained and processed. The physical acts performed to fix an issue are performance. Each of these components has its own strategy: metacognitive strategies, cognitive strategies, and performance strategies, in that order.

The study has established that gifted students are keen to solve problems as they learn. The findings are congruent with existing literature. For instance, Gick (2015) found that many academic activities they encounter each day at school are a puzzle and require gifted and talented learners to try different strategies to solve the problem before becoming frustrated. According to Gick (2015), in many primary schools where learners manifested problem-solving traits, registered impressive grades in their assessment tests. In line with these findings, Houtz and Selby (2016) conducted a similar study in Colombia, which established that primary education advocates support problem-solving in curricula through inquiry-based explorations that require gifted and talented learners to think critically and creatively. Houtz and Selby (2016) further indicated that this developmentally appropriate best practice for primary has parallel support in the gifted education literature as one hallmark of gifted learners is their ability to think critically and process information. These findings are indicative of the fact that problem solving skills, which help gifted and

talented learners to overcome difficulties well they encounter, see an effective way for improving individual abilities. This further implies that determining in which level gifted children have these abilities that can be learned or improved and especially are seen as a necessary to be acquired in early ages has a key importance in terms of enhancing education quality given them in addition to improving these skills in children.

In line with this study's findings, in many primary schools in Sub-Saharan Africa, problem-solving attributes are the most noticeable among gifted and talented learners. For example, in a study conducted in Egypt, Lee (2015) noted that many learners in elementary schools exhibit excellent abilities devise strategies to solve a problem during play, classwork activities and some number work concepts. Lee (2015) indicated that such learners tend to perform better than their peers who lack problem-solving characteristics. Such thinking among gifted and talented learners has the task of devising some action which may mediate between the existing and the desired situations. In Liberia, Lang (2016) found that teaching strategies that support problem-solving skills, critical and creative thinking skills, and enhancing achievement are the key points of the education of gifted and talented learners. In many primary schools in Kenya and informal settlements in Nairobi County, gifted and talented learners are considered to own higher potential to achieve topics and abilities as compared to normal learners and, due to this potential, it is expected that their problem-solving skills, creative and analytical thinking skills are also at high levels. Also, a study carried out in Nairobi County by Odundo, Kinyua and Ganira (2018) revealed that there is a need to prepare learners to make informed choices, think critically, solve problems, build healthy interpersonal relationships and succeed in life; these aspects of cognition can be acquired through instruction, mentorship and practice. However, Odundo et al (2018) as did other empirical studies have not articulated how specific problem-solving skills influence academic achievement of gifted and talented learners.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

From the mixed findings, gifted and talented learners manifest different problem-solving characteristics which are key predictors of their academic achievement in public primary schools. It was established that most of the gifted and talented learners usually observe and evaluate situations before seeking solutions to a problem, usually identify and analyze patterns of the problem before seeking a solution to it. In other words, gifted and talented learners who observe and evaluate situations, identify and analyze patterns, identify opportunities and persist in seeking solution to tasks register impressive academic competencies and achievement.

5.2 Recommendations

The study recommends that gifted learners in public schools within Nairobi County should be encouraged to engage in problem-solving to improve their studies and perform better in academics. Teachers and other stakeholders such as parents from Nairobi County public schools should motivate gifted learners on their achievement as this can encourage them to work hard and excel in school work. The Ministry of Education should provide resource centers where gifted and talented learners can nurture their competencies and formulate a policy for setting up centers of excellence for placement of learners who are gifted and talented, while Teachers' Service Commission should undertake capacity building and retraining of teachers on how to handle learners with different forms of giftedness. The Kenya Institute of Curriculum Development should also provide curriculum guides to teachers on how to differentiate the content to meet the needs of learners who are gifted and talented.

REFERENCES

Agran, M. (2012). Curriculum and instruction in general education: Implications for service delivery and personnel preparation. *Journal of the Association for Persons with Severe Handicaps,* 25, 167-174.

Barrick, M. R., & Mount, M. K. (2015). Yes, personality matters: Moving on to more important matters. *Human Performance, 18*, 359–372.

Bingham, A. (2014). *Improving problem solving skills in children.* İstanbul: Ministry of National Education Publications.

Creswell, J. (2014). *Research design: qualitative, quantitative and mixed methodology*. Thousand Oaks, California: Sage Publications.

Daminabo, W. H. (2013). The Relationship between Personality Traits and Academic Achievement of Secondary School Students in Rivers State. *Unpublished MEd Dissertation,* University of Port-Harcourt.

Delisle, J. R. (2010). A millennial hourglass: Gifted child education's sands of time. *Gifted Child Today,* 22(6), 26–32.

Durmaz, H., & Mutlu, S. (2014). The effects of an instructional intervention on 7th grade students' science process skills and science achievement. Elementary education online, 43(2), 155–168.

Ewies, M. G., Ahmad, A. C., & Hamzah, A. (2021). The availability of problem-solving skills among gifted students in schools of excellence and its relation with their parents' academic level. *International Journal of Instruction*, *14*(3), 705–716. https://doi.org/10.29333/iji.2021.14341a

Gick, M. L. (2015). Problem-solving strategies. *Educational Psychologist*, 4(1), 99-120.

Gubbins, E. J. (2010). Revolving door identification model: Characteristics of gifted students. *American Psychologist*, 5, 444–454.

Houtz, J. C., & Selby, E. C. (2016). Problem solving style, creative thinking, and problem solving confidence. *Educational Research Quarterly*, 3(1), 18-30.

Karimi, S. S. (2020). *Participatory monitoring and evaluation process, school environment and performance of literacy and numeracy educational programme in public primary schools in Nairobi County, Kenya.* Published PhD Thesis, the University of Nairobi.

Klein, E. (2020). *Problem-solving strategies and giftedness: A study into observable differences in problem- solving strategies between gifted and non-gifted children.* https://essay.utwente.nl/73508/1/Klein_MA_BMS.pdf

KNBS. (2019). *2019 Kenya population and housing census*. Nairobi; Government Printer.

Kothari, C. R. (2005). *Research Methodology*. New International Publishers, New Delhi.

Lang, J. (2016). *What factors influence the academic success of Liberian high school students?* Published MA Thesis. Hamline University.

Lee, K. H. (2015). The relationship between creative thinking ability and creative personality of preschoolers. *International Education Journal*, *6*(2), 194-199.

Odundo, P. A., Kinyua, G. W. & Ganira, L. K. (2018). Adopting Value Creating Pedagogy and Problem Based Learning in Secondary Schools in Kenya. *World Journal of Educational Research*, 5(3), 1-19

Renzulli, J. S. (1978). What makes giftedness? Re-examining a definition. *Phi Delta Kappa, 60,* 180-181.

Reusen, J. (2015). Developmental reading instruction, academic attainment and performance among underprepared college students. *Journal of Applied Research in the Community College,* 10, 127-136.

Uwezo. (2016). *Are Our Children Learning? The State of Educaton in Kenya in 2015 and beyond*. Nairobi: Twaweza East Africa.

Walberg, H., (2012). A psychological theory of educational outcomes and productivity. *Psychological and Education,* 81-110.