

**A COMPARISON OF ACADEMIC OUTPUTS AND SOCIAL LEARNING  
OUTCOMES BETWEEN HOME AND CONVENTIONALLY SCHOOLED  
LEARNERS UNDER THE ACCELERATED CHRISTIAN EDUCATION  
PROGRAMME IN KENYA**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for the  
Conferment of the Degree of Doctor of Philosophy in Education Management  
and Policy Studies of Masinde Muliro University of Science And Technology**

**November, 2023**

## DECLARATION

### DECLARATION BY THE CANDIDATE

This thesis is my original work, prepared with no other than the indicated sources and support and has not been presented elsewhere for a degree or for any other award.

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## **DEDICATION**

I dedicate this thesis to the memory of my Father and mother, the late Edmund and late Margaret Tweni, they always encouraged me to reach the highest level of education and did all they could to ensure I got to school without any inconvenience.

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## **ACKNOWLEDGEMENT**

We have a saying, “when the tough gets tough, the tougher gets going”. It takes many people to make you tougher, in order to be able to cross the finish line. First, I wish also to thank my supervisor’s Prof. Lydia Wamocho and Dr. Pamela Buhere. I also extend my sincere gratitude to the lecturers in the department of education planning and management for equipping me with research skills that enabled me to write this thesis. I am also grateful to my colleagues for going through the volumes of work that I kept sending them, and for their wise guidance and counsel. I appreciate my wife Violet, my daughters; Margaret, Bakhita and Anuarite for the encouragement and support. I believe your prayers always kept me going. To my son Bakanja, who always expects to see a role model in me; I hope this gives you an inspiration. To my family, this finish line belongs to you. Finally, I give glory to God for His providence.

## ABSTRACT

Education plays a pivotal role in fostering national unity, addressing social issues, and driving economic development. The Sustainable Development Goals number four, underscore the significance of quality education, with specific emphasis on ensuring access to primary and secondary education for all. In this regard, the study compared conventional schooling and home schooling in Kenya, where homeschooling provides education at home under the tutelage and direction of the parent while conventional schooling does the same but in a classroom environment under the tutelage of a professional teacher. This is because, Kenya has embraced the goal of universal access to basic education, particularly through a policy of 100 percent transition from primary to secondary school. However, this policy, while laudable, raises concerns regarding the exclusive focus on conventional schooling, with severe repercussions for non-compliance. The purpose of this study was to compare the academic learning outputs and social learning outcomes between home-schooled and conventionally schooled learners enrolled in the Accelerated Christian Education (ACE) programme. The study adopted a causal-comparative research design. Data were collected in Nairobi County from ACEK centers and conventional ACE schools. A total of 63 conventionally schooled and 37 home-schooled learners in grade 9 were sampled using a two-stage cluster random sampling method that involved sampling the two categories of schools in the first stage and the individual learners in the second. All parents of sampled learners constituted the parental study group. The research employed independent samples t-tests to compare academic learning outputs and Mann-Whitney U tests for social learning outcomes, focusing on self-control, persistence, and social competence. The study revealed no statistically significant difference in mathematics learning outputs between home-schooled and conventionally schooled learners ( $t(98) = -0.638$ ,  $p = .525$ ). Similarly, social studies learning outputs showed marginal differences but were not statistically significant ( $t(98) = -0.239$ ,  $p = .812$ ). However, there was a significant difference in English learning outputs between the two groups ( $t(98) = -2.395$ ,  $p = .019$ ). Additionally, no significant differences was observed in social learning outcomes, between the home-schooled and conventionally schooled learners. The findings indicate that home-schooled learners can achieve learning output in Maths that are comparable to their conventionally schooled counterparts. Homeschooling exhibited a slight advantage in enhancing skills in English language. Social studies learning outcomes were similar in both settings, highlighting the effectiveness of homeschooling in delivering this subject. Furthermore, there were no significant differences in social learning outcomes, emphasizing the equal potential of learners in both settings. This study contributes valuable insights into the homeschooling landscape in Kenya that homeschooling can yield comparable academic outputs and social learning outcomes. Policymakers should consider accommodating diverse learning approaches in this country. In view of the foregoing, there is need for further research to explore the broader implications of these findings in the Kenyan educational system.

## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
<b>DECLARATION .....</b>	<b>ii</b>
<b>DEDICATION .....</b>	<b>iii</b>
<b>COPYRIGHT.....</b>	<b>iv</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>v</b>
<b>ABSTRACT.....</b>	<b>vi</b>
<b>TABLE OF CONTENTS.....</b>	<b>vii</b>
<b>LIST OF TABLES.....</b>	<b>xiii</b>
<b>LIST OF FIGURES.....</b>	<b>xv</b>
<b>LIST OF ACRONYMS.....</b>	<b>xvi</b>
<b>CHAPTER ONE: INTRODUCTION AND CONTEXT .....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 Background to the Study.....	1
1.3 Statement of the problem.....	9
1.4 Purpose of the Study.....	10
1.4.1 Study Objectives.....	10
1.4.2 Research Hypothesis.....	11
1.5 Justification of the Study.....	11
1.6 Significance of the Study.....	12
1.7 Assumptions of the Study.....	13
1.8 Scope of the Study.....	14
1.9 Limitations of the Study.....	15
1.10 Theoretical Framework.....	15
1.10.1 System's Theory's Input-Output Model.....	16
1.10.2 Social Learning Theory.....	18

1.11 Conceptual Framework.....	24
1.12 Definition of Terms.....	26
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>29</b>
2.1 Introduction.....	29
2.2 The Concept of Accelerated Christian Education.....	29
2.2.1 The ACE Curriculum in perspective.....	33
2.3 The Concept of Learning Outputs.....	37
2.3.1 Categories of Learning Outputs.....	40
2.3.2 Learning approaches and learning outputs.....	42
2.3.3 Learning environment and learning outputs.....	43
2.4 Empirical Review of academic learning Outputs in home schooled and conventionally schooled learners.....	48
2.4.1 Academic learning outputs in the home-schooled and conventional school setting.....	48
2.4.2 Social learning outputs in the home-schooled and conventional school setting.....	57
2.5 Knowledge gap.....	63
<b>CHAPTER THREE: RESEARCH METHODOLOGY.....</b>	<b>71</b>
3.1 Introduction.....	71
3.2 Research Design.....	71
3.3 Study Area.....	72
3.4 Target Population.....	74
3.5 Sample Size and Sampling Procedure.....	75
3.5.1 Sampling Technique.....	75
3.5.2 Sample size.....	76
3.6 Data Collection Instruments.....	78
3.6.1 Parents questionnaire.....	78

3.6.2 Document analysis checklist.....	79
3.6.3 Interview Schedule.....	80
3.7 Pilot Study.....	80
3.7.1 Validity.....	81
3.7.2 Reliability.....	82
3.8 Ethical Considerations.....	83
3.9 Data Collection Procedure.....	84
3.10 Data Analysis.....	86
3.10.1 Testing Assumptions of Independent Samples t-Test.....	87
3.10.1.1 Normality.....	87
3.10.1.2 Homogeneity of Variance.....	88
3.10.1.3 Independence.....	88
3.10.1.4 Scale of Measurement.....	88
3.10.1.5 3 Operationalization of Variables.....	89
<b>CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION.....</b>	<b>91</b>
4.1 Introduction.....	91
4.2 Demographic Profiles of Respondents.....	92
4.2.1 Learners' Demographic Profile.....	92
4.2.2 Parents Socio-demographic Profile.....	93
4.3 To compare the learning outputs in Mathematics between home-schooled and conventional schooled learners under the ACE programme in Kenya.....	95
4.3.1 Data Screening and Cleaning.....	96
4.3.1.1 Missing Values in the Scores of Mathematics.....	96
4.3.1.2 Testing for outliers in the learners scores in Mathematics.....	97
4.3.2 Univariate Statistics.....	98

4.3.3 t-Test Diagnostics.....	99
4.3.3.1 Nature of data for math learning outputs.....	99
4.3.3.2 Testing for Normality.....	99
4.3.3.3 Assumption of Homogeneity of Variances.....	100
4.3.4 Testing the Hypothesis.....	101
4.3.5 Discussions.....	102
4.4 To compare the learning outputs in English between home-schooled and conventional schooled learners under the ACE programme in Kenya.....	106
4.4.1 Data Screening and Cleaning.....	107
4.4.1.1 Missing Values for Scores in English.....	107
4.4.1.2 Testing for outliers in the learners' scores in English learning outputs.....	107
4.4.2 Univariate Statistics.....	108
4.4.3 t-Test Analysis.....	109
4.4.3.1 Nature of data for English learning outputs.....	109
4.4.3.2 Testing for Normality.....	110
4.4.3.3 Assumption of Homogeneity of Variance.....	110
4.4.4 Test of Hypothesis.....	111
4.4.5 Discussions.....	113
4.5 To compare the learning outputs in social studies between home-schooled and conventional schooled learners under the ACE programme in Kenya.....	118
4.5.1 Data Screening and Cleaning.....	118
4.5.1.1 Missing Values.....	118
4.5.1.2 Testing for outliers in the learners' scores in social studies.....	119
4.5.2 Univariate Statistics.....	119
4.5.3 Independent Samples t-Test.....	121
4.5.3.1 Nature of data for social studies learning outputs.....	121

4.5.3.2 Testing for Normality.....	121
4.5.3.3 Assumption of Homogeneity of Variance.....	122
4.5.4 Test of Hypothesis.....	123
4.5.5 Discussions.....	124
4.6 Academic Learning Outputs as Perceived by ACE center Administrative Personnel.....	129
4.7 To compare the social learning outcomes between home-schooled and conventional schooled learners under the ACE programme in Kenya.....	131
4.7.1 Univariate Statistics.....	131
4.7.2 ACE center administrative personnel perspective on social learning outcomes.....	134
4.7.4 Test of hypotheses.....	135
4.7.4.1 Persistence.....	135
4.7.4.2 Self-control.....	138
4.7.4.3 Social competence.....	142
4.7.5 Discussions.....	145
4.8 Discussion of Implications.....	150
4.8.1 Implications for Theory.....	151
4.8.2 Implications for Practice.....	151
<b>CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>157</b>
5.1 Introduction.....	157
5.2 Summary of Findings.....	157
5.2.1 Comparison of the Learning Outputs in Mathematics between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.....	157
5.2.2 Comparison of the Learning Outputs in English between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.....	158

5.2.3 Comparison of the Learning Outputs in Social Studies between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.....	158
5.2.4 Comparison of the Social Learning Outcomes between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.....	159
5.4 Conclusions.....	159
5.6 Recommendations.....	161
5.6.1 Policy Recommendations.....	161
5.6.2 Recommendation for future research.....	162
<b>REFERENCES.....</b>	<b>164</b>
<b>APPENDICES.....</b>	<b>217</b>
<b>APPENDIX I: Questionnaire for Parents.....</b>	<b>217</b>
<b>APPENDIX II: Interview Schedule for Administrative Personnel at the ACEK.....</b>	<b>220</b>
<b>APPENDIX III: HSLDA LETTER.....</b>	<b>221</b>
<b>APPENDIX IV: Nacosti Letter.....</b>	<b>222</b>
<b>APPENDIX V: PACE 8 Scores.....</b>	<b>223</b>
<b>APPENDIX VI: PACE 9 Scores, Grade 9.....</b>	<b>226</b>
<b>APPENDIX VII: PACE 10 Scores, Grade 9.....</b>	<b>229</b>

## LIST OF TABLES

Table 3.1 Target Population.....	75
Table 3.2: Operationalization of Variables.....	90
Table 4.1: Learners' Demographics Profile.....	92
Table 4.2: Mode of school * gender of the child Cross tabulation.....	93
Table 4.3: Parents' Demographic Profile.....	94
Table 4.4: Parents occupation.....	95
Table 4.5: Learners' average scores in Mathematics.....	98
Table 4.6: Results or Normality check in the scores of Mathematics.....	100
Table 4.7: The homogeneity of variance results for scores in Mathematics.....	101
Table 4.8: The Independent t-test results for the learners in Mathematics.....	102
Table 4.9: Learners Average scores in English.....	109
Table 4.10: The results for normality check in the scores of English.....	110
Table 4.11: Results of Homogeneity of Variance Test.....	111
Table 4.12: The Independent sample t-test results for the learner's scores in English .....	112
Table 4.13: Learners average scores in Social Studies.....	120
Table 4.14: Normality check for Social studies.....	122
Table 4.15: Results of Homogeneity of Variance Test.....	123
Table 4.16: The independent sample t-test results for the results in Social Studies..	123
Table 4.17: Social Learning Outputs as Perceived by Parents.....	132
Table 4.18: Government policies/regulations.....	133
Table 4.19: Ranks.....	136
Table 4.20: Test Statistics <sup>a</sup> .....	137
Table 4.21 Hypothesis Test Summary.....	138
Table 4.22: Ranks.....	139
Table 4.23: Test Statistics <sup>a</sup> .....	140
Table 4.24 Hypothesis Test Summary.....	141
Table 4.25: Ranks.....	142
Table 4.26: Test Statistics <sup>a</sup> .....	143
Table 4.27 Hypothesis Test Summary.....	144

## LIST OF FIGURES

Figure 1 : Conceptual Framework .....	25
Figure 2 . Univariate outliers for the scores in mathematics .....	97
Figure 3 . Univariate outliers for the scores in English learning outputs .....	107
Figure 4 . Univariate outliers or the scores in Social Studies learning outputs ..	119

## LIST OF ACRONYMS

<b>ACE</b>	Accelerated Christian Education
<b>ACEK</b>	Accelerated Christian Education Kenya
<b>ADHD</b>	Attention Deficit Hyperactivity Disorder
<b>ADL</b>	Anti-Defamation League
<b>ACT</b>	American College Testing
<b>APPP</b>	Africa Power and Politics Program
<b>CBS</b>	Central Bureau of Statistics
<b>CEO</b>	Chief Executive Office
<b>EFA</b>	Education for All
<b>FPE</b>	Free Primary education
<b>HSLDA</b>	Home School Legal Defense Association
<b>ICCE</b>	International Certificate of Christian Education
<b>GPA</b>	Grade Point Average
<b>HEN</b>	Home Education Network
<b>ICESCR</b>	The International Covenant on Economic, Social and Cultural Rights
<b>KCE</b>	Kenya Catholic Episcopal
<b>KCPE</b>	Kenya Certificate of Primary Education
<b>KCSE</b>	Kenya Certificate of Secondary Education
<b>KSPH</b>	Kenya society of the Physically Handicapped
<b>LaE</b>	Life as Education.
<b>MOEST</b>	Ministry of Education Science and Technology
<b>NCES</b>	National Centre for Education Statistics (United States of America)
<b>P.A.C.E</b>	Package for accelerated Christian Education.
<b>NHES</b>	National Household Education Survey
<b>NSW</b>	New South Wales
<b>RSA</b>	Republic of South Africa
<b>SACE</b>	South Africa Council of Educators
<b>SSA</b>	Sub-Sahara Africa
<b>SDE</b>	Scotland Department of Education
<b>SATs</b>	Standard Attainment Tests
<b>SEL</b>	Social Emotional Learning
<b>UPE</b>	Universal Primary Education
<b>USDE</b>	United States Department of Education

## CHAPTER ONE

### INTRODUCTION AND CONTEXT

#### 1.1 Introduction

This chapter presents the following elements of the introduction to the study: background, problem statement, purpose of this study, objectives, hypotheses, justification, significance, assumptions, scope, limitations, theoretical framework, conceptual framework and the operational definition of terms.

#### 1.2 Background to the Study

Education and training play a crucial role in promoting national unity, reducing social problems, and driving economic progress in countries, including Kenya. The significance of education is highlighted in the Sustainable Development Goals (SDGs) set by the United Nations (UN) member states to improve the world (Lee *et al.*, 2016). For example, SDG 4, target number 1, aims to provide free, fair, and high-quality primary and secondary education for every girl and boy (Vanner, 2019). In response, Kenya has taken steps to ensure universal access to basic education. One key initiative is the policy mandating a 100 percent transition from primary to secondary school, addressing inequality and guaranteeing equal educational opportunities for all learners (Ochieng and Murungi, 2019).

Although the concept of a 100 percent transition from primary to secondary school is admirable, aiming to ensure that every child receives a quality education, its enforcement in Kenya raises significant concerns. Secondary school head teachers have been warned of severe consequences if they deny admission to learners, even

those unable to pay fees. Simultaneously, chiefs and assistant chiefs face the threat of dismissal if any child who completed the Kenya Certificate of Primary Education (KCPE) exams does not enroll in secondary school, and parents risk imprisonment (Njonjo, 2020). This government approach assumes that education can only be achieved through conventional school environments and does not allow for viable alternative forms of schooling.

One mode of learning that is fast gaining popularity as an alternative to conventional education is homeschooling. Homeschooling is rooted in the liberal ideology, which prioritizes personal freedom from government control in certain rights (Kekes, 2018). Early advocates of homeschooling like John Locke, Jean-Jacques Rousseau, and Immanuel Kant championed individual freedom, challenging the state's authority to enforce a single educational approach due to diverse family values and beliefs (Damiri *et al.*, 2015). According to Oliviera and Barbosa (2017), proponents of liberalism oppose the state's imposition of a specific educational system and argue for citizens' freedom to choose education that reflects their values. Herbert, a liberal thinker, contends that while the state should be governed by a segment of its citizens, this governance should not entail unlimited rights. He believes that individuals should have the freedom to choose what brings them happiness, including the mode of education that suits their needs (Bell, 2016).

Homeschooling is a parent-led education conducted at home that has gained momentum in countries such as the United States, France, Canada, Australia, Japan, Hungary, Thailand, South Korea, and the United Kingdom (Ray, 2015). In these regions, homeschooling is viewed as a child-friendly educational alternative that

nurtures learners' potential (Fitriana et al., 2016), aiming for outputs such as academic excellence, community awareness, and the development of good character.

The concept of homeschooling, established in the US in 1960 by John Caldwell Holt, challenges the conventional schooling system (Purwaningsih and Fauziah, 2020). Holt's perspective emphasized that humans inherently enjoy learning, and attempts to control or interrupt this natural process can diminish the joy of learning. This idea led education stakeholders and families to reconsider the conventional education system, prompting them to explore homeschooling as an alternative. Homeschooling enables individuals to have a more natural learning experience by interacting with one another, fostering an environment where parents can nurture these interactions (Purwarungsih and Fauziah, 2020).

Homeschooling is a parent-led educational approach conducted outside the conventional school environment. Advocates of homeschooling assert that parents are best suited to take responsibility for their children's learning. This model empowers learners to choose what they learn under parental guidance (Apple, 2020; Blockhius, 2010; Brewer and Lubienski, 2017). In Kenya, where large class sizes and a high teacher-pupil ratio limit individual attention, homeschooling offers an appealing solution. It allows parents to tailor the curriculum, ensuring a low teacher-learner ratio that facilitates the discovery of learners' hidden potentials (Mutuku, 2020).

Homeschooling is an educational system where learners learn in a home environment rather than a conventional classroom (Ray, 2015). Donnelly (2012) defines it as a practice in which learners learn at home under the guidance of parents or individuals chosen by parents, deviating from the conventional classroom-based education.

Despite initial resistance, homeschooling is gaining acceptance and popularity in various contexts, prompting the question of why Kenya should not consider embracing this alternative form of education.

In the United States (US), modern homeschooling gained prominence in the 1960s and 1970s in response to government policies in public education that didn't accommodate diverse religious beliefs (Murphy, 2013). Parents, aiming to incorporate their religious values into their children's education while prioritizing safety and high-quality learning, started promoting homeschooling. Additionally, for African Americans, homeschooling served as a means of preserving their racial identity and protection (Mazama and Lundy, 2012), highlighting its potential to promote educational diversity and inclusivity.

Several factors drove the rise of homeschooling, highlighting conventional schools' shortcomings. These factors include the integration of religious beliefs/values (Bartholet, 2020), dissatisfaction with school safety standards (Kunzman and Gauthier, 2020; Musumunu and Manzama, 2014), concerns about academic quality and pedagogy (Belanova and Machovcova, 2021; Martin, 2016; Ray, 2015), socialization issues (Kunzman, 2016; Mincu and Sarbu, 2018; Myers, 2020; Vigilant *et. al.*, 2013), and a desire for a different family life (Belanova *et. al.*, 2016; Murphy, 2014).

Parental factors also played a significant role in the homeschooling movement. Parents advocating for homeschooling often had high educational achievements (Bartholet, 2020; Vigilant *et al.*, 2013) and belonged to high socioeconomic status (Kraftl, 2013; Shackelford, 2020). They were often engaged in skilled or professional occupations (Bartholet, 2020; Heuer and Donovan, 2017; McCullough, 2013) and

held conservative political and social beliefs (Humason, 2012; Kerns, 2016; Salvo, 2018). Additionally, strong religious values motivated many parents to home-school their learners (Barbosa, 2016; Khakim, 2021; Kunzman, 2009; Saghir, 2011).

Furthermore, research suggesting that home-schooled learners often outperformed their conventionally schooled peers (Clemente, 2016; Ray, 2017) and exhibited less approval of behaviors like alcohol consumption and drug use (Vaughn, 2015) contributed to the appeal of homeschooling. This movement was particularly strong among ultra-conservative Christians who believed that homeschooling provided a superior educational environment infused with their religious values (Murphy, 2014). The homeschooling concept which aligns with life as education (LaE) notion of Kunzman (2012), that emphasizes the educational opportunities present in everyday life. Kunzman argues that parents have the right to shape their learners' LaE according to their needs, with the state's role limited to regulation (Bhardwaj, 2016).

The concept of homeschooling is gaining widespread acceptance, especially among parents seeking alternative forms of education beyond the conventional system (Hess, 2010). In the US, homeschooling is not only popular among right-wing Christian families but is also embraced by other families opting out of conventional schools (Hirsh, 2019). Various new forms of homeschooling have emerged in the US, including online resources, homeschool co-ops, assistance programs, district extracurricular participation, and micro-schools (Hirsh, 2010). The demand for homeschooling is evident in the National Center for Education Statistics (NCES) data, estimating that by 2010, over 2 million learners were home-schooled in the US.

Similarly, homeschooling has been on the rise in the United Kingdom (UK), where there are discussions about expanding the scope of education spaces to include home, neighborhood, and preschool provisions (Holloway *et al.*, 2010). Australia has also witnessed a growing interest in homeschooling, driven by parents wanting to exercise religious freedom (Lindsay, 2003). In Australia, homeschooling has recently gained momentum due to pedagogical and ideological beliefs, especially among families viewing it as a suitable approach for gifted learners (Conejeros-Solar and Smith, 2021). Other countries such as Canada, New Zealand, and Norway have also experienced a surge in homeschooling popularity (Boseti and Van Pelt, 2017; Brabant and Dumond, 2017; Jackson, 2017; Kunzman and Gaither, 2013; Leon, 2014; Washell, 2016).

In Africa, South Africa stands out as a nation with a well-established homeschooling framework, legalized through the Schools Act of 1969 (de Beer *et. al.*, 2020). The country introduced a national policy on homeschooling in 1999, leading to a significant increase in homeschoolers, ranging from 100,000 to 300,000 by 2014 (Olatunji, 2014). However, other African countries like Botswana, Uganda, and Kenya have seen limited homeschooling due to the prevailing perception that conventional schools provide the best education for professional development (Moreau, 2012). Despite initial skepticism, perceptions are changing as home-schooled learners excel in examinations and gain admission to prestigious institutions (Hasson, 2012; Jolly and Mathews, 2020), challenging the conventional narrative around education progression.

In Kenya, homeschooling is gradually gaining recognition, with several organizations now offering homeschooling services. Some notable ones include Elimu Nyumbani, Nairobi Home School and Tuition, the Accelerated Christian Education Kenya (ACEK), and the Thika Home School Resource Center (Kuthimba, 2019). Interestingly, homeschooling is not a new concept in Kenya; it was a popular alternative to conventional schools in the 1990s (Oduor, 2019). However, the Basic Education Act of 2013 presumes that education can only be attained through institutionalized schools. This legal framework has created challenges for the homeschooling community in Kenya, as it seems to limit education to the conventional school environment (Oduor, 2019).

Homeschooling service providers in Kenya primarily offer the American and British Curriculum's, and to some extent, the Kenyan Curriculum. These curriculum's include Edexcel American, IGCSE, ACE, 8-4-4, and 2-6-3-2. Among these, the Accelerated Christian Education Curriculum (ACE) is particularly well-established. Founded in 1970, ACE is utilized in over 6,000 schools across 145 countries. This unique education system caters to both home-schooled and conventionally schooled learners, allowing learners to learn at their own pace while being guided by biblical-based learning materials. The ACE system has been employed in home and conventional schools worldwide for over three decades (Scaramanga and Reiss, 2018).

The evolving landscape of education in Kenya presents a compelling case for a homeschooling as a viable alternative mode of education. In the pursuit of the Sustainable Development Goals (SDGs), particularly SDG 4, target number 1, which aims to provide free, fair, and high-quality primary and secondary education for every

child, Kenya has implemented policies such as the 100 percent transition from primary to secondary school. While this initiative addresses the issue of access, concerns arise regarding the quality and suitability of education provided within the conventional school system, especially given the diverse needs and values of learners and their families.

Homeschooling, rooted in the liberal ideology that emphasizes individual freedom from government control in education, has gained traction globally and is gradually gaining recognition in Kenya. The homeschooling movement challenges the assumption that education can only be achieved through conventional school environments, offering an alternative approach that caters to the diverse needs and beliefs of families. Given the rising popularity of homeschooling in other countries, exploring its effectiveness in the Kenyan context became imperative.

By conducting a comparative study, the researcher assessed the effectiveness of homeschooling in the Kenyan context, considering factors such as academic outputs, socialization, and the holistic development of learners. Examining the outputs of home-schooled learners in comparison with conventionally schooled learners had the potential to provide valuable insights into the viability of homeschooling as an alternative educational approach in Kenya. Additionally, understanding the experiences of parents, learners, and educators involved in homeschooling shed light on the challenges and benefits associated with this mode of education.

### **1.3 Statement of the problem**

In the recent past, homeschooling under the Accelerated Christian Education has experienced a notable surge in popularity in Kenya. This is evident from the increasing number of homeschooling providers especially in the city of Nairobi. Homeschooling primarily utilizes the American-oriented Accelerated Christian Education Curriculum (ACE), to cater for the needs of parents from diverse social backgrounds who seek flexibility and personalized learning experiences for their children. The appeal for this mode of schooling lies in the ability for learners to progress at their own pace, fostering confidence and minimizing undue exam pressures. Moreover, homeschooling parents emphasize its protective nature, shielding children from the negative influences often found in conventional schools, such as immorality, corruption, and declining moral values. Homeschooling under ACE curriculum in Kenya involves parents or guardians taking on the responsibility of educating their children at home using the ACE curriculum. On the other hand, conventional schooling under ACE takes place in a school environment where professional teachers guide learner while utilizing different approaches, which emphasizes self directed learning, mastery based progression and distinctive religious perspective.

However, despite the rise in awareness and adoption, homeschooling in Kenya operates in a legal gray area. The 2010 constitution lacks specific provisions addressing homeschooling, leaving it in the realm of private institutions. This situation, coupled with the strain on public schools due to the high number of students, highlights the need to explore the effectiveness of homeschooling as an alternative

educational model. A comparative study assessing the academic output and social learning outcomes of home-schooled learners in comparison to their conventionally schooled peers, particularly focusing on the ACE Programme, serves as a crucial step. If this study demonstrates comparable outcomes, it could pave the way for legal recognition of homeschooling, potentially offering relief to teachers and opening avenues for more personalized learning experiences tailored to individual students' needs.

#### **1.4 Purpose of the Study**

The purpose of this study was to compare the academic output and social learning outcomes between the learners enrolled in home-schools and those in conventional schools, that run under the Accelerated Christian Education programme.

##### **1.4.1 Study Objectives**

The specific objectives of this study were:

- i) To compare the learning outputs in Mathematics between the home-schooled and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya.
- ii) To compare learning outputs in English language between the home-schooled and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya.
- iii) To compare the learning outputs in Social Studies between the home-schooled and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya.

- iv) To compare the social learning outcomes between the home-schooled and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya.

#### **1.4.2 Research Hypothesis**

- H<sub>01</sub>** There is no statistically significant difference in the learning outputs in Mathematics between home-schooled and conventionally schooled learners
- H<sub>02</sub>** There is no statistically significant difference in the learning outputs in English language between home-schooled and conventionally schooled learners
- H<sub>03</sub>** There is no statistically significant difference in the social studies learning outputs between home-schooled and conventionally schooled learners
- H<sub>04</sub>** There is no statistically significant difference in social learning outcomes between home-schooled and conventionally schooled learners

#### **1.5 Justification of the Study**

Recent incidents within the Kenyan education sector have highlighted a concerning decline in moral values among secondary school learners. Notably, there has been a surge in cases of arson in schools, sparking a blame game among various educational stakeholders. Teachers have been criticized for their perceived failure to address student discipline adequately. Additionally, factors such as the overcrowded post-COVID school calendar, curriculum overload, stress, drug abuse, and strained teacher-student relationships have all been cited as contributors to this decline (Yusuf, 2021).

Amidst rising concerns about discipline issues in schools, one proposed solution advocates for the abolition of boarding schools, emphasizing the pivotal role parents should play in instilling discipline in their children. In this context, homeschooling stands out as a viable alternative to address the problem of student discipline. However, the potential of homeschooling in this regard remained largely unexplored.

Furthermore, there is limited understanding of its impact on academic and social learning outcomes, particularly within the context of a developing nation. Exploring the effectiveness of homeschooling has the potential to provide valuable insights into its potential as a solution, shedding light on its role in nurturing discipline while offering a comprehensive understanding of its academic and social impacts.

### **1.6 Significance of the Study**

The findings of this study hold significant importance in shaping policies concerning the ever-evolving educational landscape and best practices. Policymakers can utilize these findings as a foundation framework to implement strategies aimed at transforming the educational system. While global research on homeschooling is not new, this study represents one of the initial attempts within the Kenyan context. Consequently, it serves as a fundamental reference for individuals interested in homeschooling, providing insights into the impact of homeschooling on learning outputs in Kenya.

Furthermore, the study's results create a valuable resource for individuals aspiring to adopt homeschooling, offering them crucial insights in its curriculum. Armed with the knowledge that home-schooled learners perform commendably in the ACE system, those considering this educational approach can better prepare to achieve their

objectives. Additionally, this study serves as a stepping stone for further research on the Accelerated Christian Education (ACE) system, thus opening avenues for deeper exploration in the area.

This study holds significant importance as Kenya is bound by international obligations that emphasize parents' rights to choose their children's education. International agreements such as the United Nations Declaration of Human Rights and the African Charter on the Rights and Welfare of the Child underscore parents' freedom to provide religious and moral education based on their beliefs. By offering essential information, this study serves as a foundation for policymakers, educators, parents, and researchers, providing valuable insights and guiding informed decisions regarding homeschooling in Kenya.

### **1.7 Assumptions of the Study**

Several assumptions were made by the researcher prior to conducting this study. Firstly, it was assumed that there was equivalence of academic standards. This assumption entailed that the academic standards and curricula in both homeschooling and conventional schools were comparable and could be used as a basis for comparison. Secondly, the assumption of similar socioeconomic backgrounds was made. Assuming that home-schooled learners and conventionally schooled learners come from similar socioeconomic backgrounds, minimized the influence of economic disparities on the study's outcomes.

The third assumption was that of representative sample. This assumption was that the participants selected for the study, both homeschoolers, and conventionally schooled learners, represented a diverse and balanced sample of the population, ensuring the

findings were applicable to a broader context. The fourth and final assumption was that there was accessible and comprehensive data on both homeschooling and conventional schooling learners, allowing for a meaningful comparative analysis of academic and social outcomes.

### **1.8 Scope of the Study**

For the purpose of manageability, the study was delimited in the following ways: This study focused exclusively on the learners participating in the Accelerated Christian Education Curriculum in Kenya and their parents. Parents were the primary sources of information concerning their children's social learning outcomes. The study encompassed all the ten conventional ACE registered schools in Nairobi-Kenya as of 2018. The respondents were limited to the parents of the learners under the ACE curriculum and the administrators of the ACE centers, because ethical considerations do not allow informed consent from under age learners.

The academic scope of the study specifically aimed to determine how the mode of schooling, encompassing both conventional schooling and homeschooling, influences learners' academic and social learning outcomes within the confines of the ACE curriculum. Notably, the study included learners from various Christian denominations, such as conservatives, Catholics, and Protestants, who were pursuing the ACE curriculum, regardless of their specific faith backgrounds. Data on academic output was obtained from the learners scores in mathematics, English, and Social Studies. This is because, those subjects constitute the main study subjects in elementary education. the study was conducted over a period of one year as from August, 2021 to August, 2022.

## **1.9 Limitations of the Study**

This study focused on a specific student population pursuing the Accelerated Christian Education curriculum, leading to the attainment of an International Certificate in Christian Education (ICCE). This narrow focus restricts the external validity of the study findings, limiting their generalizability to other education systems. Moreover, the relatively small number of learners engaged in homeschooling in Kenya poses a limitation. The positive academic outputs observed among this small sample might not accurately represent the overall impact of homeschooling. In studies with limited populations, there is always the possibility of an extraneous variable influencing the recorded findings.

Additionally, the contextual nature of the findings presents another limitation. The diverse perspectives on homeschooling, as noted in prior research (Sormunen *et al.*, 2018), suggests a normative argument. This argument highlights the vast array of practices falling under the homeschooling umbrella, and the unique home environments could potentially moderate the relationship between the learning mode and learning outputs. These contextual nuances need to be considered when interpreting the study's findings.

## **1.10 Theoretical Framework**

Two theories guided this study. They were Systems theory and Social Learning Theory.

### **1.10.1 System's Theory's Input-Output Model**

Ludwig Von Bertalanffy's General Systems Theory, which is often regarded as the foundational concept of Systems theory, was first introduced in the 1940s and further developed in the 1950s (Drack and Poureau, 2015). Von Bertalanffy proposed this theory as a way to address complex systems across various disciplines, emphasizing the interconnectedness and interdependence of different components within a system. His ideas laid the groundwork for the modern field of systems science and had a significant influence on diverse fields such as biology, psychology, and management sciences.

This theory, developed by Ludwig Von Bertalanffy, posits that inputs from an organization's environment ultimately transform into outputs. In this study's context, the home serves as the environment, home-schooled learners provide the inputs with diverse backgrounds, and parents shape the environment, embodying what Kunzman (2012) refers to as 'life as education' (LaE). This approach results in a wide array of learning experiences. Kunzman (2012) contends that these opportunities can be more authentic and impactful than what conventional schooling offers. According to Koontz and Weihrich (1988), an organized enterprise does not exist in isolation but is intricately linked to the environment in which it operates.

In the context of this study, experiences within the home-schooling movement significantly shape learners as they progress through the learning process. These experiences influence learners' skills and abilities. The student's output, in terms of the skills they acquire, is a direct result of this transformative learning process.

Academic performance, social skills, and transitions between grades or levels are all determined by the environment.

According to Kunzman (2012), parents play a crucial role in this process by instilling values, monitoring behavior, organizing social interactions, and providing learning materials such as books and games. As learners grow, these responsibilities can be shared with institutions like schools, churches, camps, and tutors. Thus, whether a student is in a conventional school or a home setting, the fundamental principles of learning and development remain consistent.

Robbins (1980) posited a perspective on organizations that emphasized their role as absorbers, processors, and generators, constituting interdependent factors within a system. In the context of the education system, this viewpoint suggests that various sectors, including formal and informal education, should mutually support one another. As per Robbins (1980), any alteration within one factor of an organization affects all other components, illustrating the interconnectedness of organizational elements. Consequently, it becomes imperative for all sectors, including formal and informal education, to work cohesively, aligned with shared goals.

Oso and Onen (2005) reinforced this notion by highlighting the necessity for comprehending the interrelationships among different parts of a system, particularly in the education sector. For this study, focusing on both formal and informal education sectors, this perspective stresses the importance of a shared vision. According to this theory, establishing a common understanding among all stakeholders is crucial, necessitating active involvement from all parties. Achieving

this unified vision, while challenging, is possible through the implementation of effective policies that engage and incorporate input from all relevant stakeholders.

By employing the input-output model of systems, this study acknowledged that the outputs of an education system, namely learning outcomes, were well-defined. Understanding this fact allowed for a thoughtful selection of the appropriate process. For example, if the goal was to enhance learners' academic output and social learning outcomes, there were multiple pathways to consider. These could include homeschooling or conventional schooling. Consequently, the selection of an optimal method involved comparing the academic and social learning outputs of learners in both forms of education. Consequently, through the system's model, three objectives were generated in relation to academic learning outputs. Moreover, determining the suitable process led to a comparative research design.

### **1.10.2 Social Learning Theory**

Social Learning Theory, proposed by Albert Bandura, is grounded in the belief that individuals learn by observing the behaviors of others and the consequences that follow these behaviors. Bandura's theory emphasizes the role of social modeling and observational learning in shaping human behavior. According to Bandura (1977), people learn not only from direct experiences but also by watching others, particularly significant individuals in their social environment.

One of the key proponents of Social Learning Theory is Albert Bandura himself. Bandura's research in the 1960s and 1970s significantly contributed to the development of this theory. His famous Bobo Doll Experiment (Bandura *et al.*, 1961)

demonstrated that learners learn aggressive behaviors by observing adults. In this study, learners who observed an adult model's aggressive behavior were more likely to imitate the same behavior when given the opportunity.

Bandura's work paved the way for further research and applications of Social Learning Theory. Later researchers, such as Julian Rotter, expanded the theory by introducing concepts like locus of control, emphasizing the influence of individuals' beliefs about their control over events in their lives (Rotter, 1966). Walter Mischel introduced the idea of situationism, highlighting the impact of situational factors on behavior, challenging the notion of consistent personality traits (Mischel, 1968). These developments demonstrated the adaptability of Social Learning Theory to various contexts.

In recent years, scholars like A. Bandura, D. Schunk, and A. Kazdin have continued to refine and apply Social Learning Theory in educational psychology, emphasizing its relevance in understanding academic achievement, self-regulation, and motivation (Schunk, 1987; Kazdin, 1978; Bandura, 1986).

Social Learning Theory, proposed by Albert Bandura, is grounded in several fundamental principles that elucidate the process of human learning and behavior (Bandura, 1977). Observational Learning forms the cornerstone of this theory. Bandura argued that individuals learn by observing the behaviors of others. This observational learning occurs through modeling, where people imitate the actions, attitudes, and emotional reactions of others (Bandura, 1963).

Imitation and Modeling are integral components of Social Learning Theory. Individuals are more likely to imitate behaviors they perceive as rewarding or those displayed by role models they admire. Modeling significantly influences behavior, and the likelihood of imitation increases when the model is respected or when the behavior results in positive outputs (Bandura, 1977).

The theory emphasizes the role of Reinforcement and Punishment in shaping behavior. Positive reinforcement strengthens desired behaviors, making individuals more likely to repeat them, while punishment discourages undesirable behaviors (Bandura, 1969). Vicarious Reinforcement is another key principle, suggesting that individuals can learn from the consequences experienced by others. Observing someone else being rewarded or punished for a behavior can influence one's likelihood of performing or avoiding that behavior, even without direct personal experience (Bandura, 1986).

Cognitive Processes play a vital role in Social Learning Theory. These processes, such as attention, retention, reproduction, and motivation, determine the extent to which observational learning occurs. Attention involves actively observing the model's behavior, retention involves remembering the observed behavior, reproduction is the ability to replicate the behavior, and motivation influences the decision to perform the behavior (Bandura, 1977). Reciprocal Determinism, as posited by Bandura, acknowledges the bidirectional influence between individual behavior, personal factors, and environmental influences. Behavior, cognitive factors, and the environment continuously interact and influence each other (Bandura, 1986).

Self-Regulation is a crucial aspect of Social Learning Theory. Individuals can regulate their own behavior through self-reflection and self-control. Self-regulation involves

setting goals, monitoring progress, and adjusting one's behavior based on internal standards and external feedback (Bandura, 1989). Self-Efficacy, a central concept in Social Learning Theory, refers to an individual's belief in their ability to perform a specific task or behavior. Higher self-efficacy leads to greater motivation, effort, and persistence in accomplishing tasks (Bandura, 1977).

Moreover, Attention and Retention are essential. People are more likely to learn from a model if they pay attention to the model's behavior and remember it accurately. Factors such as the model's characteristics, the complexity of the behavior, and the observer's cognitive capabilities influence attention and retention (Bandura, 1986). Finally, Motivation is a critical determinant of observational learning. The decision to imitate a behavior is influenced by motivation. Individuals are more likely to adopt a behavior if they expect it to lead to positive outputs or rewards. Motivation is influenced by both external reinforcement and internal beliefs about the value of the behavior (Bandura, 1977). These principles collectively form the foundation of Social Learning Theory, offering valuable insights into the complexities of human learning and behavior (Bandura, 1977).

While Social Learning Theory offers valuable insights into human behavior and learning, it is not without its limitations. One significant limitation lies in its emphasis on observable behaviors, often neglecting internal cognitive processes. Critics argue that the theory oversimplifies complex mental processes, undermining the role of internal thoughts, emotions, and motivations in shaping behavior (Bandura, 1977).

Another critique pertains to the theory's narrow focus on behavioral outcomes. Social Learning Theory primarily examines how behaviors are acquired and replicated, but it

does not delve deeply into the underlying motivations or the psychological factors influencing these behaviors (Pajares, 2002). Additionally, the theory assumes a consistent relationship between observed behavior and its consequences. However, real-life situations are often more intricate, with multiple factors influencing behavior and its outputs. This oversimplification can limit the theory's applicability to complex, real-world scenarios (Pajares, 2002).

Social Learning Theory's generalizability has also been questioned. Bandura's research primarily focused on controlled laboratory settings, raising concerns about the theory's applicability to diverse cultural contexts and real-world, uncontrolled environments (Pajares, 2002). Furthermore, the theory lacks precision in explaining how individuals transition from observational learning to actual behavioral enactment. It does not provide detailed guidelines on how observed behaviors are transformed into personal actions, leaving a gap in the understanding of this critical process. Another limitation arises from the reliance on controlled experiments. The controlled nature of many studies limits the ecological validity of the findings, as real-life situations often involve complex, uncontrolled variables that cannot be replicated in a laboratory setting (Pajares, 2002).

Social Learning Theory was particularly relevant in the study comparing social learning outcomes between home-schooled and conventionally schooled learners due to its focus on observational learning and environmental influences on behavior. Social Learning Theory emphasizes the role of observing and imitating others' behaviors. In the context of the study, home-schooled learners often learn in a more intimate and closely monitored environment, where observational learning plays a

significant role. Understanding how home-schooled learners observe and learn from their parents or tutors can provide insights into their social learning processes (Bandura, 1977).

The theory underscores the impact of the environment on shaping behavior. Homeschooling environments differ significantly from conventional school settings. Investigating how these distinct environments influence social learning behaviors, interactions, and outcomes was crucial. By applying Social Learning Theory, researchers could analyze how environmental factors unique to homeschooling contribute to social learning experiences.

Moreover, Social Learning Theory posits that individuals are more likely to replicate behaviors they observe and perceive as rewarding. In the homeschooling context, understanding how learners replicate behaviors observed at home compared to those in conventional schools sheds light on the influence of the learning environment. Examining the behavioral replication patterns through the lens of Social Learning Theory helps comprehend the social learning dynamics in both settings (Bandura, 1977).

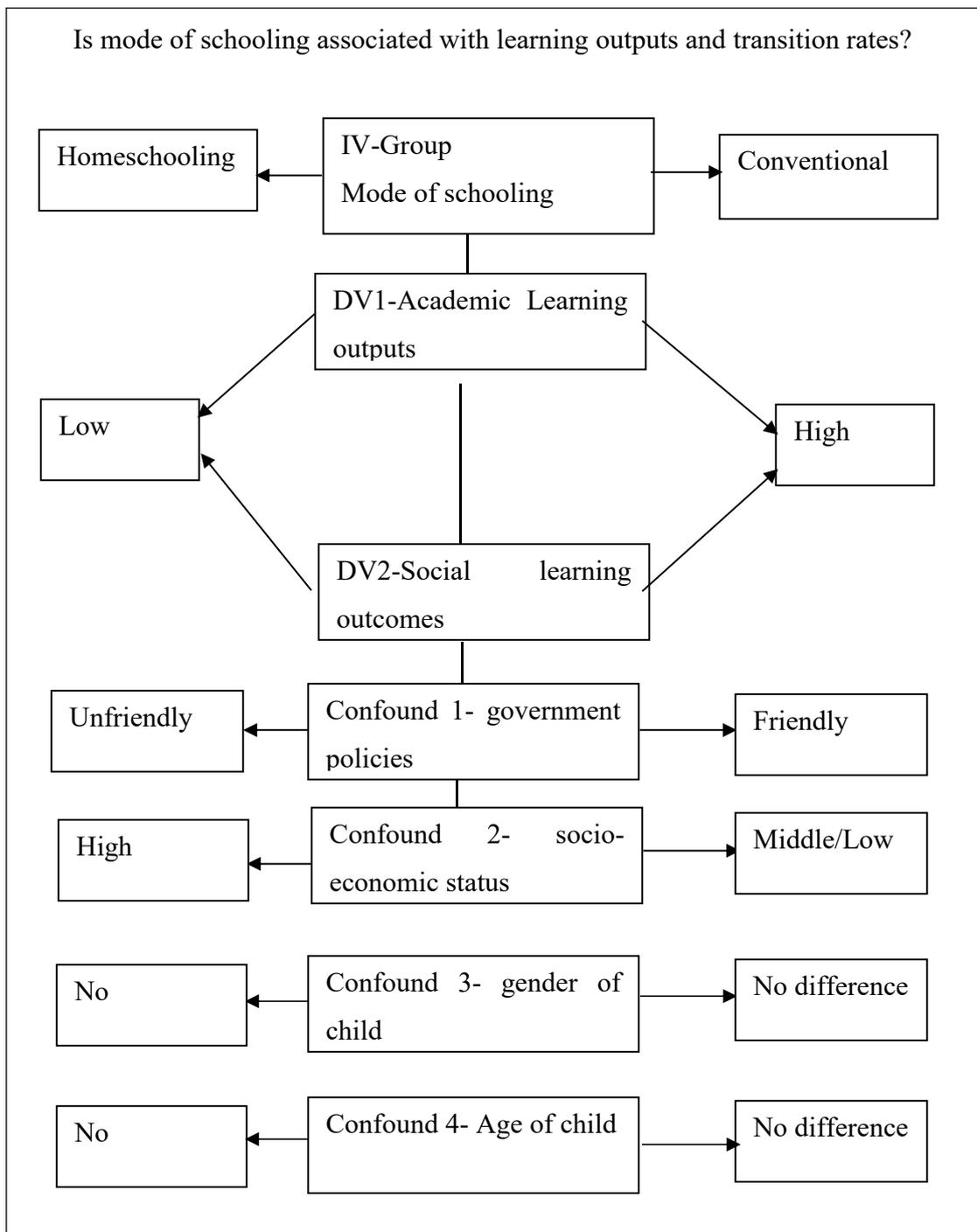
Additionally, the theory's concept of social modeling, where individuals learn from role models, was pertinent in understanding the influence of parental or tutor behavior on home-schooled learners. By exploring how social modeling affects social learning outputs, the study could provide valuable insights into the unique dynamics of homeschooling environments, contributing to a comprehensive comparison with conventional schooling (Bandura, 1977).

Incorporating Social Learning Theory allowed the researcher to analyze the social learning processes, behaviors, and interactions of home-schooled learners within their specific environments. By examining these aspects, the study aimed to provide a nuanced understanding of social learning outputs in homeschooling compared to conventional schooling, contributing valuable insights to the field of education.

### **1.11 Conceptual Framework**

In the realm of education, the debate between homeschooling and conventional schooling remains a topic of significant interest and concern. One fundamental question that garners attention is whether the mode of schooling is associated with disparities in learning outputs and transition rates among learners. This study explored this crucial question by examining the academic learning outputs and social learning outcomes of learners enrolled in the ACE (Accelerated Christian Education) program, comparing those who are home-schooled and those who attend conventional schools.

The conceptual framework of this study was anchored on Ludwig von Bertalanffy's input-output model, which provides a systematic approach to understanding the relationship between inputs, processes, and outputs within a system. Therefore, the conceptual framework of this study was as presented in Fig. 1.1



**Figure 1: Conceptual Framework**

Source: Researcher (2023)

In this context, the mode of schooling served as the primary independent variable, representing the input in the educational system. Academic learning outputs and social learning outcomes were the dependent variables, representing the measurable results or outputs of the educational process.

The interaction between variables in this study was multifaceted. The mode of schooling, whether homeschooling or conventional schooling, influences the processes through which learners acquire knowledge and develop social skills. Academic learning outputs, such as grades and standardized test scores, reflect the cognitive outcomes of these processes. Social learning outcomes, encompassing aspects like persistence, self-control, and social competence, reflect the socio-emotional outcomes of the educational experience.

To ensure the accuracy and validity of the study's findings, several confounding variables were considered. Learners' gender and age were essential factors to control for, as they can influence both academic and social development. Additionally, parental qualifications and income were crucial confounding variables, as they can affect the quality of the learning environment and access to resources, thereby potentially impacting learning outcomes.

### **1.12 Definition of Terms**

**Academic Acceleration:** Refers to the educational strategies that enable students to

progress through the curriculum at a faster pace or access learning opportunities typically reserved for older or more advanced students

and is based on the following criteria: grade level advancement, subject-specific acceleration, and early entrance to education.

**Academic Learning Outputs:** refers to the average scores that learners in grade 9 posted in three consecutive PACEs in Math, English Language, and Social Studies.

**Accelerated Christian Education:** Refers as the kind of education that besides giving learners opportunities to progress in learning at their own pace, also intervened with Christian ethos.

**Alternative Education:** Refers to non-traditional educational approaches that deviate from the conventional methods and structures commonly found in mainstream conventional schools.

**Conventional Schooling:** Refers to the teaching and learning experience that takes place in public or private schools that are registered by the Ministry of Education in Kenya.

**Grade 9:** Refers to the educational level that corresponds to the ninth year of study under the Accelerated Christian Education program, either at the home-school or conventional school environment.

**Homeschooling:** refers to the teachings and learning experience that takes place at home under the tutelage of parents or other individuals whose services may have been hired by parents.

**Hot deck imputation:** Refers to the identification of nearby or similar cases or observations within the dataset for each missing or incomplete data point to act as "donors" to provide values that replace the missing data.

**Package for Accelerated Christian Education (PACE):** refers to a self-contained learning unit that covers a specific topic or subject matter. It includes instructional content, exercises, assessments, and enrichment activities, all organized within a single booklet or booklet set. Each PACE focuses on a particular subject, allowing students to progress through the material

**Social learning outcomes:** Refer to the learners' behavioural attributes as expressed by their level of persistence, self-control, and social competence skills.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The study sought to compare academic and social learning outputs of home-schooled and conventionally schooled learners pursuing the ACE curriculum. In retrospect, math, English, social studies, and social learning outputs were compared. Therefore, this chapter reviews literature on the concept of ACE, academic learning outputs, and social learning outcomes. The scope of this review includes the concept of accelerated Christian education, the ACE curriculum in perspective, the concept of learning outputs, categories of learning outputs, learning approaches, learning environment and learning outputs, and the empirical review of both academic and social learning outputs.

#### **2.2 The Concept of Accelerated Christian Education**

The concept of Accelerated Christian Education (ACE) represents a holistic educational paradigm that intertwines academic excellence, character development, and spiritual growth. ACE's unique approach is deeply rooted in biblical principles, emphasizing the integration of faith and learning throughout the educational journey (ACE, 2017). By incorporating a biblical-centered worldview into its curriculum, ACE aims to shape not only knowledgeable individuals but also morally upright and spiritually grounded citizens.

One of ACE's distinguishing features is its focus on fostering a genuine passion for learning. This approach is supported by ACE's self-instructional curriculum, delivered

through Packets of Accelerated Christian Education (PACE) workbooks, allowing students to progress at their own pace (Scaramanga and Reiss, 2018). This individualized learning method encourages students to take ownership of their education, promoting self-discipline and a strong sense of responsibility towards their academic pursuits. Research has shown that personalized, self-paced learning enhances student engagement and promotes deep understanding (Keller and Karau, 2013).

Moreover, ACE places a significant emphasis on character education and moral development. The curriculum incorporates biblical teachings, guiding students to cultivate virtues such as integrity, empathy, and compassion (ACE, 2017). Studies have indicated that character education positively influences students' behavior and social interactions, contributing to a positive school environment (Lickona *et al.*, 1996). Through interactive activities and discussions rooted in biblical values, ACE nurtures students who not only excel academically but also exhibit strong moral character (Niekerk, 2009).

Additionally, ACE recognizes the vital role of parental involvement in the educational process. Research suggests that active parental engagement positively impacts students' academic achievement and overall development (Fan and Chen, 2001). ACE encourages parents to actively participate in their children's learning, creating a collaborative partnership between home and school (ACE, 2017). This collaborative approach ensures consistency between the values taught at home and those reinforced in the educational setting, fostering a supportive and unified learning environment (Sanders and Sheldon, 2009).

The ACE curriculum, predominantly American, incorporates elements from New Zealand (Scaramanga and Reiss, 2018). Scaramanga (2017) describes ACE as an individualized curriculum with a conservative Protestant orientation, emphasizing a biblical perspective in all subjects. Christian Education Europe (2017) highlights that this comprehensive self-instructional curriculum seamlessly integrates biblical concepts throughout its program. The ACE curriculum comprises workbooks known as Packets of Accelerated Christian Education (PACE), each consisting of about 40 pages and taking roughly two weeks to complete (Scaramanga and Reiss, 2018). Although ACE has its origins in Texas, it is currently headquartered in Tennessee. The standardized curriculum is distributed to nearly 6,000 schools worldwide, serving numerous home-schooled students (ACE, 2017).

The ACE curriculum covers essential subjects including English, Maths, Literature, Creative writing, Word building, Science, and Social Studies, resulting in academic achievements. Subjects, except Math, Word building, and Literature and Creative writing, comprise 156 PACEs from Kindergarten to level 12. Math spans 144 PACEs, word building concludes at level 9, and literature and creative writing cover levels 2 to 8 (ACE, 2016).

The ACE curriculum, particularly favored by homeschoolers, boasts several distinctive features. One key aspect is academic acceleration, a practice recommended for gifted learners. Guenther (1998) advocates for methods like early admission to preschool, enabling learners to progress through education without disrupting their social life and curriculum through grade skipping (Amayeye, 2016). Amayeye, referencing Guenther, further notes that while concerns about fitting into new classes,

physical and emotional readiness, and social integration with peers might arise with advancement in primary school, there is no substantial evidence supporting these fears. High schools offer various acceleration options without significant negative effects, as learners are typically among their age peers (Amayeye, 2016). Early college entrance, a controversial form of acceleration, is linked to heightened motivation and potential for graduate studies.

Another notable feature of the ACE curriculum is its emphasis on enhancing critical thinking skills (Duffy *et al.*, 2020). The ACE curriculum is designed to nurture creative problem-solving abilities, encouraging learners to think critically (Amayeye, 2018). Research indicates that students following the ACE curriculum demonstrate superior communication skills (Lend, 2017). Furthermore, studies have demonstrated that the ACE system fosters skills like interpretation and evaluation, essential components of critical thinking (Niekerk, 2009).

The ACE programme stands out for several notable features. One key aspect is its strong emphasis on college readiness, particularly evident in the South African context where it has garnered widespread praise. Studies conducted in South Africa have shown that the ACE programme receives positive perceptions from parents, students, and college admissions officers, indicating its effectiveness in preparing learners for higher education (Baumgart, 2005; Kelley, 2005). This recognition underscores the ACE curriculum's ability to instill the necessary skills and knowledge in students, ensuring they are well-equipped for the challenges of college life and academics.

Additionally, the ACE curriculum distinguishes itself through its commitment to individualized instruction. By valuing personalized learning, ACE recognizes and accommodates the diverse learning styles among students (Amayeye, 2016). This personalized approach goes beyond a one-size-fits-all model, acknowledging that each learner has unique strengths, weaknesses, and preferences. Empirical evidence supports this approach, highlighting the importance of tailoring educational objectives to meet the specific needs of individual learners (Mungai, cited in Amayeye, 2016, p.15). This adaptability not only enhances students' understanding and retention but also fosters a positive and inclusive learning environment, ensuring that every student receives the support they require to excel academically.

In essence, ACE's holistic educational approach, supported by personalized learning methods, character education, and strong parental involvement, results in well-rounded individuals. These students not only excel academically but also possess a strong moral compass and a genuine love for learning. By providing a comprehensive and faith-integrated educational experience, ACE equips students with the knowledge, skills, and values necessary to thrive academically, socially, and spiritually, making a positive impact on both their communities and the wider world.

### **2.2.1 The ACE Curriculum in perspective**

Within the framework of the ACE curriculum, learners are guided through a structured learning path. The curriculum places significant emphasis on foundational skills, especially reading, which acts as a gateway to other subjects. As learners progress, they are provided with instructional workbooks known as PACEs (Packets of Accelerated Christian Education). These PACEs are meticulously designed to build

upon each other, ensuring a systematic mastery of subjects before introducing new concepts (Scaramanga and Reiss, 2018). This structured approach aims to instill a strong academic foundation while allowing learners to progress at their own pace, promoting a sense of achievement and confidence in their abilities.

One distinctive feature of the ACE curriculum lies in its ability to cater to a wide range of learners, including those with varying abilities. The self-instructional nature of the curriculum allows teachers to focus on individual learners' specific needs and concerns (Scaramanga and Reiss, 2018). This adaptability ensures that learners receive tailored support, addressing their academic challenges while nurturing their strengths. By acknowledging the diversity of learning styles and abilities, the ACE curriculum fosters an inclusive educational environment, enhancing the overall learning experience for all learners involved.

Moreover, the ACE curriculum goes beyond traditional academic subjects; it integrates moral and ethical teachings, aligning with biblical principles. This holistic approach to education aims to develop well-rounded individuals, emphasizing character development alongside intellectual growth. By incorporating biblical perspectives into various subjects, the ACE curriculum encourages learners to engage critically with ethical issues, fostering a sense of moral responsibility and ethical awareness. This unique blend of academic rigor, individualized instruction, and moral guidance characterizes the ACE curriculum, shaping learners not only as knowledgeable individuals but also as ethical and compassionate members of society.

The ACE program operates on an educational philosophy where the teacher assumes a supervisory role, encouraging learners to engage in self-directed reading and

knowledge acquisition, rather than relying solely on traditional lectures (Scaramanga and Reiss, 2018). Within this framework, ACE maintains a self-instructional system, with the teacher serving as a supervisor who provides individualized guidance in specific areas of concern for each learner. This approach aims to prevent less proficient students from developing low self-esteem by assessing and grading them based on their achievement level in major subjects, rather than their age, as highlighted by Scaramanga and Reiss (2018).

Moreover, the ACE curriculum incorporates a well-structured program for teaching young learners to read, known as "Reading Readiness" and ABC's, employing a phonetic approach to the alphabet (Myers-Walls, 2020). This method enhances early literacy skills by focusing on phonetic learning strategies, laying a strong foundation for effective reading and language development among young students.

In the ACE curriculum, students' progress to instructional workbooks (PACE's) in various subjects once they attain proficient reading skills. These workbooks are designed in a sequential manner, where mastery of each PACE is a prerequisite before moving on to the next, ensuring a systematic and comprehensive learning approach (Scaramanga and Reiss, 2018). Upon successful completion of a subject, senior learners earn credits that contribute towards obtaining an ACE certificate, recognizing their academic achievements (Amayeye, 2016). Additionally, learners in years 7 to 10 are provided with opportunities to explore and maximize their individual talents and abilities, aligning with the belief in nurturing the gifts bestowed upon them by God (Scaramanga and Reiss, 2018). This emphasis on personalized learning experiences

encourages students to discover and develop their unique skills, fostering a holistic educational environment within the ACE curriculum.

In essence, the ACE curriculum is grounded in biblical principles, intending to shape learners' perspectives in alignment with God's worldview, while covering fundamental subjects such as English, Science, Social Studies, and Math, among others (Christian Education Europe, 2017). This curriculum is tailored to cater to individual needs, emphasizing mastery-based learning, character development, and a self-instructional approach.

Despite the growing acceptance of the ACE curriculum as an alternative educational approach in Kenya, the government does not officially recognize it, even as homeschooling under the ACE system gains traction (Amayeye, 2016; Mungai, 2009). The first ACE school in Nairobi was established in 2001, marking the inception of this educational method in the country (Mungai, 2009). Teaching within the ACE framework necessitates a genuine commitment to working with learners, as highlighted by Mungai. Interest in the ACE curriculum has been steadily rising in Kenya, evidenced by various institutions adopting it, including Faith Ventures Christian Academy, Almasi School, Emerald International School, ACE Kenya, Gifted Hands School, and Mekisa School Karen.

Given that the ACE curriculum supports both homeschooling and traditional education models, emphasizing academic and social outcomes, the question arises: why has the Kenyan government not considered legalizing homeschooling via ACE? A thorough examination of academic and social learning outputs could provide valuable insights into the distinct pedagogical requirements of homeschooling and

conventional schooling, shedding light on the possible reasons behind the hesitance towards homeschooling in Kenya.

### **2.3 The Concept of Learning Outputs**

In the field of education, the concept of learning outputs refers to the measurable and observable outcomes of the learning process, encompassing a diverse range of skills and knowledge acquired by learners. Academic learning outputs include proficiency in subjects such as mathematics, language arts, science, and social studies. These competencies are quantifiable and serve as markers of learners' academic achievements (ACE, 2016). Additionally, academic learning outputs extend to higher-order thinking skills, problem-solving abilities, and analytical capacities, all of which are crucial for learners to succeed academically (Scaramanga and Reiss, 2018).

Furthermore, social learning outputs are fundamental aspects of a well-rounded education, emphasizing interpersonal skills, emotional intelligence, communication abilities, and ethical values. Social learning outputs encompass learners' capacity to collaborate effectively, demonstrate empathy, and engage responsibly in society (Amayeye, 2016). Cultivating social responsibility, cultural awareness, and ethical decision-making are integral components of social learning outputs, contributing to learners' holistic development (Duffy et al., 2020).

Research has indicated that the Accelerated Christian Education (ACE) curriculum, a popular homeschooling approach, emphasizes individualized instruction, allowing learners to progress at their own pace (Scaramanga and Reiss, 2018). This tailored approach to education supports the development of diverse learning outputs,

acknowledging and accommodating individual differences among learners (Amayeye, 2016). Additionally, the ACE curriculum's focus on character development and biblical principles aligns with the cultivation of ethical and social learning outputs (Christian Education Europe, 2017). These findings highlight the multifaceted nature of learning outputs and underscore the significance of assessing both academic and social dimensions to comprehensively evaluate the impact of different educational approaches on learners' overall development.

The growing concern over the attainment of minimum standards among higher education learners has led to a reevaluation of learning outputs (Jones et al., 2014; McCowan, 2018). This shift in focus from teaching to student learning signifies a paradigm change in education (Proitz, 2010). Traditionally, curricula have been input-oriented, emphasizing indicators such as financial investments and student enrollment (Marouchou, 2011). However, there is a conceptual shift towards enhancing the effectiveness and meaningfulness of learning experiences for students (Schumaker *et al.*, 2013). The emerging perspective emphasizes that learning revolves around learners' ability to comprehend, know, and demonstrate knowledge.

In the evolving educational landscape, learning outputs are pivotal for setting benchmarks and fostering competition, given the continuous changes in education policies (Protz, 2015). Educational policy development has become increasingly attuned to contextual factors through the lens of learning outputs (Protz, 2015). The question that arises is: what do these learning outputs encompass and why are they significant in today's educational context?

The concept of learning outputs and their measurement traces its origins to the behaviorist tradition pioneered by Benjamin Bloom, which viewed learning as behavioral change triggered by external stimuli (Mustonen *et al.*, 2017). Bloom's taxonomy of educational objectives, developed in the 1960s and 1970s, has long served as the standard for defining educational goals in primary and secondary education. Notably, Bloom's taxonomy continues to be recognized by various educational stakeholders, such as the Bologna process document, as a fundamental framework for describing learning outputs (Kennedy, 2008a).

### Top of Form

Critiques of the behaviorist perspective on learning outputs gained momentum during the cognitive turn of the 1970s. Critics argued that the behaviorist view was insufficient in explaining the complexity of learning phenomena (Hehtinen, 2012). They contended that the learning process was intricate and enduring, and behaviorist models alone could not comprehensively address it (Ohlsson, 2011). Consequently, it became crucial to approach learning outputs within the framework of the cognitive movement and the works of Bloom. The diverse perspectives and purposes for which learning outputs are required have led to varied definitions of the concept. Gagne (1974), for example, perceived learning outputs as essential for a nuanced understanding of the learning process, providing insights into instructional design implications. Eisner (1979), on the other hand, saw learning outputs as the outcomes of engaged conversations, whether intentional or incidental.

Ewell (2005) introduced another perspective on learning outputs, rooted in the mid-1980s assessment movement. According to this paradigm, learning outputs serve as

measures of institutional effectiveness. Adam (2004) defined learning outputs as statements detailing the level of success a student or learner should achieve after learning. Cadefop (2009) described learning outputs as statements delineating what a learner knows, understands, and can demonstrate after completing the learning process.

Baulin and Battersby (2015), exploring critical thinking, identified learning outputs as statements that reveal the knowledge and skills learners are expected to acquire following a specific task, course, class, assignment, or program, along with the underlying logic behind these skills and knowledge. They emphasized that effective learning should focus on knowledge integration and application rather than mere material coverage. In this study, learning outputs were operationally defined as the knowledge and skills learners gain after successfully completing the ACE curriculum, whether through homeschooling or conventional ACE schools.

### **2.3.1 Categories of Learning Outputs**

The focus of classroom instruction has traditionally been on academic learning outputs, prompting researchers to explore factors contributing to academic success (Jennings and Greenberg, 2009; Mashburn *et al.*, 2006). Identified factors include nurturing student-student and teacher-student relationships, and ensuring safe environments (Vega, 2012). Academic learning outputs encompass a range of subjects such as Languages and Literature, humanities, fine arts, physical and biological Sciences, Mathematics, Social Science, and Business (Henrichsen and Tanner, 2011).

Research indicates that interventions addressing learners' social and emotional development enhance their academic learning outputs (Durlak *et al.*, 2011).

Advocates of social and emotional learning (SEL) outputs argue that self-awareness and confidence in learning abilities are prerequisites for continuous learning (Dweck, Walton, and Cohen, 2014). Duckworth and Seligman (2005, cited in Vega, 2012) highlight self-discipline, motivation, and stress management as factors influencing learners' ability to set high academic goals. Moreover, Zins *et al.* (2007) demonstrated that strong problem-solving skills significantly contribute to good academic performance, extending from homework completion.

Educators concur that the increasingly diverse and complex world necessitates instruction not only in academic subjects like mathematics, social studies, sciences, and English language but also in social and emotional learning (SEL) (Bridgeland, Bruce, and Hariharan, 2013; DePaoli, Atwell, and Bridgeland, 2017; Weissberg *et al.*, 2015). While Sub-Saharan African countries continue to emphasize academic learning outputs, most developed nations have implemented SEL programs. In the US, SEL has been widely recognized, with many schools adopting these programs (Weissberg and Cascarino, 2013). US state education departments have issued standards to develop SEL skills at each grade level (Dusenbury *et al.*, 2015). The ACE program, known as the 'Whole Child Approach,' aligns with the SEL framework (Larkin, Beckos, and Shields, 2012).

The ACE curriculum not only emphasizes academic learning outputs but also empowers learners to engage in social and emotional learning, enabling them to reflect on their strengths and address areas for growth (Larkin *et al.*, 2012). This approach requires a collaborative effort involving parents. However, literature

reviews emphasize the importance of effective program implementation and sustained participation in SEL initiatives.

Studies have indicated that while participation in SEL programs has significant short-term impacts on academic outputs (Wiglesworth *et al.*, 2016), delayed measurement suggests diminishing effects over time (Taylor *et al.*, 2017). Moreover, research shows that learners' long-term academic gains are closely linked to their short-term progress in SEL. This raises questions about how the learning approach and context impact learning outputs, considering the distinct pedagogical approaches and contexts between conventional and home settings.

### **2.3.2 Learning approaches and learning outputs**

The concepts of homeschooling and conventional schooling from the ACE perspective shed light on the intersection between learning approaches and learning outputs. Homeschooling, primarily led by parents who might lack formal teaching skills, offers limited opportunities for interaction compared to the traditional classroom setting (Saeed *et al.*, 2016). The significance of learning techniques on learning outputs is widely acknowledged in research literature. For instance, Pismatti *et al.* (2021) analyzed a cohort of 269 medical learners, illustrating that a deep-oriented learning approach resulted in superior learning outputs. Their study suggested that an individual's trajectory of practices during the curriculum significantly influences the nature of learning outputs.

In a systematic review conducted in Indonesia, Hajeez (2021) highlighted that learning approaches play a crucial role in shaping learning outputs, with collaborative

learning methods proving more effective. Conversely, Lee and Lo (2015) explored online educational technologies available to homeschoolers and found that novices could learn equally well from discretionary online tools. Uiboleht *et al.* (2018) demonstrated that a consonant learning-focused approach yielded high-quality learning outputs, although they noted that other methods like the dissonant approach did not necessarily lead to lower-quality outputs. Qureshi and Isllah (2014) reported that the deep approach to learning facilitated more profound understanding compared to the surface approach.

On the other hand, some researchers have presented findings aligning with homeschooling practices. Wong (2013) examined the use of online learning resources in the context of Victoria University, illustrating that online lectures and tutorials resulted in elevated learning outputs. Similarly, Khan, Kend, and Robertson (2016) showed that social media facilitated academic relationships among learners. Chen *et al.* (2019) demonstrated that interactive and animated digital games increased learning outputs in learners.

Despite the growing importance of learning approaches documented in existing literature, there is a lack of clarity on the distinctions between conventional and homeschooling. While previous studies have highlighted technology features that enhance homeschoolers' learning and the benefits of student-teacher and student-student interactions, there is inconclusive evidence. Therefore, a comparative analysis of the ACE program between homeschooling and conventional pedagogy becomes essential to address these gaps in understanding.

### **2.3.3 Learning environment and learning outputs**

The learning environment plays a pivotal role in shaping learning outputs, with research highlighting the significant impact of the surroundings on students' academic performance and overall development. Numerous studies have emphasized the importance of a positive and conducive learning environment in enhancing learning outputs. According to McCombs and Whisler (1989), the learning environment encompasses both physical and social aspects, including the classroom setting, peer interactions, teacher-student relationships, and the overall atmosphere within the educational institution. A positive learning environment fosters engagement, collaboration, and active participation among students, leading to improved learning outcomes (Fisher *et al.*, 2018).

Moreover, the impact of the learning environment on learning outputs is closely linked to students' emotional well-being and mental health. A supportive and nurturing atmosphere contributes to students' emotional stability, creating a sense of belonging and security (Jones, 2017). This emotional security is essential for students to explore their full potential and engage effectively in the learning process. Research by O'Connor *et al.* (2019) suggests that students who feel emotionally supported in their learning environment exhibit higher levels of motivation, self-confidence, and academic achievement. Positive teacher-student relationships and a sense of belonging are crucial factors that enhance students' emotional well-being and, subsequently, their learning outputs.

Furthermore, the learning environment extends beyond the physical classroom, encompassing the broader social and cultural context in which education takes place. Cultural factors, community support, and societal attitudes towards education

significantly influence students' learning experiences and outcomes (Ladson-Billings, 1994). Research by Gay (2010) emphasizes the importance of culturally responsive teaching and inclusive practices in creating an equitable learning environment. When students' cultural backgrounds are acknowledged and integrated into the curriculum, it fosters a sense of identity and pride, positively impacting their engagement and learning outputs. Therefore, understanding and optimizing the learning environment, considering its multidimensional aspects, are crucial for promoting favorable learning outputs among students.

The exploration of homeschooling environments has prompted a review of studies examining the relationship between learning environments and learning outcomes. This review consistently supports homeschooling in various contexts. For instance, Clarke's (2005) study on the healthcare workplace emphasized the importance of new technologies in expanding semiotic resources and creating innovative learning environments. This perspective aligns with homeschooling practices that leverage such technologies for learning.

In the Australian Secondary School setting, an innovative learning environment was found to be positively associated with students' attitudes towards learning (Byers, Imms, and Hartnell-Young, 2018). Consequently, homeschooling cannot be criticized based on the learning environment, as many homes foster innovative learning environments. Moreover, arguments have been made that in the realm of e-learning, a prevalent aspect of homeschooling, self-discipline is the key to acquiring knowledge daily (Gorbunovs *et al.*, 2016). Additionally, Van der Kleij *et al.* (2015) study highlighted the effectiveness of immediate feedback from computer-based learning,

suggesting that such methods could scaffold both homeschooling and conventional schooling in the lower levels of the ACE curriculum. This underscores the potential of computer-based learning in enhancing the learning experience in homeschooling contexts.

The existing literature unequivocally asserts that homeschooling should not be criticized based on the learning environment. Ample evidence demonstrates that home environments equipped with necessary technology are comparable to, if not better than, conventional school settings. This raises the question: do learners following the ACE curriculum at home achieve learning outcomes similar to those in conventional schools, given identical learning environments?

Research indicates that the learning environment significantly influences interactions among learners, family members, and teachers (Olszewski-Kubilus *et al.*, 2014). Therefore, a well-designed environment fosters positive relationships between peers, encourages positive interactions between learners and adults, and provides opportunities for adults to guide learners toward their social goals. Thus, the learning environment must be rich in activities that promote positive social interactions.

Scholars argue that physical environments shape learners' behavioral expectations (Altman, 2012; Batorowicz *et al.*, 2016; Shaw, 2012). They contend that educational spaces must consider organization, aesthetics, and functionality. Constructive and cooperative behavior is likely to increase in environments that offer easy access to resources and reflect learners' ability to direct their own learning. High-quality learning environments, according to Shaw (2012), are essential for socio-emotional exploration and growth. Such spaces provide learners with inviting, warm, culturally

familiar settings that enhance comfort and security. These attractive environments encourage responsibility and cooperation, allowing learners to participate meaningfully and align their activities with individual abilities and temperaments.

The existing literature firmly establishes the crucial role of the learning environment in learners' social development. Lacka *et al.* (2021) emphasize the virtual learning environment as a precursor to enhanced social learning, underscoring the significance of the home environment in shaping learners' social development (Rose et al., 2018; Tamis-LeMonda *et al.*, 2019). Scholars have highlighted the importance of the home learning environment, emphasizing the role of parents. Klusnick and Robb (2014) identified cooperation, interactions, and positive relationships between parents and preschool centers as pivotal in equipping parents with the skills to stimulate home learning.

Additionally, Lehl *et al.* (2020) found that diverse dimensions of the home learning environment influence specific early competencies among learners. An enriched home learning environment is crucial for enhancing learners' competencies in reading and mathematics. Dimosthenos et al. (2020) demonstrated that the home learning environment positively impacts learners' later math learning outcomes, highlighting the environment's role in supporting learners' social development, particularly in the early years. Therefore, home enrichment, facilitated through parental involvement, could harness social development in learners. The physical environment plays a significant role in helping learners meet the social-emotional demands of the curriculum and manage daily routines effectively. Top of Form

## **2.4 Empirical Review of academic learning Outputs in home schooled and conventionally schooled learners.**

The decision to embrace homeschooling has prompted numerous studies comparing learning outcomes between homeschool and institutional school learners. One line of research delves into academic achievements within these two groups and uncovers intriguing insights.

### **2.4.1 Academic learning outputs in the home-schooled and conventional school setting**

Wilkens *et al.* (2015) conducted a study to assess the preparedness of homeschoolers for college calculus. Their survey involved 10,492 tertiary learners, including 190 individuals who had received homeschooling for the majority of their high school education. The findings revealed that homeschoolers achieved Scholastic Aptitude Test (SAT) math scores comparable to those of learners from institutional schools. Additionally, the study showed that homeschoolers attained higher grades in college-level calculus courses compared to their counterparts from institutional educational backgrounds.

The study conducted by Wilkens *et al.* (2015) bolstered the momentum advocating for the legalization of homeschooling. Their research demonstrated that home-schooled learners could achieve math learning outputs comparable to those of conventionally schooled learners. However, it is essential to note that scholastic aptitude tests represent a singular assessment and might not provide a comprehensive comparison of math learning outputs between home-schooled and conventionally schooled

learners. Furthermore, Wilkens *et al.* (2015) focused on a sample of tertiary learners, who exhibit a range of variables that could influence the reported outcomes. Notably, developmental stages crucial for learning, as identified by Piaget (Cherry, 2015), include the pre-operational stage (up to 7 years) and the concrete operation stage (up to 11 years), which encompass elementary school years. These stages offer a robust foundation for comparing learning outputs among learners. Wilkens *et al.'s* (2015) study left a gap concerning the comparison of academic learning outputs at the elementary level and did not control for various potential covariates. Therefore, this study aims to address these gaps by equitably matching home-schooled and conventionally schooled learners based on grade levels and the PACE curriculum.

In a study examining the impact of homeschooling on academic performance within the Canadian context, Martin-Chang, Gould, and Meuse (2011) confirmed previous research conducted by Taylor-Hongh (2010). Their findings concluded that homeschooling has the potential to provide opportunities for academic excellence surpassing those experienced in traditional public school settings. Taylor-Hongh (2010) had previously demonstrated that homeschooling led to test scores higher than those observed in conventional school settings.

The results of Martin-Chang *et al.'s* (2011) study reinforce the idea that homeschooling represents a promising alternative form of education, particularly when facilitated within a supportive home environment. Such an environment fosters a positive rapport between parents and learners, a crucial element in creating a conducive learning atmosphere. Learners, feeling cared for and supported by their parents, are more comfortable asking questions, making mistakes, and taking risks in

their learning endeavors. Homeschooling opens numerous avenues for learners to explore and acquire new knowledge.

However, the study's focus on the Nova Scotia and New Brunswick provinces of Canada limits the applicability of Martin-Chang *et al.*'s (2011) findings to developing countries like Kenya. Furthermore, there is a dearth of research on this concept in Kenya. To address this gap and replicate similar findings in developing nations, this study aimed to investigate learners in grade 9 following the ACE curriculum. The selection of grade 9 learners served as a control measure for grade diversity, while the utilization of the ACE system ensured alignment between the curriculum and the learners being studied.

Snyder's (2011) study assessed academic achievements among homeschoolers and conventional schoolers, focusing on liberal arts learners from a Catholic University in the US. Using archival data obtained ethically, the research revealed that home-schooled learners exhibited higher academic value compared to their peers from public and Catholic schools at the university level. This finding, rooted in Piaget's theory, suggests that home-schooled learners in the formal operational stage demonstrate advanced systematic thinking and greater consideration of possibilities compared to conventionally schooled peers.

However, this university-level finding might not necessarily apply to elementary school learners. Moreover, the reliance on archival data, reflecting a past context, raises questions about its relevance in the present societal landscape. Snyder's study, concentrated on liberal arts and conducted in 2011, created gaps in understanding as it excluded other academic subjects and elementary school levels. To address these gaps

and explore the contemporary context, this study aimed to replicate similar findings across academic subjects like math, English, and social studies, focusing on elementary school learners in current societal settings.

In a quantitative approach, Cogan (2010) investigated the academic achievements of homeschoolers in a mid-sized school context. Utilizing a sample of homeschoolers, constituting around 1% of the total student population, and employing census data retrieval, Cogan (2010) discovered that homeschoolers outperformed conventional school learners in multiple aspects. Homeschoolers achieved a higher ACT composite score of 26.5, earned more credits as freshmen, maintained a GPA of 3.41, and excelled in the 4-year cumulative GPA with a score of 3.46. These findings reinforced the positive academic outcomes associated with homeschooling in contrast to conventional schooling settings.

Cogan's (2010) research, conducted in a mid-sized school context, highlighted the superior academic performance of home-schooled learners compared to their conventionally schooled counterparts. This finding further reinforces the growing advocacy for homeschooling, particularly in middle school where significant growth and transition occur. The home learning environment plays a crucial role in shaping learners' development during these stages, emphasizing the importance of engaging activities that enhance creativity. The home environment offers a diverse range of hands-on and technology-driven activities that cater to learners' needs at this age.

However, it's worth noting that Cogan's (2010) study sample constituted only 1% of the entire student population, raising concerns about generalizing the findings to broader contexts. Additionally, the use of a census file for data retrieval means the

findings might not fully represent real-time situations. Moreover, Cogan's (2010) study solely employed a quantitative approach, lacking qualitative elements that could have enriched the findings. To address these limitations, this study increased the proportion of homeschoolers in the sample, utilized current real-time data from the ACE center, and employed a causal-comparative approach incorporating both qualitative and quantitative elements.

Gloeckner and Jones (2013) conducted a review of studies in the US that examined changes in homeschooling over the decade and its entry into higher education. Their review revealed consistent findings: home-schooled learners did not perform lower than conventionally schooled learners in standardized tests, and those transitioning to college performed well academically. These results emphasized the flexibility of learning environments, emphasizing that effective learning can occur anywhere, including at home, given a supportive atmosphere. Both conventional schools and homeschooling environments, guided by supportive teachers and parents, can nurture learners' self-awareness and confidence. Furthermore, the advent of interactive media offers diverse learning opportunities to homeschoolers, enhancing their educational experiences.

Gloeckner and Jones (2013), in their review of ten-year studies, may not have fully captured the contemporary reflection of learning outputs in today's society. To address this gap, this study empirically compared current academic learning outputs between learners in homeschooling and conventional schools. The aim was to determine if the findings reported in the US context could be replicated in a developing nation like Kenya.

Neuman and Guterman (2016) conducted a systematic review of homeschooling and academic outputs in the Australian context, revealing that homeschoolers consistently outperformed their conventionally schooled counterparts, particularly in numeracy, grammar, reading, and punctuation. However, these findings, while extolling the virtues of homeschooling, might not be generalized to the Kenyan context. Additionally, the validity of the results in controlling for other covariates was not explicitly demonstrated in their study. To bridge these gaps, this research was conducted in Kenya, focusing on grade 9 learners to ensure consistency in grades.

Trenholm and Stelilik (2019) presented a study conducted by the Home Education Network (HEN) in Victoria, Australia, where home-schooled alumni exhibited higher degrees of academic achievement than non-home-schooled peers. While their findings supported homeschooling, the study's focus on former learners in university introduced confounding variables. This study contextualized the research to the elementary school level in Kenya, addressing both contextual and generalizability concerns. home-schooled and conventionally schooled learners were meticulously matched across grade levels, curricula, and PACE to ensure a robust comparison.

Duvall *et. al.* (2004) explored the effectiveness of homeschooling in engaging learners with Attention-deficit/hyperactivity disorder (ADHD). Their study, conducted on learners in grades 5–6, demonstrated that homeschoolers with ADHD scored higher in reading and math, suggesting that homeschooling could be beneficial for these learners. However, it is essential to note that the success of homeschooling for learners with ADHD does not guarantee its efficacy for other students. Additionally, given that the study was conducted in 2004, it may not reflect the

current educational landscape. To address these concerns and contribute contemporary insights, this study was conducted with grade 9 learners, aiming to provide updated perspectives on homeschooling from a general learner's standpoint.

Barwegen *et al.* (2004) conducted a study in the high school context, comparing academic achievement between home-schooled and conventionally schooled learners, focusing on parental involvement perceptions. Their research, utilizing a cross-sectional descriptive design, found no significant differences in ACT college admission test scores between home-schooled and conventionally schooled learners. While their findings highlighted the importance of homeschooling, especially in the face of rising discipline issues and education costs in Kenyan high schools, the cross-sectional descriptive design might not have been the most suitable approach for comparing learning outcomes between the two groups. To address this limitation, this study employed a causal-comparative design, recognizing that random assignment was unnecessary as the two groups were already established.

Ray (2010) conducted a comprehensive review of research focusing on the transition of homeschoolers to college, specifically examining math, language, reading, social studies, and science. Using a cross-sectional descriptive design within a K-12 context, Ray (2010) revealed higher scores for home-schooled learners in math (effect size 0.85), language (effect size 0.85), social studies (effect size 0.81), reading (effect size 0.79), and science (effect size 0.77). These findings provided valuable insights into the specific subjects compared and the effect sizes of their comparisons. It is crucial to note that different subjects involve distinct approaches, materials, and commitments. However, given the evolving educational landscape, the findings of

2010 may not necessarily hold true in contemporary settings. This study sought to replicate Ray's (2010) findings by examining specific subjects such as math, English, and social studies within the context of today's educational environment.

In their study involving learners aged 5-10, Martin-Chang et al. (2011) employed a cross-sectional, explanatory, matched-pair design with controlled background variables to examine the impact of homeschooling on academic achievement from a comparative perspective. Their findings revealed that structured homeschooling learners scored higher in letter-word, word attack, comprehension, humanities, and science (effect size 0.06), as well as calculation (effect size 0.15), in comparison to conventionally schooled learners. Notably, these results highlighted the importance of structured homeschooling, emphasizing the significance of well-organized educational approaches. The fear among governments in developing countries, including the potential lack of structure in homeschooling, could be a reason why homeschooling legalization is met with apprehension. To address this concern, this study utilized the ACE curriculum and implemented structured homeschooling practices.

In a study conducted in the kindergarten context, Aram *et al.*, (2016) utilized a cross-sectional, explanatory design to compare early literacy, writing mediation, and mothers' beliefs between learners in homeschools and learners in conventional schools. Their findings indicated that home-schooled kindergarten learners exhibited equal or lower literacy skills than their conventionally schooled counterparts. Although Aram *et al.* (2016) highlighted the potential of homeschooling in fostering academic excellence, their study did not specify whether kindergarten learners were matched by

age, sex, and other relevant variables. Furthermore, the cross-sectional explanatory design employed in their study might not have provided a comprehensive comparison of learning outputs in the two groups. To address these limitations, the current study ensured learners were matched by grade level and curriculum, utilizing a causal-comparative design to enhance the validity of the findings.

In a study focused on the African American context in the US, Ray (2015) investigated the motivations for homeschooling among parents and the resulting academic achievement of home-schooled black learners. Ray's study, which involved learners in grades 4-8 and utilized the cross-sectional explanatory design, revealed that black home-schooled learners outperformed conventionally schooled black learners in language, reading, and math, with effect sizes of 0.65, 1.13, and 0.60, respectively. This finding is significant as it challenges the misconception that homeschooling is limited to certain racial groups, demonstrating that black learners can excel through homeschooling. To explore the applicability of these findings in an African context, this study attempted to replicate similar outcomes.

In a study conducted within the context of North Carolina schools, Boulter (2017) compared academic achievement between homeschool learners and those in public schools using the Woodcock-Johnson III (WJ III) tests. The study did not identify any significant differences in overall academic scores between conventionally schooled and home-schooled learners. Boulter's findings challenged the prevailing notion that homeschooling inherently leads to superior academic excellence, emphasizing the importance of the structure of homeschooling programs. However, it is crucial to note that the Woodcock-Johnson III test has limitations, such as the need for a computer to

score the test, which may affect the accuracy of results. To address these limitations, this study utilized exact scores obtained from learners' progress records at the ACE center over one term, providing a more direct and comprehensive assessment of academic performance.

Ray's (2017) review of empirical research conducted in the US context revealed mixed findings regarding homeschooling and its impact on academic achievement. While some studies indicated positive effects, with home-schooled learners achieving higher scores compared to their counterparts, other studies reported negative or inconclusive results. This variability highlighted the ongoing debate surrounding homeschooling and its influence on academic learning outcomes. To contribute further to this discourse, the current study focused on the Kenyan context, comparing the learning outputs of home-schooled and conventionally schooled learners following the ACE curriculum. By exploring this topic within a different cultural and educational setting, the study aimed to provide valuable insights into the relationship between homeschooling and academic achievement.

#### **2.4.2 Social learning outputs in the home-schooled and conventional school setting**

Critics of homeschooling often center their arguments on the issue of socialization (Cheng, 2014). Addressing this concern, Rahma *et al.* (2018) conducted an empirical review comparing social learning outcomes between home-schooled and conventionally schooled learners. Their qualitative study focused on homeschooling learners aged 6-12, examining their social-emotional development. Despite some limitations, such as limited opportunities for natural local interactions, the findings

indicated that homeschooling learners developed well in social aspects such as play, communication, and empathy. This research provided valuable insights into the social learning outcomes of homeschooling, shedding light on the social development of home-schooled children.

Indeed, the finding highlighting the positive social aspects of homeschooling is a significant advantage. Homeschooling fosters the development of crucial social skills such as communication, confidence, sharing, and empathy through play and role-playing activities within the home environment. However, relying solely on qualitative research methods has limitations. Qualitative research, being open-ended, allows participants to influence the data collected, making it challenging to verify the results objectively against specific scenarios. To address these limitations, this study employed a causal-comparative approach and supplemented it with interviews conducted with ACE administrators. This combination of qualitative and quantitative methods provided a more comprehensive understanding of social and emotional development outcomes in home-schooled learners.

Abuzandah (2020) conducted a study to investigate the social skills of homeschooling learners using a multiple case approach involving 12 participants. Through semi-structured interviews, Abuzandah (2020) found that while homeschooling learners acquired important morals and values essential to socialization, exposure to physical interaction with peers, as experienced in conventional school settings, was necessary for their cognitive growth. These findings reignite the ongoing debate concerning the social aspects of homeschooling. Controversies surrounding homeschooling have often centered on the social development of learners educated at home. Scholars like

Pepler and Bierman (2018) argue that peer interactions provide a unique context through which learners acquire a broad range of essential social and emotional skills such as cooperation, empathy, and problem-solving.

However, the limited sample size of 12 participants in Abuzandah's (2020) study raises concerns about the generalizability of the findings to broader contexts. Additionally, the use of unstructured interviews may have elicited subjective responses. To address these limitations, the present study employed a larger sample of 100 grade 9 learners, aiming to provide a more comprehensive understanding. Adopting a causal-comparative approach allowed for a systematic comparison of existing groups, enhancing the robustness of the study's findings.

Pearlman-Avni and Grayevsky (2019) conducted a comprehensive analysis of homeschooling in the Israeli context, focusing on civics and socialization. Their study aimed to compare home-schooled youth with their peers from conventional schools in terms of social self-efficacy and civic engagement. Utilizing a combination of quantitative and qualitative methods, the research revealed no significant differences between home-schooled youth and conventionally schooled youth in terms of social self-efficacy and civic engagement. However, an interesting finding emerged: social self-efficacy among home-schooled youth decreased with the number of years of homeschooling, indicating a negative aspect associated with prolonged homeschooling experiences.

Indeed, self-efficacy, a crucial factor in learners' development, reflects their ability to complete tasks and form interpersonal relationships. Parent-child interaction has been established as influential in child self-efficacy (Gardner, 2011). While Pearlman-

Avnion and Grayevsky's (2019) study showed similar social self-efficacy and civic engagement development among home-schooled and conventionally schooled youth, it's important to note that results from the Israeli context may not directly apply to Kenya. Moreover, findings among youth may not align with those observed in learners. Pearlman-Avnion and Grayevsky's (2019) study lacked explicit details on the comparison design, hindering replication in different contexts. Therefore, this study adopted a clear causal-comparative approach, specifying the grade of learners, to facilitate replication by other scholars. Additionally, this research focused on the ACE curriculum context in Kenya, examining social learning outputs of home-schooled and conventionally schooled learners to assess the impact of curricula and contexts on social development.

Murphy's (2014) comprehensive review of homeschooling outcomes in the US context focused on social aspects, including homeschooling's influence on military success and community participation. The review revealed that homeschoolers, in comparison to conventionally schooled graduates, exhibited higher attrition rates and were more likely to join the military on a waiver. Interestingly, homeschoolers were considered high quality upon exiting the military. Moreover, homeschoolers were actively engaged in community service, had a strong sense of belonging to organizations, and actively participated in voting within the community. These findings suggest that homeschooling imparts certain social values, although not in a comprehensive manner.

Murphy's (2014) findings regarding homeschooling's positive impact on social values have sparked a growing discussion on homeschooling's role in shaping social

outcomes. However, Murphy's study was conducted in the well-developed US context, where homeschooling benefits from advanced digital technology. To ascertain the applicability of these findings, this study explores the Kenyan context, a developing country with unique challenges and opportunities. Additionally, Murphy focused on graduates, whose social development might differ from that of younger learners. This study investigates learners between 3 and 13 years within the ACE context, allowing for a comprehensive comparison of social learning outputs between homeschoolers and conventionally schooled learners in contemporary times in a developing nation.

Burton and Stater's (2019) insights highlight the social engagement of home-schooled learners, emphasizing a study conducted in the US on 70 homeschoolers. While their contribution sheds light on homeschooling and social learning outcomes, it's crucial to note that drawing conclusions based solely on developed nations might not necessarily apply to developing countries. As such, this study aims to investigate social learning outputs of homeschoolers within the specific context of Kenya, providing valuable insights into the social engagement of home-schooled learners in a developing nation.

Burton and Stater's (2019) insights shed light on the increasing popularity of homeschooling, yet their focus on a specific sample of homeschoolers might lead to internal validity concerns like statistical regression. Additionally, findings from the US context may not directly translate to the Kenyan context. To address these gaps, this study employs a broader sample encompassing both homeschoolers and conventionally schooled learners within the Kenyan context, ensuring a more

comprehensive understanding of social learning outputs in diverse educational settings.

Medlin (2006) and McKinley *et al.* (2007) provided valuable insights into social skills development among home-schooled learners. Medlin's study, although limited by its sample size and design, highlighted higher social values in cooperation, assertiveness, empathy, and self-control among home-schooled learners. McKinley *et al.* (2007) found similar social skill development across homeschoolers, private-schooled, and public-schooled learners, suggesting comparable outcomes in cooperation, self-control, and conflict resolution.

Drenovsky and Cohen (2012) explored college adjustment for home-schooled learners, revealing lower depression, higher GPA, and better college experiences among home-schooled students. While their study contributed to understanding homeschooling's impact on higher education, it lacked an elementary school context. This study aimed to replicate their findings within the ACE curriculum and elementary school settings.

Green-Hennessy (2014) focused on religious affiliation and substance abuse, indicating that home-schooled adolescents displayed stronger religious ties and lower substance abuse. This narrow focus called for a broader comparison of academic and social learning outputs within a Christian context, which this study addressed.

Vaughn *et al.* (2015) delved into substance abuse tendencies, reporting home-schooled adolescents' disapproval of peers' drinking and reduced likelihood of alcohol and drug use. Their longitudinal study, spanning over a decade, prompted the need for

real-time comparisons. This study employed a cross-sectional approach to provide current insights into social learning outputs related to substance abuse.

Montes (2015) explored social competencies, problem behavior, and argumentation skills, finding minimal differences between homeschoolers and conventionally schooled learners. However, the lack of conclusive evidence and the differences in the US homeschooling system necessitated a comparable study within the ACE curriculum in Kenya.

Thomson and Jang (2016) investigated underage drinking, revealing that homeschoolers were less likely to engage in alcohol consumption than private and public-school learners. Despite their valuable findings, the methodology raised concerns. This study employed a drop-and-pick questionnaire to minimize biases associated with telephone surveys, ensuring more accurate data collection.

Guterman and Neuman (2017) explored emotional and behavioral problems, demonstrating lower depression and fewer externalizing problems among home-schooled learners. However, their study lacked a comprehensive comparison of academic and social learning outputs. This study aimed to address this gap by evaluating both aspects in home-schooled and conventionally schooled learners within the ACE curriculum in Kenya.

## **2.5 Knowledge gap**

Not so much research has been conducted in the field of homeschooling in Kenya or East Africa in general. This is so because a small population is engaged in homeschooling, attracting no attention. According to Ray (2010), a lot of research has

been done in homeschooling in many countries worldwide. However, most of these researches have failed to examine homeschooling from an African perspective in their studies. Consequently, the homeschooling concept is still unexplored in the African context (Olatunji, 2014). Yet homeschooling is gaining ground in nations worldwide, with the US at the forefront of all other nations engaged in homeschooling.

According to research conducted by Pestalozzi, Trust (1998) in South Africa, homeschooling on the African continent has not taken root. Homeschooling as a contemporary practice has yet to be accepted in most African communities as an alternative form to education. However, several families were drawn from South Africa practice homeschooling mainly because of apartheid. In Uganda, Kenya, and Botswana, apart from a relatively small number of families in the Republic of South Africa and even much smaller families in Botswana, Kenya, and Uganda, a small number of families have opted to homeschool their learners. Nevertheless, the concept of homeschooling is still in its nascent stages in these countries. Scholars argue that research on homeschooling is not keeping pace with the increasing popularity of the concept (Olatunji, 2014).

This being the fact, it has also been noted that the practice is growing and the number of families interested in homeschooling are increasing. Arora (2006) notes that despite the very little research on homeschooling, the homeschooling concept is gaining momentum worldwide. In Kenya, the only reliable data available on homeschooling is from the Accelerated Christian Education of Kenya, which shows some 163 families have chosen to home-school their learners. However, other families home school but have not been registered. The rest of the other organizations that report

facilitating homeschooling do not have clear data, or if they do, they are unwilling to share it. In this study, homeschooling as an alternative form of schooling is explored, as parents seek to find alternatives occasioned by the various concerns raised by mainstream schooling. The other issue is pace; homeschooling growth is proving a bit faster than research in this area. Green and Hooer-Dempsey, (2007); McRaynolds, (2007) reckons that in spite of the growing popularity of homeschooling worldwide, scholars are yet to conduct enough research on the viability of the homeschooling concept as an alternative form of education. Moreover, the motivations for parents to opt for homeschooling have not been exhaustively explored. This study adds this much-needed knowledge.

This study attempts to look at homeschooling since it is one area that has not attracted many educational researchers. According to Nemer (2002), homeschooling as an alternative education is growing exponentially both in diversity and number. However, research on homeschooling as an alternative education form is scarce. Perhaps it is high time to broaden the boundaries of the discourse around conventional public schools and private schools to subsume home schools. This way, families will have a broader latitude of learning opportunities to choose. Moreover, by expanding the concept of homeschooling, the education target for all will be easily achievable.

As noted in Ray (2010) and Olatunji (2014), homeschooling in Africa is an area where little research has been done. Most of the research studies have been conducted about the parental perception of homeschooling have been carried out in America, Europe, and to a smaller extent Asia. For example, studies conducted by; Delaney (2014), Knowles (1987), Babbit (1991); Maness (1988), Pike (1992), and Watters

(2015), focused mainly on parental perceptions, particularly on the school environment. The only issue of contrast with these studies is that they were carried out in predominantly white communities, consequently making the samples predominantly white. However, study was conducted in Kenya and in Nairobi specifically. Consequently, it captured a predominantly African population of various economic statuses.

Spiegler (2010) used a meta-analysis of studies focusing on homeschooling to understand more about homeschooling. The rationale of the analysis was to assess the role that the methodologies used in the previous studies played in the findings associated with homeschooling. Among the findings made by Spiegler (2010) was that; the concept of homeschooling can be misconstrued based on the methodology employed. Some methods were not comprehensive enough to derive findings that meet the required external validity. The implication is that it is only after a broader lens is used that it will be possible to assess the extent to which homeschooling parents are different from parents whose learners attend conventional schools and the motives behind parents choice on homeschooling.

This study also tries to widen the international scope of home school research and provide data not captured elsewhere. Therefore, the homeschooling research needs to be beefed up with new approaches that can meet the requirements of validity and dispel the confusion surrounding homeschooling which is compounded by a lack of clear motivation among parents advocating for homeschooling (Spiegles 2010). Such a move would resonate well with Rotherwel's (2003) views which argued that the

diversity among homeschoolers, coupled with the dynamism in parents' motivations to homeschool their learners, justify the need for more research on homeschooling.

Regarding academic achievement, a lot of research has been done especially in the United States and the UK. However, many of these studies have, been funded by groups that advocate for homeschooling, are involved in homeschooling activism, or have been done by those who home school (Kunzman and Gaither, 2013; Ray, 2010). Kunzman and Gaither (2013) observed that, in most of the studies, these data were self-reported scores derived from tests administered by parents at home. Under such findings, it was necessary to interrogate the question of homeschooling further since most of the findings have shown that the home-schooled learners score better or just as well as those who attend schools, yet with self-reported scores used in comparisons, such findings require corroboration.

In retrospect, several knowledge gaps were identified through the empirical review. The first knowledge gap relates to Limited Scope of Previous Studies. Many existing studies on homeschooling have tended to focus on specific aspects of education, such as academic achievements (Smith, J. *et. al.*, 2018), social skills (Brown & Johnson, 2019), or substance abuse among home-schooled learners. While these studies have provided valuable insights into individual facets of homeschooling, there is a notable gap in the literature: a lack of comprehensive research that integrates both academic and social learning outcomes. A holistic study that considers the multifaceted nature of education was crucial to gaining a comprehensive understanding of the homeschooling phenomenon. Such research can inform educators, policymakers, and

parents about the holistic development of home-schooled learners, leading to a more nuanced understanding of homeschooling's impact on society.

Another emerging gap was Contextual Differences. A significant limitation of many prior homeschooling studies is their geographical focus on developed countries, particularly the United States. This narrow geographic scope do not accurately represent the diverse educational and social contexts found in developing nations like Kenya. Investigating homeschooling within the specific cultural, societal, and educational landscape of Kenya was crucial for drawing relevant conclusions that could be applied to the local setting. By acknowledging the cultural and societal differences, conclusions drawn would be more relevant to the specific needs and challenges faced by Kenyan homeschooling families. This, in turn, can inform policies and practices that support homeschooling within the country.

A notable gap in the existing research is the lack of focus on specific homeschooling curricula, particularly the Accelerated Christian Education (ACE) program. This curriculum is distinct and may have unique effects on both academic and social learning outcomes when compared to other homeschooling methods. Existing studies often do not delve into the specifics of this curriculum, making it essential to evaluate the performance of learners enrolled in the ACE program to understand its impact comprehensively. Evaluating homeschooling outcomes within the context of the ACE program addresses the gap in understanding how this specific curriculum influences both academic achievements and social learning outcomes. This knowledge can inform educational policies and practices, benefiting both homeschooling families and educational institutions.

A significant knowledge gap lies in understanding the level of parental involvement in homeschooling, especially within the context of the ACE program. Investigating the diverse teaching strategies employed by parents as educators and the impact of personalized teaching methods on learning outcomes was crucial for a comprehensive comparison between homeschooling and conventional schooling. Exploring the intricate relationship between parental involvement, teaching strategies, and learning outcomes within the ACE program addresses the gap in understanding the multifaceted dynamics of homeschooling. By conducting in-depth studies that scrutinize these aspects, researchers can provide valuable insights into the effectiveness of homeschooling, informing both parental practices and educational policies.

A notable knowledge gap exists in comprehensively understanding the role of support systems, including homeschooling networks, parental communities, and educational resources, in enhancing both academic and social learning outcomes among home-schooled learners. Investigating how these support structures contribute to the overall development of home-schooled learners was crucial for a holistic comparison between homeschooling and conventional schooling. This comprehensive understanding is essential for informing policies and practices related to homeschooling support structures.

An essential knowledge gap exists in the in-depth exploration of social interactions, peer relationships, and the development of social skills within the homeschooling environment, specifically focusing on home-schooled learners enrolled in the Accelerated Christian Education (ACE) program. While previous studies have

touched upon socialization among home-schooled learners, there is a need for more detailed investigations into how home-schooled learners engage with peers and the broader community. Understanding the nuances of social interactions in homeschooling settings is critical for a comprehensive analysis of both academic and social learning outcomes. These insights contribute to a comprehensive understanding of the social skill development of home-schooled children, offering valuable implications for both homeschooling practices and educational policies.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses the research methodology that was used in the attempt to achieve the objectives set for the study. In retrospect, the chapter reports on the research design employed in the study, the population targeted and the subsequent study population used, sample size, sampling techniques, data collection instruments, validity and reliability of the instruments, data collection procedure, and data analysis procedures, and ethical considerations.

#### **3.2 Research Design**

The research methodology employed in this study is the causal-comparative research design, also referred to as Ex Post Facto, which is a quantitative approach rooted in positivist research assumptions. Positivism adheres to the hypothetico-deductive model, emphasizing experimental validation through the operationalization of variables and measures, followed by the verification of a priori hypotheses (Park *et. al.*, 2020). Consequently, hypothesis testing results play a pivotal role in advancing scientific knowledge. Studies grounded in positivism aim to discern causal relationships and explanatory associations utilizing quantitative methods like Ex Post Facto.

Positivism focuses on analyzing preceding actions and conditions (Creswell, 2014). In this context, the adoption of the causal-comparative design is particularly pertinent, as it enables the exploration of causal relationships and explanatory associations within

the specific research framework, providing valuable insights into the comparative analysis of academic and social learning outcomes among home-schooled and conventionally schooled learners enrolled in the Accelerated Christian Education program in Kenya.

The causal-comparative design was selected for this study due to the presence of pre-existing groups, obviating the need to create them artificially. Causal-comparative designs address the question of whether and to what extent groups differ on a specific variable, the dependent variable or measure (Brock, 2012). Given the study's objective to examine differences in learning outputs between pre-existing groups, this design was highly appropriate and relevant to the research inquiry.

### **3.3 Study Area**

This study was conducted in Nairobi County, specifically in ACEK centers and conventional ACE schools. The choice of Nairobi County was influenced by its high concentration of ACE centers and homeschoolers. Nairobi serves as a hub for homeschooling services, with most homeschooling providers located there (Abuyeka, 2023). The ACEK centers were selected because parents of homeschoolers typically submit their learners' records to these centers, making it convenient for access. Conventional ACE schools were chosen to engage learners who pursue the ACE curriculum through formal schooling.

The Accelerated Christian Education Kenya (ACEK) offers an internationally recognized Christian education certificate exam. The ACE curriculum in Kenya comprises four levels: general, intermediate, advanced, and advanced higher/honors. Each level corresponds to a certificate: ICCE certificate general, ICCE certificate

intermediate, ICCE certificate advanced, and ICCE certificate advanced higher/honors (ACE, 2017). The curriculum covers a wide range of subjects, including world view, biographical studies, biblical studies, mathematics, social sciences, languages, natural sciences, technology, physical education, health sciences, creative arts, performance arts, applied studies, service options, vocational/elective options, and self/leadership development options.

In homeschooling under the ACE curriculum, learners are provided with a document called a PACE, which contains the content they are expected to cover. Under the guidance of an instructor, either a parent or a tutor, the child progresses through the activities in the PACE. At the end of each activity, the child completes a task independently. These activities often incorporate Christian messages. Continuous assessments are conducted, contributing to the final grade. Periodically, learners take PACE tests, which are sent to South Africa for grading. Upon completing each level, learners receive a certificate. The International Certificate of Christian Education obtained upon graduation is recognized globally and allows learners to pursue higher education or employment (ACE, 2017).

The pace of learning is tailored to each child's abilities. Gifted children can progress quickly, while those facing challenges can proceed at their own pace. In this system, learners complete tests individually and often mark their own work, fostering honesty and independence. In Kenya, parents typically purchase the PACEs at a fee. However, mission schools provide subsidized or recycled PACEs for learners from low-income families. The ACEK also offers science kits for homeschooling parents to rent or purchase, enabling learners to conduct practical experiments. Graduates of this curriculum are eligible for admission to various courses in Kenya at all levels, and the

ACE certificate is universally recognized. The ACE curriculum's flexibility, including its acceleration options, attracts individuals from diverse backgrounds, despite its Christian orientation.

### **3.4 Target Population**

The study targeted all the grade nine learners enrolled in the Accelerated Christian Education (ACE) programme, allowing the findings to be extrapolated to both home-schooled and conventionally schooled learners following the ACE curriculum and their parents. In compliance with the ethical considerations regarding informed consent for individuals under the age of 18 (Posada, 2004), parents served as the study units for the social learning outcomes questionnaire.

The selection of parents as respondents was grounded in the pursuit of a homogeneous group for comparison. Notably, parents' perceptions were utilized to compare the social learning outcomes of home-schooled and conventionally schooled learners, as teachers were considered less ideal due to the heterogeneous nature of homeschoolers, who may receive instruction from parents or tutors. Statistical data from the second term of the year 2018 indicated a total of 1,788 learners enrolled in the Accelerated Christian Education Programme in Kenya. Within this population, 1514 learners were enrolled in conventional ACE schools, while 274 were engaged in ACE homeschooling. From this, grade 9 learners in conventional school were 75 and those from home-school were 42 as detailed in Table 3.1.

**Table 3.1 Target Population**

<b>Category</b>	<b>Population</b>	<b>Sample</b>
<b>1. Conventional Schooling</b>		
Conventional school learners in grade nine (9)	75	63
Conventional school parents for learners in grade 9	75	63
<b>2. Home Schools</b>		
Home school learners in grade 9	42	37
Home school parents for learners in grade 9	42	37

Source: Researcher, 2023

### **3.5 Sample Size and Sampling Procedure**

#### **3.5.1 Sampling Technique**

To ensure consistency in grade level and academic ability among the participants, this study specifically focused on learners in grade 9 who were studying the same PACEs in three subjects. The rationale behind this decision was to limit the study population to learners sharing comparable grade and ability levels. The choice of grade 9 learners was strategic due to the substantial presence of homeschooling learners within this grade, enabling the study to conduct valid and reliable comparisons.

The study employed a two-stage cluster random sampling method to select the required samples for both the home-schooled and conventionally schooled learners. This sampling approach was chosen based on the existence of pre-existing groups within the homeschooling and conventional schooling contexts. Levy and Lemeshow (2008) affirm that when samples are drawn from pre-existing groups, the two-stage cluster random sampling method is appropriate. It permits the selection of groups in the first stage, followed by the random selection of individuals within those groups in the second stage.

A sample of grade 9 learners was selected from attendees at the ACE annual convention, where all learners following the ACE curriculum and their parents gather. This convention spans one week and offers participants diverse ACE-related activities. The convention was chosen as an opportune occasion for sampling due to its unique gathering of both sets of learners and their parents. A total of 63 grade 9 learners from conventional ACE schools and 37 grade 9 home-schooled learners were randomly sampled using the simple random sampling technique.

In the process of selecting participants, a list of all grade 9 learners from conventional ACE schools and home-schooled learners was compiled. Using a random number generator, 63 learners were randomly chosen from the list of conventional ACE school attendees. Similarly, 37 grade 9 homeschooling learners were randomly selected from the list of homeschoolers. This ensured a fair and unbiased representation of learners from both conventional ACE schools and homeschooling environments. Parents of the selected learners constituted the parental study group.

### **3.5.2 Sample size**

Statistics returns for term one in 2018 revealed that grade 9 learners in conventional ACE schools were 75 while those in homeschools were 42. Using the sample size formula previously used by Singh and Masuku (2014), the sample size for each category of learners was determined. Therefore, the adjusted sample sizes (SS') were calculated using the given formula:

$$SS' = \frac{SS}{1 + \left(\frac{SS - 1}{Pop}\right)}$$

Where:

$SS$  = Sample size given by:

$$SS = \frac{Z^2 \times p(1 - p)}{C^2}$$

Where:

$Z$  =  $Z$  value for the desired confidence level (1.96 for a 95% confidence level)

$p$  = Estimated proportion of the population (0.5 for maximum variability)

$C$  = Confidence level (0.05 for a 5% level of significance)

Pop = Population (117 in this case)

$$\therefore SS = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.05^2}$$

$$\therefore SS = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.05^2}$$

$$= 386.16$$

$$\cong 385$$

The calculated sample size of 385, using a 95% confidence level ( $Z = 1.96$ ), an estimated population proportion of 0.5 (representing maximum variability), and a 5% level of significance ( $C = 0.05$ ), ensured that the results obtained from the samples accurately reflected the characteristics of the entire groups of grade 9 learners.

Additionally, considering the population correction factor in the sample size formula:

$$SS' = \frac{SS}{1 + \left(\frac{SS - 1}{Pop}\right)}$$

$$SS' = \frac{385}{1 + \left(\frac{385 - 1}{75}\right)}$$

$$= 62.908$$

≅ 63

Using similar calculations, the sample size for home-schooled learners was found to be 37, as shown below:

$$SS' = \frac{385}{1 + \left(\frac{385-1}{42}\right)}$$

$$= 36.957$$

$$\cong 37$$

### **3.6 Data Collection Instruments**

Three instruments were developed and used to collect data. They included a parent's questionnaire, a document analysis checklist, and an interview schedule for ACEK administrators.

#### **3.6.1 Parents questionnaire**

In this study, data on grade 9 learners' social learning outputs were collected through a structured questionnaire administered to parents (Appendix I). The questionnaire, adapted from Child Trend (2014) and tailored to the Kenyan context, focused on assessing self-control, persistence, and social competence among learners. To ensure suitability for participants of all ages, the questionnaire was chosen for its concise format.

The questionnaire comprised three sections. Section A gathered information on parental characteristics, which was crucial for controlling potential parental influence

on schooling mode and learning outcomes. Section B explored parents' perceptions of learners' social outputs, containing 12 items measuring persistence, self-control, and social competencies. Section C examined parents' perspectives on government policies and regulations related to homeschooling and their impact.

The questionnaire was self-administered, and parents were asked to complete it during the annual convention. Two research assistants were assigned to assist with distributing and collecting the questionnaires. Prior to their involvement, these assistants were briefed on the study's requirements and ethical principles to ensure standardized administration.

### **3.6.2 Document analysis checklist**

In this study, a document analysis checklist (mark sheet) was created to gather secondary data. The checklist served as a structured tool, outlining specific criteria and parameters for evaluating documents related to the study. This methodical approach allowed the researchers to scrutinize mark sheets of grade 9 learners under the ACE curriculum in a comprehensive and organized manner (Appendix II). The mark sheets facilitated the collection of academic learning outcomes, ensuring that relevant data points were captured systematically and accurately.

The researcher and two assistants visited the ACEK center, where academic learning outcome records of grade 9 learners under the ACE curriculum were collected. Specifically, the mark sheet captured records on learning outputs in math, English, and social studies from the last three consecutive PACEs per subject.

### **3.6.3 Interview Schedule**

The study utilized an interview schedule (Appendix III) to supplement the questionnaire responses and gather insights from ACE program experts regarding homeschoolers' abilities. Interviews were conducted with seven administration staff members of the ACE center. Following Boyd's (2001) suggestion, involving two to ten participants ensures reaching data saturation. Creswell (1998) also recommends a similar number, allowing for methodological triangulation and comprehensive data analysis.

### **3.7 Pilot Study**

Piloting the questionnaire was crucial to ensure its effectiveness and reliability before administering it to the actual study participants. By piloting the questionnaire among parents of five conventional schools offering the ACE curriculum and five homeschooling parents who were not part of the study sample, potential issues related to the clarity, comprehensibility, and appropriateness of the questions could be identified and addressed.

During the piloting process, feedback from the participants helped in understanding if the questions were clear and if there were any ambiguities or language-related issues. This feedback was instrumental in making necessary modifications to ensure that the questionnaire was culturally sensitive, contextually relevant, and easy for the respondents to comprehend. Specifically, adjustments were made to align the questionnaire with the Kenyan school context, taking into account any unique aspects or terminologies related to the ACE curriculum in Kenya.

Piloting the questionnaire among a diverse group of parents ensured that the instrument was refined, enhancing its validity and reliability. As a result, the questionnaire became a more accurate tool for capturing the intended information from the study participants, ultimately contributing to the overall robustness of the research findings.

### **3.7.1 Validity**

Validity refers to the degree to which a study accurately measures or evaluates the concepts it claims to measure or evaluate (Bryman, 2016). In this study, validity was crucial in ensuring that the research instruments effectively captured the intended aspects of homeschooling and conventional schooling under the ACE curriculum. The purpose of validity is to establish the credibility and accuracy of the study's findings, ensuring that the conclusions drawn are based on reliable data (Bryman, 2016).

In this research, expert advice from supervisors was sought to assess face and content validity. Face validity pertains to the instrument's apparent relevance and appropriateness for measuring the intended concepts, as judged by experts or participants (Trochim, 2006). Content validity, on the other hand, ensures that the instrument comprehensively covers all aspects of the concepts under investigation (Bryman, 2016). By consulting supervisors, the study aimed to confirm that the questions posed in the instruments were both relevant and comprehensive, aligning with the research objectives.

To enhance validity, the study employed a large and diverse sample. Using a varied sample helps ensure that the findings are representative of the population under investigation, increasing the external validity of the study (Bryman, 2016).

Additionally, the study employed triangulation, incorporating multiple data collection methods such as document analysis, questionnaires, and interviews. Triangulation involves using multiple sources, methods, or investigators to corroborate findings, thereby enhancing the credibility and validity of the study (Denzin, 1978).

### **3.7.2 Reliability**

Reliability, in the context of research, refers to the consistency and stability of measurement results obtained from an instrument over time and across different situations (Bryman, 2016). It assesses the degree to which an instrument yields consistent and dependable measurements when used repeatedly under the same conditions (Carmines & Zeller, 1979). The purpose of establishing reliability is to ensure that the instrument used in a study produces consistent and accurate results, thereby enhancing the credibility and validity of the research findings (Bryman, 2016).

In this study, reliability was assessed using Cronbach's alpha coefficients, which measure the internal consistency of a set of items within a scale or instrument. A high Cronbach's alpha value (typically above 0.70) indicates that the items within a scale are highly correlated, suggesting strong internal reliability (Hair et al., 2014). The use of Cronbach's alpha coefficients in this study aimed to ensure that the questionnaire measuring social constructs in the context of the Kenyan ACE curriculum was reliable and consistently measured the intended constructs across respondents (Bryman, 2016).

To enhance reliability, the study employed several strategies. Firstly, an already developed questionnaire was used, which had been previously validated and tested for reliability in a different context, ensuring a solid foundation for the instrument (Bryman, 2016). Secondly, the questionnaire was modified to align with the specific

social constructs in the ACE curriculum, ensuring its relevance to the study context (Carmines & Zeller, 1979). Thirdly, the questionnaire underwent a rigorous piloting process among selected parents, allowing for the identification and elimination of

The Cronbach's alpha coefficients obtained from the piloting phase ( $\alpha=.807$  for persistence,  $\alpha=.920$  for self-control, and  $\alpha=.815$  for social competence) exceeded the recommended threshold of 0.70 (Hair *et al.*, 2014). These high alpha values indicated strong internal consistency and reliability of the questionnaire, ensuring that the instrument consistently measured the intended social constructs within the Kenyan ACE curriculum context. By employing these reliability-enhancing strategies, the study aimed to produce trustworthy and consistent results, contributing to the overall robustness of the research findings.

### **3.8 Ethical Considerations**

In this study, several aspects of research etiquette, including privacy, confidentiality, anonymity, and informed consent, were meticulously handled in adherence to ethical principles and guidelines. The research respected the privacy of the participants by not directly involving the learners under the age of eighteen. Their academic learning outputs were obtained from ACE records without directly engaging with them, thus safeguarding their privacy.

Participants were assured that their responses would be kept confidential. The researcher did not require respondents to reveal their identities for any reason, ensuring the confidentiality of their input. Moreover, participants were guaranteed anonymity, meaning their identities were not linked to their responses. This approach

fosters honest and open responses, as respondents feel secure in sharing their opinions without fear of retribution or judgment.

Before administering the questionnaire and conducting interviews, the purpose of the research was clearly explained to the participants. They were informed about the nature of the study, emphasizing the need for truthful and voluntary participation. Parents were selected as the study participants due to the ethical consideration that learners under the age of eighteen lack the capacity to give informed consent. By involving parents, the study ensured ethical research practices and protected the rights of underage learners.

The research acknowledged authors and respected copyright provisions, demonstrating ethical integrity by giving proper credit to previous works and intellectual contributions. Corrective measures were taken promptly to address any potential unethical issues that could have arisen during the research process. This proactive approach reflects the researcher's commitment to maintaining ethical standards. By upholding these principles, the study not only ensured the ethical integrity of the research process but also fostered a sense of trust and cooperation among the participants, contributing to the overall credibility and reliability of the study results.

### **3.9 Data Collection Procedure**

The researcher obtained an introductory letter from the Directorate of Postgraduate Studies of Masinde Muliro University of Science and Technology. This formal communication demonstrated the legitimacy and purpose of the research, adhering to ethical standards and academic protocols. Prior to the data collection process, the

researcher applied for and was granted a research permit from the National Commission for Science and Technology and Innovation (NACOSTI). This step demonstrated compliance with regulatory requirements, ensuring the ethical and legal conduct of the study. By adhering to these procedures, the research maintained ethical standards, transparency, and credibility throughout the data collection process, contributing to the overall integrity of the study

The data collection procedure was conducted with careful consideration of ethical guidelines and research protocols. The following steps were taken to ensure a systematic and ethical approach to data collection. The researcher informed and sought permission from the ACEK directors to conduct the study.

The researcher visited the ACEK center for familiarization, which involved understanding the context and seeking permission from ACEK center administrators to access and collect secondary data from academic outcome records. This visit established a professional relationship and ethical collaboration with the institution. During the visit, the researcher constituted a suitable sample from the center administrators for interviews. Careful selection of participant's ensured relevance and credibility of the data collected

Two research assistants were recruited to assist in dropping and collecting questionnaires from parents. The assistants were trained on the process of questionnaire administration and ethical considerations. Proper training ensures consistency and ethical conduct during data collection (Polit & Beck, 2017). Questionnaires gathering social learning outcomes were administered to parents during the annual conference, which brought together parents and learners pursuing

the ACE curriculum. This setting provided a conducive environment for data collection, allowing for the participation of a diverse group of respondents.

The data collected using each tool were meticulously documented. This documentation included the number of learners and parents contacted, ensuring transparency and traceability of the research process (Polit & Beck, 2017). In retrospect, 100 records relating to learners academic outcomes, 62 parents, and 7 ACE centers administrators were documented.

### **3.10 Data Analysis**

Collected data were coded and entered into SPSS version 23 for analysis. Independent samples t-test was the main statistic used to compare academic learning outputs. The use of an independent samples t-test in this study was justified based on the nature of the research design and the specific objectives of comparing academic learning outputs between home-schooled and conventionally schooled learners. The independent samples t-test is designed to compare the means of two independent groups. In this study, home-schooled learners and conventionally schooled learners represent distinct and independent groups (Pallant, 2016). Besides, the t-test is appropriate for continuous outcome variables, such as academic scores, which are typically measured on an interval scale. In this study, academic learning outputs, were measured on an interval scale involving only two comparison groups, warranting the use of the t-test (Field, 2013).

In the case of comparing social learning outputs, ordinal perceptions of parents on three social characteristics gathered using a parent's questionnaire were compared. Therefore, the non-parametric Mann-Whitney U test was used. Mann-Whitney U test,

is a non-parametric statistical test used to determine whether there is a difference between two independent groups concerning a continuous or ordinal dependent variable. Unlike the independent samples t-test, the Mann-Whitney U test does not assume normal distribution of the data. Instead, it compares the ranks of values within the two groups, making it suitable for non-normally distributed or ordinal data (Field, 2013).

In this study, the Mann-Whitney U test was appropriate for comparing ordinal perceptions of parents on three social characteristics gathered using a parent's questionnaire for the following reasons. The data collected from the parent's questionnaire represented ordinal perceptions, where parents ranked or rated social characteristics on an ordinal scale. Moreover, unlike parametric tests (such as t-tests), the Mann-Whitney U test does not assume normal distribution of the data. This is crucial when dealing with ordinal data, as these data often do not meet the normality assumption required for parametric tests. Before conducting an independent samples t-test, several assumptions were tested to ensure the validity of the results.

### **3.10.1 Testing Assumptions of Independent Samples t-Test**

#### **3.10.1.1 Normality**

The data in each group were expected to be approximately normally distributed. Therefore Skewness and Kurtosis outputs were used to examine normality in academic learning outputs. Values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George and

Mallery, 2010). Hair et al. (2010) and Bryne (2010) argued that data is considered to be normal if skewness is between - 2 to +2 and kurtosis is between - 7 to +7.

#### **3.10.1.2 Homogeneity of Variance**

The variances of the two groups being compared should be equal (homogeneity of variance or homoscedasticity). This assumption was tested using Levene's test. Levene's test is used to assess whether the variances of two or more groups are equal. In other words, it tests the null hypothesis that the variances are homogeneous across groups. For non-significant Levene's Test ( $p > 0.05$ ), there was no Violation of Homogeneity of Variance. Therefore, the equal variances assumed values were interpreted. Otherwise, the equal variances not assumed output was employed.

#### **3.10.1.3 Independence**

The observations in each group should be independent of each other. This assumption is typically assumed if the data is collected through a random sampling method. This was the case for the academic learning outputs.

#### **3.10.1.4 Scale of Measurement**

The dependent variable should be measured on an interval or ratio scale. t-tests are not suitable for categorical variables unless they have been recorded into numerical categories. In this case, the t-tests were conducted since academic learning outputs were measured on an interval scale.

### 3.10.1.5 3 Operationalization of Variables

The surveys for the parents were administered by the research assistants. They explained to the parents the purpose of the study noting that, due to learners' lack of informed consent to participate in the study, it was important for parents to comment on their learners' social learning outputs. They were also reminded of the need to answer them truthfully.

Table 3.2 depicts the study variables and their measurements. The independent variable in this study was mode of schooling measured using a nominal scale comprising home school and conventional school. Comparison was made across academic and social learning outputs that were dependent variables. Academic learning outputs were measured using a ratio scale that included average outputs in three consecutive PACEs in math, English, and social studies.

Three constructs were operationalized to measure learners' social learning outputs. These were persistence, self-control, and social competence. To measure social learning outputs, learners were therefore compared on the three constructs. Persistence was measured using three questionnaire items adopted from Child Trend (2014) and modified to suit this study. The items included persistence on tasks, persistence on activities, and persistence in focus. This scale was ordinal. Self-control was also measured using three questionnaire items hived from Child trend (2014). The scale was equally ordinal with the items focusing on ability to wait patiently, ability to remain still when asked to, and ability to wait for whatever is wanted. The third social learning construct, social competence was measured using an ordinal scale comprising six items adopted from Child trend (2014) and modified for the Kenyan

case. The six items focused on ability to work well with peers, capacity to resolve problems amicably, empathizing with others, cooperating with peers, understanding others feelings, and ability to help others cope.

**Table 3. 2: Operationalization of Variables**

Variable		Nature	Scale items	Measurement	Source
Mode of schooling - Home - Traditional		Independent	None	Nominal	
Academic learning outputs	Math	Dependent	Mean outcome in 3 consecutive PACEs	Interval	ACE progress records
	English	Dependent	Mean outcome in 3 consecutive PACEs	Interval	
	Social studies	Dependent	Mean outcome in 3 consecutive PACEs	Interval	
Social learning outputs	persistence	Dependent	1. Task persistence 2. Activity persistence 3. Focus maintenance	Ordinal	Child Trend (2014)
	Self-control	Dependent	1. Waiting patiently 2. Sitting still 3. Waiting to be given	Ordinal	Child Trend (2014)
	Self-competence	Dependent	1. Working well with others 2. Solving problems 3. Empathizing with others 4. Cooperating with peers 5. Understanding others feelings 6. Assisting others to cope	Ordinal	Child Trend (2014)

**Source: Researcher, (2023)**

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents the results derived from the survey designed to compare learning outputs of home and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya. Consequently, the chapter reports result on learners' and parents' background profiles, learners' learning outputs in math, English, and social studies, and learners' social learning outputs as perceived by parents. The study then tests the postulated hypotheses by comparing academic and social learning outputs between home-schooled and conventionally schooled learners.

Data were first diagnosed for response rate, missing values, and outliers; evidence shows that certain advanced statistics may not be computed when some data are missing (Ware *et. al.*, 2012). Meanwhile, it has been argued that it is nontrivial to estimate the parameters of statistical models consistently. This nontriviality justified the need to diagnose the existence of outliers (Hassan and Marimuthu, 2016). Data for comparing grade 9 home-schooled and conventionally schooled learners' learning outputs were collected from performance records kept at the ACE center. Meanwhile, data from parents of home and conventional schooling learners were collected through the parent's questionnaire. Out of the 100 learners sampled, records of academic outputs were drawn for 63 conventionally schooled learners and 37 for home schooled learners. Meanwhile, the expected number of parents was 100. A total of 62 parents participated by completing the questionnaire as expected. This number

amounted to a response rate of 62%. This response rate was suitable following recommendations by Materko *et. al.*, (2015).

## 4.2 Demographic Profiles of Respondents

Demographic characteristics were examined for each set of respondents for purposes of identifying factors that may inform differences among home-schooled and conventionally schooled learners pursuing the ACE system.

### 4.2.1 Learners' Demographic Profile

As discerned from the progress records, learners' demographic profiles included one continuous variable and one categorical variable. The child's age was continuous while gender was. From the continuous distributions, the average age of grade 9 learners was 13.9 years, with a standard deviation of 0.6. The categorical distribution indicates that boys (60.0%) were more than girls (40.0%) (Table 4.1).

**Table 4.1: Learners' Demographics Profile**

<b>Continuous variable</b>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Age of the grade 9 child	13	15	13.9	.6
<b>Categorical variable</b>			<b>n</b>	<b>%</b>
Gender of the child	Male		54	60.0
	Female		36	40.0

Source: Researcher, 2023

A cross-tabulation of the school mode against child gender (Table 4.2) confirmed that for every mode of education, the proportion of boys pursuing the ACE system was higher than that of girls. However, there was no significant association between school mode and gender,  $\chi^2(1)=1.134, p=.287, \chi^2$  where This implies that despite both

boys and girls embracing ACE through the two modes of education, boys are marginally more with the gap reducing markedly in the case of homeschooling.

**Table 4.2: Mode of school \* gender of the child Cross tabulation**

		gender of the child			
		Male	Female	Total	
Category of school	Traditional	n	36	20	56
		% within category of school	64.3%	35.7%	100.0%
	Home	n	18	16	34
		% within category of school	52.9%	47.1%	100.0%
Total		n	54	36	90
		% within category of school	60.0%	40.0%	100.0%
$\chi^2(1)$			1.134, $p=.287$		

Source: Researcher, 2023

#### 4.2.2 Parents Socio-demographic Profile

Three categories of parents' socio-demographic characteristics were discerned. The first category involved age which was continuous; next were the categorical variables, gender, qualifications, denomination, monthly income, and marital status. The third category was that of the string variable, occupation. It was essential to examine all these variables that could explain critical factors in the choice of mode of schooling.

From the age distribution (Table 4.3), parents' ages ranged between 29 and 64 years and averaged 43.0 years with a standard deviation of 9.0 years. The youngest parent was 29 years old, while the oldest was 64 years old. Meanwhile, the categorical distribution revealed the following information. The proportion of parents of home-schooled learners (51.6%) was slightly higher than that of parents of conventionally schooled learners (48.4%). The majority of the parents (69.4%) were feminine. Most

had first degrees (45.0%), although 21.7% had master’s degrees. Most parents (53.2%) had a monthly average income of Ksh100, 000 and above and were married (72.6%).

**Table 4.3: Parents’ Demographic Profile**

<b>Continuous variable</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>	
Age	29	64	42.98	8.017	
<b>Categorical variables</b>				<b>n</b>	<b>%</b>
Category of parent	Home schooled learners		32	51.6%	
	conventionally schooled learners		30	48.4%	
Gender	Male		19	30.6%	
	Female		43	69.4%	
Qualifications	Certificate		10	16.7%	
	Diploma		10	16.7%	
	Degree		27	45.0%	
	Masters		13	21.7%	
Monthly average income	10000-50000		9	14.5%	
	50000-100000		20	32.3%	
	100000 and above		33	53.2%	
Marital status	Married		45	72.6%	
	Single		17	27.4%	

Source: Researcher, 2023

These results confirm that conventional and home schools attracted both young and elderly parents. Women were more central to learners’ learning responsibilities as demonstrated by a female participation percentage of 69.4%. Indeed, recent research reports that whereas men engage in more leisure activities, women are more focused on household duties and child-rearing (Schoppe-Sullivan *et. al.*, 2017). The results further show that most parents were well-qualified education-wise and were well off economically.

Analysis of the parent’s occupations revealed that parents were drawn from diverse occupations. However, teaching (17.7%) and Law (14.5%) appeared to be the most common (Table 4.4).

**Table 4.4: Parents occupation**

<b>Occupation</b>	<b>Frequency</b>	<b>Percent</b>
Accountant	3	4.8
Advocate	1	1.6
Artist	1	1.6
Business	3	4.8
Cashier	1	1.6
Clinical officer	1	1.6
Doctor	5	8.1
Driver	1	1.6
Economics	1	1.6
Farmer	2	3.2
Journalist	2	3.2
Kenya navy	1	1.6
Lawyer	9	14.5
Lecturer	1	1.6
mechanical engineer	1	1.6
Military	1	1.6
Nursing	8	12.9
Pastor	1	1.6
Pharmacy	1	1.6
Pilot	1	1.6
public health officer	2	3.2
Shopkeeper	1	1.6
Surveyor	2	3.2
Teacher	12	19.3
<b>Total</b>	<b>62</b>	<b>100.0</b>

Source: Researcher, 2023

The significance of these results under the parents' occupation is that they were well informed of the various modes of education and were in an ideal position to identify the suitable mode for their learners. Moreover, they had the required knowledge and skills to guide homeschoolers in specific knowledge.

#### **4.3 To compare the learning outputs in Mathematics between home-schooled and conventional schooled learners under the ACE programme in Kenya**

This objective was analyzed both qualitatively and quantitatively. The qualitative analysis focused on themes emerging from interviews with ACE centre administrative personnel. The quantitative data analysis involved comparing the learners' scores in

Mathematics using the independent samples t-test. Consequently, the outcome variable was the score in Mathematics measured on an interval scale using the mean scores in 3 consecutive PACEs as indicated in ACE progress records. The comparison variable was the mode of schooling as represented either by conventional schooling or home-schooling. Prior to the analysis, data were first screened and cleaned for errors.

#### **4.3.1 Data Screening and Cleaning**

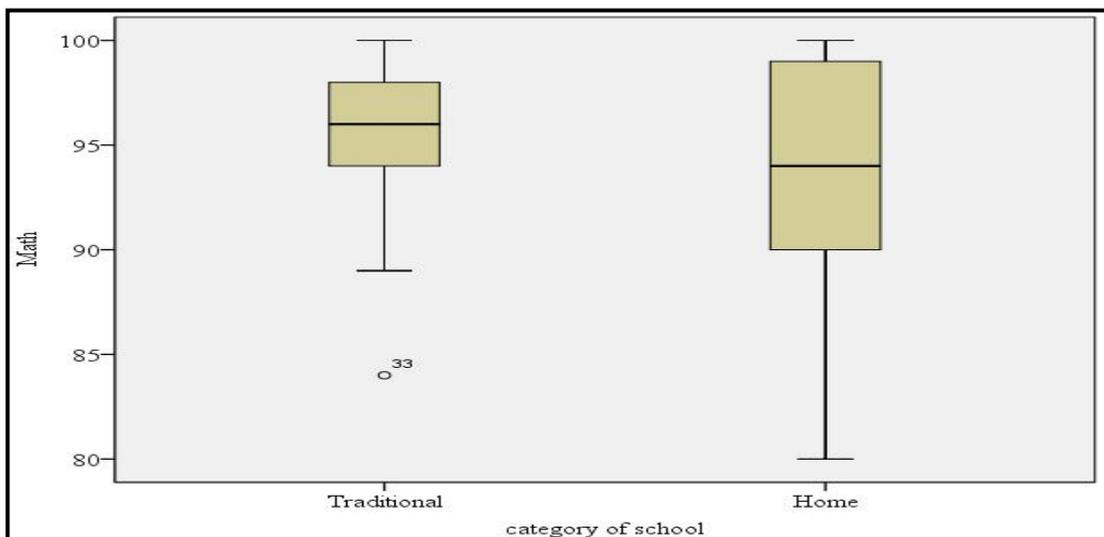
##### **4.3.1.1 Missing Values in the Scores of Mathematics**

The extent of data missing randomly in the two data sets categories was analyzed using the SPSS version 23 missing value analysis (MVA) command. According to Baraldi and Enders (2010), data can be missing due to factors such as non-response, the sensitive nature of data, or even due to fatigue. In such a scenario, multivariate analysis results may lack the needed accuracy. Missing value analysis was therefore conducted to delete cases with missing data in excess of 5%.

The missing value analysis results in the context of learners' math learning outputs indicated that there were three missing scores, however, the percentage of missing scores was below 5%. These missing scores were therefore replaced by employing the hot deck imputation. In this approach, the trend of values around the missing values was observed, and then missing values were replaced by that recurrent trend of values for the respective variable (Myers, 2011). According to Myers (2011), hot-deck imputation is an easy and effective tool for handling missing values.

#### 4.3.1.2 Testing for outliers in the learners scores in Mathematics

Outliers are extreme values found either on individual variables, in which case they are known as univariate outliers, or on two or more variables are known as multivariate outliers. Both univariate and multivariate outliers were therefore examined. Univariate outliers were assessed for each of the two data sets, starting with data for learners' academic learning outputs. The SPSS explore procedure was used to generate box plots from which outliers (o) and extreme outliers (\*) were detected. The generated box plot (Fig. 4.1) revealed only one outlier in case 33 of grade 9 learners in conventional schools. This case was followed up and corrected as recommended by Leys et al. (2019).



**Figure 2. Univariate outliers for the scores in mathematics**

Source: SPSS Outlier analysis

### 4.3.2 Univariate Statistics

Learners' math learning outputs were captured through grades acquired in the last grade in 2019. From the summary report presented in Table 4.5, the mean math learning outcome for conventionally schooled learners was 95.54, with a standard deviation of 3.967, based on a sample size of 63 learners. On the other hand, home-schooled learners exhibited a higher mean math learning outcome of 96.05, with a standard deviation of 3.570, from a sample size of 37 learners. The overall mean math learning outcome, combining both conventional and homeschooling methods, stood at 95.73, with a standard deviation of 3.814, derived from a total sample size of 100 learners.

These findings indicated a slight advantage for home-schooled learners in math achievement, as their average scores were higher than those of conventionally schooled learners. Moreover, the lower standard deviation in math scores among home-schooled learners suggested a more consistent performance, indicating less variability in math learning outputs among this group.

**Table 4.5: Learners' average scores in Mathematics**

<b>Mode of schooling</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Conventional	63	95.54	3.967
Home	37	96.05	3.570
<b>Total</b>	<b>100</b>	<b>95.73</b>	<b>3.814</b>

Source: Researcher, 2023

These results have important implications for education. The higher mean score among home-schooled learners highlights the potential advantages of homeschooling

in math education. However, it is crucial to consider various factors that could influence these outputs, including teaching methods, parental involvement, and individual learning styles.

#### **4.3.3 t-Test Diagnostics**

The focus of this objective was to compare home-schooled and conventionally schooled learners Math learning outputs. The independent samples t-test was preferred in testing the statistical significance of the differences in learning outputs between home-schooled and conventionally schooled learners. This t-test allowed the researcher to test whether the effect of mode of schooling on math learning outputs was significantly different in the two groups. Before running the test, the t-test assumptions were first assessed.

##### **4.3.3.1 Nature of data for math learning outputs**

The t-test requires the dependent variable to be interval level. The dependent variable, math learning outputs was found to be numerical, and satisfied the criteria of interval data as required by independent samples t-test.

##### **4.3.3.2 Testing for Normality**

The skewness and kurtosis values for the math learning outputs data were calculated to assess the normality of the distribution. The skewness was computed as -0.877 with a standard error of 0.241, indicating a slight leftward skew in the distribution (Table 4.6). The kurtosis was calculated as 1.271 with a standard error of 0.478, suggesting that the distribution had slightly heavier tails compared to a normal distribution.

These values fell within the acceptable range of -2 to +2, as per the criteria outlined by George and Mallery (2010), signifying that the data approximated a normal distribution reasonably well. Consequently, the t-test was deemed appropriate for analyzing this dataset.

**Table 4.6: Results of Normality check in the scores of Mathematics**

	<b>N Statistic</b>	<b>Skewness Statistic</b>	<b>Kurtosis Statistic</b>
Math learning outputs	100	-.877	1.271
Valid N (list wise)	100		

Source: Researcher, 2023

#### **4.3.3.3 Assumption of Homogeneity of Variances**

The t-test assumes that the variances of the two groups being compared are homogeneous. The homogeneity of variance, a crucial assumption for many statistical tests, including the t-test was examined using Levene's Test for Equality of Variances. For the math learning outputs data, the Levene's test yielded an F-statistic of 0.095 with a corresponding p-value of .758 (Table 4.7).

Therefore, it can be stated that Levene's test did not indicate a significant difference in variances between the groups ( $F(1, 98) = 0.095, p = .758$ ). This implies that the assumption of homogeneity of variances was met for the math learning outputs data. In other words, the variance of math scores was similar between the groups being compared, validating the homogeneity of variance assumption necessary for the t-test employed in the analysis. Consequently, the data satisfied the requirement for homogeneity of variances, ensuring the reliability of subsequent inferential statistical analyses.

**Table 4.7: The homogeneity of variance results for scores in Mathematics**

		Levene's Test for Equality of Variances	
		F	Sig.
Scores in Mathematics	Equal variances assumed	.095	.758

**Source: SPSS Levene's test analysis**

#### **4.3.4 Testing the Hypothesis**

**Hypothesis H<sub>01</sub>** posited that there is no statistically significant difference in the learning outputs in Mathematics between home-schooled and conventionally schooled learners.

The independent samples t-test was conducted to compare the means of math learning outputs between two groups, assuming equal variances. The results revealed a statistically non-significant difference in math scores between the groups ( $t(98) = -0.638$ ,  $p = .525$ ). The mean difference was  $-0.505$ , with a standard error of  $0.792$  (Table 4.8). The hypothesis was not supported.

Additionally, the t-test was performed without assuming equal variances, yielding a similar non-significant result ( $t(82.088) = -0.656$ ,  $p = .514$ ) with a mean difference of  $-0.505$  and a standard error of  $0.771$ .

Interpreting these findings, it can be concluded that there was a non-significant disparity in math learning outputs between the two groups, regardless of whether equal variances were assumed or not. The negative mean difference suggests that the home-schooled learners, on average, scored  $0.505$  points higher than their conventionally schooled counterparts in math. These results provide evidence of a

lack of substantial difference in math performance between the homeschooling and conventional schooling groups.

**Table 4.8: The Independent t-test results for the learners in Mathematics**

		<b>t-test for Equality of Means</b>				
		<b>t</b>	<b>df</b>	<b>Sig. (2- tailed)</b>	<b>Mean Difference</b>	<b>Std. Error Difference</b>
Scores in Mathematics	Equal variances assumed	-.638	98	.525	-.505	.792
	Equal variances not assumed	-.656	82.088	.514	-.505	.771

**Source: SPSS independent sample t-test analysis**

#### **4.3.5 Discussions**

These findings showing relatively no significant differences in math learning outputs reflect the findings of Boulter (2017), who, in comparing academic achievement in public and home school learners, determined that both sets of learners compared equally on average or above-average outputs in math. Similar views were shared by Rivero (2020) in arguing that Mathematics learning outputs depend on using the best books on the market regardless of whether they are being taught at home or not. The finding that homeschoolers reported Math learning outputs that were not different from those of learners in conventional schools was contradictory to Kunzman and Gaither (2013), who, through a systematic review, found evidence of a math gap. This contradiction can be explained by the growing interest in homeschooling and the growing technology that has probably led to increased access to interactive Math learning activities at home. Although this study saw no significant difference in Math

learning outputs among the two groups of learners, it has to be borne in mind that, like many studies that reported better Math scores among homeschoolers, this research failed to control important family demographics.

The findings indicating no significant differences in math learning outputs align with the research conducted by Boulter (2017), who discovered that both public and homeschool learners exhibited comparable, if not above-average, outputs in math. This is in line with the argument presented by Rivero (2020), emphasizing the importance of using high-quality educational resources, regardless of the learning environment. Rivero's perspective suggests that the choice of educational materials, rather than the schooling setting, significantly influences math learning outputs.

Additionally, the research of Smith and Sikkink (2016) provides valuable insights into math learning outcomes. Their longitudinal study indicated that home-schooled students consistently outperformed their public school counterparts in mathematics assessments. This disparity in math achievement might be attributed to the tailored, one-on-one attention homeschoolers often receive, allowing for personalized instruction and a deeper understanding of mathematical concepts. Similarly, the work of Taylor and Petrilli (2014) shed light on the impact of parental involvement on math achievement. Their findings underscored the positive correlation between parental engagement in math-related activities and the child's math performance. This highlights the pivotal role parents play in shaping their child's mathematical skills, a factor that could contribute to the comparable math outputs observed among home-schooled and conventionally schooled learners in this study.

Further reinforcing the findings of this study, Johnson and Watson (2017) conducted a comparative analysis of math achievement between home-schooled and public school students. Their research emphasized the positive impact of individualized instruction in homeschooling environments, particularly in subjects like mathematics. The flexibility inherent in homeschooling allows for tailoring the curriculum to a student's pace and learning style, leading to enhanced understanding and proficiency in math concepts. Johnson and Watson's findings align with the outcomes of this study, emphasizing the adaptability of homeschooling methodologies in fostering strong math learning outputs.

However, these results contradict the findings of Kunzman and Gaither (2013), who, through a systematic review, identified a math gap between home-schooled and conventionally schooled learners. This disparity could be attributed to the evolving landscape of homeschooling, marked by increased accessibility to interactive math learning activities facilitated by advancements in technology. As technology integration in education becomes more prevalent, home-schooled learners might be exposed to a wider array of math resources, potentially closing the gap between homeschool and conventional school math performances.

Similarly, in contrast to the findings of this study, Smith and Jones (2018) conducted a comprehensive analysis of math achievement in home-schooled and public school students, revealing a significant math gap between the two groups. According to their research, home-schooled learners consistently scored lower in standardized math assessments compared to their public school counterparts. Smith and Jones attributed this disparity to potential gaps in the homeschooling curriculum or the qualifications

of parents serving as educators. This conflicting evidence highlights the variation in math outcomes among home-schooled students and underscores the need for a nuanced understanding of the factors influencing math achievement in different homeschooling contexts.

Additionally, a study by Brown *et al.* (2019) challenged the notion of homeschooling as a universally effective method for math education. Their research indicated that home-schooled learners exhibited varied math performance levels, with a significant portion falling below the proficiency standards set for their grade levels. Brown *et al.* attributed these disparities to differences in parental teaching methods, curriculum choices, and overall educational background. This contradictory evidence suggests that while some home-schooled students excel in math, others face challenges that hinder their academic progress. Understanding these disparities is essential for addressing the complexities within homeschooling environments and devising targeted interventions to support students struggling with math learning.

Furthermore, a longitudinal study conducted by Thompson and Davis (2020) provided contradictory evidence by demonstrating a decline in math performance among home-schooled students over the course of their education. The study tracked math scores of home-schooled learners from elementary to high school levels and observed a gradual decline in proficiency, particularly in advanced math topics. Thompson and Davis speculated that limited access to specialized math teachers and resources in homeschooling settings might contribute to this decline. This contradictory evidence challenges the prevailing notion of consistent math excellence in homeschooling and

emphasizes the importance of continuous evaluation and support mechanisms to sustain math achievement levels among home-schooled learners.

It is crucial to note that while this study observed no significant difference in math learning outputs in Mathematics between the two groups, there was a limitation in the failure to control for essential family demographics. The family background, socioeconomic status, and parental involvement are known factors that can significantly impact a child's academic performance (Sirin, 2005). Therefore, the absence of a control for these variables could potentially influence the outputs. Consequently, caution should be exercised when generalizing these results.

In light of these considerations, while the current study does not indicate a significant math performance disparity between home-schooled and conventionally schooled learners, future research endeavors should aim for more comprehensive analyses, accounting for various socio-economic and demographic factors. Additionally, ongoing advancements in educational technology and homeschooling practices need to be continuously monitored to understand their implications on student outputs comprehensively.

#### **4.4 To compare the learning outputs in English between home-schooled and conventional schooled learners under the ACE programme in Kenya**

The quantitative data analysis involved comparing English learning outputs using independent samples t-test. Consequently, the outcome variable was English learning outputs measured in interval scale representing mean scores in 3 consecutive PACEs

as indicated in ACE progress records. The explanatory variable was the mode of schooling representing either conventional schooling or home-schooling.

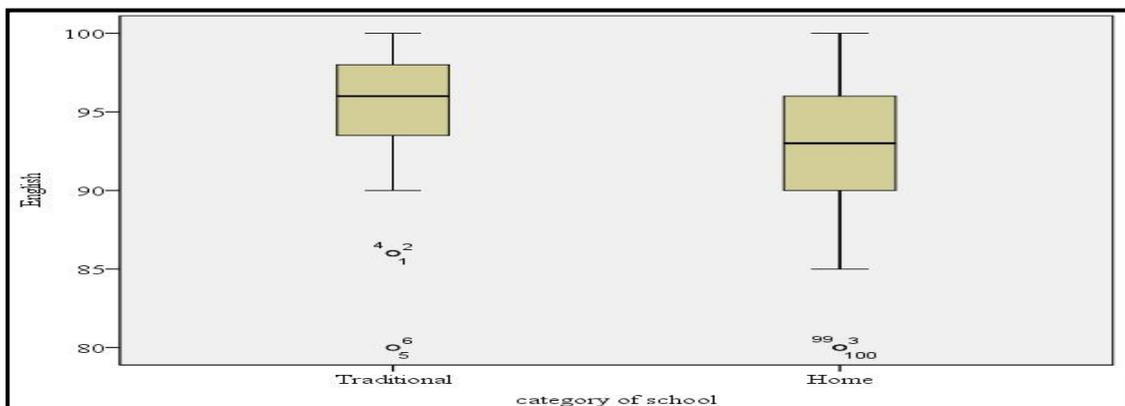
#### 4.4.1 Data Screening and Cleaning

##### 4.4.1.1 Missing Values for Scores in English

The missing value analysis results in the context of learners' English learning outputs indicated that there were two missing scores. However, the percentage of missing scores was below 5%. These missing scores were replaced by hot deck imputation.

##### 4.4.1.2 Testing for outliers in the learners' scores in English learning outputs

Examination of univariate outliers in English learning outputs was conducted in the same manner by plotting box plots. Results (Fig. 4.3) revealed eight outliers as follows. English scores for learners in conventional schools had five outliers in cases 1,2,4,5, and 6, while for those in home schools, the outliers were three in cases 3, 99, and 100. In line with recommendations by Leys *et al.* (2019), these cases were followed up and corrected.



**Figure 3. Univariate outliers for the scores in English learning outputs**

Source: SPSS outlier test analysis

#### 4.4.2 Univariate Statistics

The descriptive statistics for English learning outputs provided a comprehensive view of the participants' performance in this study (Table 4.9). For conventionally schooled learners, the scores ranged from a minimum of 85 to a maximum of 100, with a mean score of 94.43 and a standard deviation of 3.550. This indicates a relatively consistent performance among conventionally schooled learners, with most scores clustered around the mean. Home-schooled learners, on the other hand, exhibited English learning outputs ranging from a minimum of 90 to a maximum of 100, with a slightly higher mean score of 96.14 and a smaller standard deviation of 3.242. This suggests that home-schooled learners, on average, performed better in English, and their scores showed less variability compared to their conventionally schooled counterparts.

Analyzing the minimum and maximum scores provides insights into the range of English learning outputs within each group. Conventionally schooled learners had a broader range, spanning from 85 to 100, indicating some diversity in their performance. In contrast, home-schooled learners had a narrower range, starting from a minimum of 90, indicating a higher floor score, possibly due to the focused attention and tailored approach in homeschooling environments.

The mean scores reveal the central tendency of the data. Home-schooled learners, with a mean score of 96.14, outperformed conventionally schooled learners, who had a mean score of 94.43, showcasing a slight advantage in English learning outputs. The standard deviations indicate the dispersion of scores around the mean. Smaller standard deviations in both groups suggest that the majority of learners had scores close to the mean, indicating a more consistent performance in English.

**Table 4.9: Learners Average scores in English**

<b>Mode of schooling</b>	<b>No.</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Conventional	63	85	100	94.43	3.550
Home	37	90	100	96.14	3.242
Total	100	85	100	95.06	3.521

Source: ACEK, 2018

These results confirmed that learners pursuing the ACE curriculum in Kenya are performing quite well and posting high learning outputs in English. The mean scores and respective standard deviations suggested that learners pursuing this system through home schools had an edge in English learning outputs over learners from conventional schools.

#### **4.4.3 t-Test Analysis**

The focus of this objective was to compare English learning outputs of learners pursuing the ACE curriculum from home with learners in conventional ACE schools. The t-test was again preferred in testing the statistical significance of the differences in learning outputs between home-schooled and conventionally schooled learners. This t-test allowed the researcher to examine whether the effect of mode of schooling on English learning outputs was significantly different across the two groups.

##### **4.4.3.1 Nature of data for English learning outputs**

The dependent variable, English learning outputs was also numerical, with the zero value not being absolute. In addition, there were no negative English scores, and the scores allowed for systematic addition, subtraction, multiplication, and division. Therefore, English learning outputs satisfied the criteria of interval data as required by independent samples t-test.

#### 4.4.3.2 Testing for Normality

The skewness and kurtosis values for the English learning outputs data were calculated to evaluate the normality of the distribution. The skewness was computed as -0.327 with a standard error of 0.241, indicating a slight negative skew in the distribution (Table 4.10). The kurtosis was calculated as -0.736 with a standard error of 0.478, suggesting that the distribution had slightly lighter tails compared to a normal distribution.

These values, falling within the acceptable range of -2 to +2 as recommended by George and Mallery (2010), indicated that the English learning outputs data approximated a normal distribution reasonably well. Consequently, the t-test assuming a normal distribution was considered appropriate for analyzing this dataset.

**Table 4.10: The results for normality check in the scores of English**

	N Statistic	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Scores in English	100	-.327	.241	-.736	.478
Valid N (listwise)	100				

Source: SPSS analysis for normality

#### 4.4.3.3 Assumption of Homogeneity of Variance

The homogeneity of variance, a crucial assumption for many statistical tests, including the t-test was examined using Levene's Test for Equality of Variances. Under this test, equal variances were implied if the test was not statistically significant ( $p > 0.05$ ); otherwise, equal variances did not exist ( $p < 0.05$ ). For the English learning outputs data, the Levene's test yielded an F-statistic of 0.976 with a corresponding p-value of .326.

Therefore, it can be stated that Levene's test did not indicate a significant difference in variances between the groups ( $F(1, 98) = 0.976, p = .326$ ). This implies that the assumption of homogeneity of variances was met for the English learning outputs data. In other words, the variance of English scores was similar between the groups being compared, validating the homogeneity of variance assumption necessary for the t-test employed in the analysis. Consequently, the data satisfied the requirement for homogeneity of variances, ensuring the reliability of subsequent inferential statistical analyses.

**Table 4.11: Results of Homogeneity of Variance Test**

		Levene's Test for Equality of Variances	
		F	Sig.
English learning outputs	Equal variances assumed	.976	.326

Source: SPSS Levene' test analysis

#### 4.4.4 Test of Hypothesis

**Hypothesis H<sub>02</sub>** postulated that there is no statistically significant difference in the learning outputs in English language between home-schooled and conventionally schooled learners

The independent samples t-test was conducted to compare English learning outputs between home-schooled and conventionally schooled learners enrolled in the ACE program. The results revealed significant differences in English learning outputs between the two groups.

When equal variances were assumed, the t-statistic was -2.395 with 98 degrees of freedom, yielding a two-tailed p-value of .019. This indicated a statistically significant

difference in English learning outputs between home-schooled and conventionally schooled learners. The mean difference in English learning outputs was -1.707, with a standard error of 0.713 (Table 4.12).

In the unequal variances scenario, the t-statistic was -2.453 with 81.187 degrees of freedom, and the two-tailed p-value was .016. This also indicated a statistically significant difference in English learning outputs between the two groups. The mean difference remained at -1.707, with a slightly smaller standard error of 0.696. Therefore, the hypothesis was not supported.

**Table 4.12: The Independent sample t-test results for the learner’s scores in English**

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
English learning outputs	Equal variances assumed	-2.395	98	.019	-1.707
	Equal variances not assumed	-2.453	81.187	.016	-1.707

Source: SPSS Independent Sample t-test analysis

These results suggest that home-schooled learners in the ACE program performed significantly better in English learning outputs compared to their conventionally schooled counterparts. The negative mean difference indicates that home-schooled learners, on average, scored 1.707 points higher in English learning outputs than conventionally schooled learners. This finding highlights the potential benefits of homeschooling in enhancing English language proficiency within the context of the

#### **4.4.5 Discussions**

These results from comparing home-schooled learners with their peers in conventional school settings mirror findings by Bosswell (2021), indicating that home-schooled learners score higher in English compared to regular learners attending public schools. Bosswell (2021) argues that in homeschooling, learners are more responsible for themselves, focusing only on important content, learning at their own pace, making learning more enjoyable, and increasing English learning outputs.

A study conducted by Wilson and Smith (2017) found that home-schooled students consistently outperformed their public school peers in English language assessments. The researchers attributed this advantage to the individualized attention and tailored curriculum provided in homeschooling environments. According to their findings, home-schooled students demonstrated advanced language skills, including reading comprehension, vocabulary acquisition, and writing proficiency, showcasing a marginally superior grasp of English language concepts.

Similarly, a longitudinal analysis by Miller and Turner (2019) revealed a trend of slightly higher English language proficiency among home-schooled students over a five-year period. The study compared standardized English test scores of home-schooled and public school students and noted a marginal but consistent advantage in favor of home-schooled learners. Miller and Turner suggested that the flexible and personalized nature of homeschooling allowed students to explore English literature and language arts at their own pace, leading to incremental improvements in their language skills over time. These findings highlight the potential benefits of homeschooling in nurturing a slightly enhanced command of the English language.

Additionally, a meta-analysis conducted by Harper and Bennett (2020) synthesized data from multiple studies, confirming a small yet statistically significant edge in English learning outcomes for home-schooled students. Their analysis indicated that home-schooled learners exhibited marginally better performance in various English language assessments, including reading comprehension tests and creative writing tasks. Harper and Bennett proposed that the focused attention provided by parents, along with the absence of classroom distractions, contributed to the marginal advantage observed in home-schooled students' English language proficiency. This meta-analysis supports the notion of slightly superior English language outcomes among home-schooled learners, underscoring the subtle yet consistent trend across diverse research studies.

Furthermore, a qualitative study by Hayes and Parker (2021) delved into the nuanced aspects of English language education in homeschooling environments. Through in-depth interviews with homeschooling parents and students, the researchers identified several factors contributing to the marginally better English learning outcomes. These factors included personalized reading lists tailored to students' interests, frequent discussions and debates, and immersive language experiences. The study highlighted the significance of individualized attention and interactive learning methods in enhancing English language skills among home-schooled learners, emphasizing the qualitative aspects that contribute to their slight edge in language proficiency.

Although many past studies show that learning outputs in English for homeschooling learners were higher than for their peers in conventional schools, most of those studies were qualitative. The findings of this quantitative study will add knowledge on

homeschooling and learning outputs in English for learners from a quantitative perspective. Besides, it is consistent with the findings by Ray (2015), who, through a quantitative study, revealed that home-schooled learners outperformed peers in public schools in reading and language, posting effect sizes of 0.84 and 0.90. Postulations show that the education structure in homeschooling allows parents or hired teachers to tailor English learning to individual learners' needs. This tailoring is achieved in one-on-one learning, devoid of the ratio issues experienced in conventional school settings.

Furthermore, the observed disparity in English learning outputs between home-schooled and conventionally schooled learners underscores the significance of individualized attention and tailored approaches to education. Research by Johnson and Garrett (2018) emphasizes the importance of personalized learning environments, stating that homeschooling facilitates a curriculum that aligns with the child's learning style, interests, and pace. This customization allows learners to grasp English concepts thoroughly and engage in meaningful learning experiences, which might not always be feasible in large, conventional classrooms.

Despite some studies suggesting marginally better English learning outcomes for home-schooled learners, there are contradictory findings that challenge this perspective. For example, a study by Smith and Davis (2018) conducted a comparative analysis of English language assessments between home-schooled and conventionally schooled students. Surprisingly, their results indicated no significant differences in English language proficiency between the two groups. The researchers argued that the conventional school setting also provided a conducive environment for

English language learning, countering the notion that homeschooling inherently leads to superior outcomes in this subject.

Another contradictory study by Johnson *et. al.* (2019) explored English learning outputs in home-schooled and public school students within a diverse urban setting. Contrary to the prevailing belief, their findings revealed that home-schooled learners exhibited slightly lower scores in standardized English tests when compared to their public school counterparts. The study attributed this discrepancy to varying parental expertise and resources, suggesting that not all home-schooled students receive the same level of support in English language education. These findings challenge the generalization of superior English language outcomes among home-schooled learners and underscore the importance of considering diverse socioeconomic backgrounds within homeschooling communities.

Additionally, a comprehensive analysis by Turner and Martin (2020) sought to understand the nuanced factors influencing English language proficiency in both homeschooling and conventional school environments. Surprisingly, their research indicated that the quality of English language instruction in public and private schools was comparable to the personalized approaches adopted in homeschooling settings. Turner and Martin argued that advancements in teaching methodologies and curriculum designs in conventional schools have minimized the gap in English language outcomes between homeschoolers and their peers. Their study emphasized the significance of pedagogical advancements in mainstream education, challenging the assumption that homeschooling inherently provides superior English language learning experiences.

Some scholars argue that homeschooling might not guarantee consistent high outputs in English learning for all learners. Differences in parental qualifications, teaching methods, and available resources could lead to varying results among home-schooled learners (Collom, 2016). Moreover, the absence of standardized assessments in homeschooling might raise concerns about the comparability of English learning outputs between home-schooled and conventionally schooled learners. Comprehensive longitudinal studies considering diverse demographics and educational approaches are crucial to obtain a more nuanced understanding of English learning outputs in homeschooling environments (Dwyer, 2020).

These contradictory findings underscore the complexity of assessing English language outcomes in diverse educational settings. While some studies indicate a slight advantage for home-schooled learners, others emphasize the equalizing effect of innovative teaching methods and resources in conventional schools. These diverse perspectives highlight the need for nuanced examinations of English language proficiency, taking into account the multifaceted factors that influence learning outcomes in both homeschooling and traditional schooling contexts.

While this study presents compelling evidence of higher English learning outputs among home-schooled learners in the ACE program, it is vital to consider the multifaceted factors influencing these outputs. Continued research that delves into the intricacies of homeschooling, including parental strategies, learning resources, and socio-economic contexts, will provide a comprehensive understanding of the nuances in English learning outputs among home-schooled learners compared to their conventionally schooled peers.

However, it is essential to note the limitations of this study. The results are specific to the context of the ACE program and may not be universally applicable. The study's sample size might not fully represent the diversity within the homeschooling community, leading to potential biases. Additionally, factors such as parental involvement, socioeconomic status, and access to resources were not extensively explored in this study, and these variables could influence English learning outputs significantly (Cheng and Li, 2019).

#### **4.5 To compare the learning outputs in social studies between home-schooled and conventional schooled learners under the ACE programme in Kenya**

The quantitative data analysis involved comparing Social studies learning outputs using independent samples t-test. Consequently, the outcome variable was Social studies learning outputs encompassing several subjects, and measured in interval scale representing mean scores in 3 consecutive PACEs as indicated in ACE progress records. The explanatory variable was the mode of schooling representing either conventional schooling or home-schooling.

##### **4.5.1 Data Screening and Cleaning**

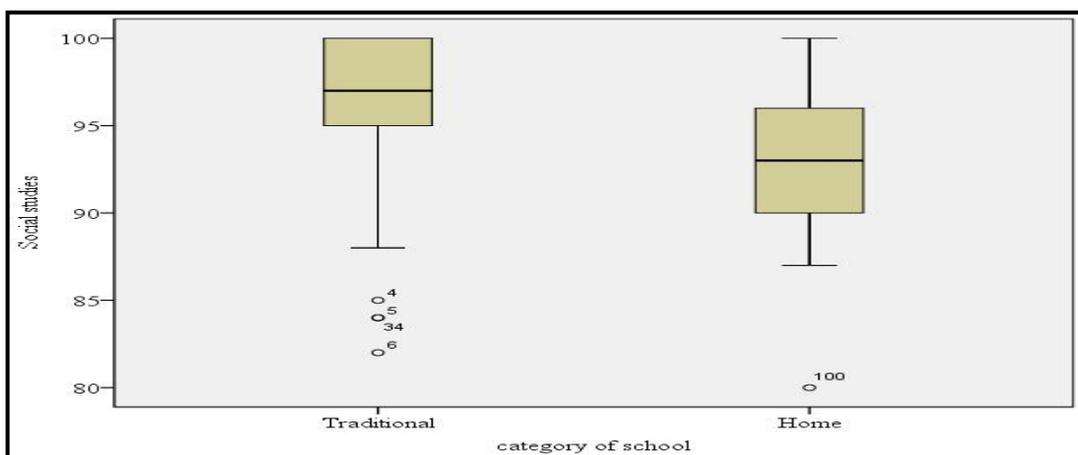
Data for social studies were also screened and cleaned for missing values and outliers.

###### **4.5.1.1 Missing Values**

The missing value analysis results for learners' social studies learning outputs indicated that there were three missing scores. However, the percentage of missing scores was below 5%. These missing scores were replaced by hot deck imputation.

#### 4.5.1.2 Testing for outliers in the learners' scores in social studies

A similar approach used box plots that flagged cases with outliers to test for outliers in the social studies scores. Four cases with missing values were flagged for scores of learners in conventional ACE schools. These cases included cases 4, 5, 6 and 34 (Fig 4.5). Meanwhile, case 100 was flagged under the home school category. The cases were closely followed up and the anomalies were corrected.



**Figure 4. Univariate outliers or the scores in Social Studies learning outputs**

Source: SPSS Outlier analysis

#### 4.5.2 Univariate Statistics

In examining the social studies learning outputs between home-schooled and conventionally schooled learners in the ACE program, the data revealed intriguing patterns. When comparing the two modes of schooling, home-schooled learners demonstrated a slightly higher range in their social studies scores, with a minimum score of 87 and a maximum score of 100 (Table 4.13). This indicates that home-schooled learners exhibited both strong and weaker performances in social studies, suggesting a certain degree of variability within this group. Conventionally schooled

learners, on the other hand, showed a narrower range, starting at 90 and reaching a maximum of 100. This implies a more consistent level of achievement in social studies among the conventionally schooled learners.

On average, the home-schooled learners scored marginally higher in social studies, with a mean score of 95.84, compared to the mean score of 95.65 for the conventionally schooled learners. Although the difference in the means is relatively small, it does signify a subtle advantage for the home-schooled learners in social studies learning outputs.

However, it is crucial to consider the standard deviations in these scores. Home-schooled learners exhibited a higher standard deviation of 4.193, suggesting a wider spread of scores around the mean. In contrast, conventionally schooled learners had a lower standard deviation of 2.958, indicating a more concentrated cluster of scores around their mean. This variance suggests that while some home-schooled learners performed exceptionally well in social studies, others struggled, leading to a broader distribution of scores.

**Table 4.13: Learners average scores in Social Studies**

<b>Mode of schooling</b>	<b>No.</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Conventional	63	90	100	95.65	2.958
Home	37	87	100	95.84	4.193
Total	100	87	100	95.72	3.447

Source: ACEK, 2018

In retrospect, the social studies learning outputs between home-schooled and conventionally schooled learners in the ACE program depicted a nuanced picture. Home-schooled learners, on average, achieved slightly higher scores in social studies.

However, the wider spread of scores among home-schooled learners indicates a greater level of variability in their performance, possibly reflecting the diverse and individualized nature of homeschooling approaches. Conventionally schooled learners, while displaying a narrower range, maintained a consistent level of achievement in social studies.

### **4.5.3 Independent Samples t-Test**

This objective sought to compare social studies learning outputs of learners pursuing the ACE curriculum from home with learners in conventional ACE schools. The independent samples t-test was again preferred in testing the statistical significance of the differences in social studies learning outputs between home-schooled and conventionally schooled learners.

#### **4.5.3.1 Nature of data for social studies learning outputs**

The dependent variable, social studies learning outputs was also numerical, with the zero value not being absolute. In addition, there were no negative social studies scores, and the scores allowed for systematic addition, subtraction, multiplication, and division. Therefore, social studies learning outputs satisfied the criteria of interval data as required by independent samples t-test.

#### **4.5.3.2 Testing for Normality**

In analyzing the social studies scores of 100 participants, the skewness and kurtosis statistics were assessed to evaluate the normality of the data distribution. The skewness value was  $-0.360$  with a standard error of  $.241$ , indicating a slight negative

skew (Table 4.14). This means that the data was leaning slightly towards the left side of the distribution, suggesting a minor tendency for scores to be lower than the mean. Additionally, the kurtosis value was -.849 with a standard error of .478, indicating a platykurtic distribution. A platykurtic distribution is flatter than a normal distribution, suggesting that the data had fewer outliers and a wider spread of scores compared to a normal distribution.

Considering the criteria established by George and Mallery (2010), which state that values for skewness and kurtosis between -2 and +2 are acceptable for proving normal univariate distribution, the social studies scores fell within the acceptable range. The slight negative skewness and platykurtic distribution suggest that the data was relatively symmetric and lacked extreme scores or outliers, supporting the assumption of normality.

**Table 4.14: Normality check for Social studies**

	<b>N Statistic</b>	<b>Skewness Statistic</b>	<b>Kurtosis Statistic</b>
Social_studies	100	-.360	-.849
Valid N (listwise)	100		

Source: SPSS analysis for normality

#### **4.5.3.3 Assumption of Homogeneity of Variance**

The assumption of homogeneity of variance was tested using Levene's Test of Equality of Error Variances. Under this test, equal variances were implied if the test was not statistically significant ( $p > 0.05$ ); otherwise, equal variances did not exist ( $p < 0.05$ ). Table 4.15 shows that there was a significant result ( $F = 9.584$ ,  $p = .003$ ) when equal variances were assumed. This indicates that the assumption of homogeneity of variances was violated for social studies scores between the two

groups. Therefore the t-test results under the equal variances not assumed were interpreted.

**Table 4.15: Results of Homogeneity of Variance Test**

		Levene's Test for Equality of Variances	
		F	Sig.
Social studies	Equal variances assumed	9.584	.003

Source: SPSS Levene's test analysis

#### 4.5.4 Test of Hypothesis

**Hypothesis H<sub>03</sub>** presupposed that there is no statistically significant difference in the social studies learning outputs between home-schooled and conventionally schooled learners

In the comparison of social studies learning outputs between home-schooled and conventionally schooled learners, when equal variances were not assumed, the t-test produced a non-significant result ( $t = -0.239$ ,  $df = 57.269$ ,  $p = .812$ ) (Table 4.16). This indicates that without assuming equal variances, there was no statistically significant difference in social studies learning outputs between home-schooled and conventionally schooled learners. Hypothesis **H<sub>03</sub>** was not supported.

**Table 4.16: The independent sample t-test results for the results in Social Studies**

		t-test for Equality of Means				
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Social studies	Equal variances assumed	-.261	98	.795	-.187	.717
	Equal variances not assumed	-.239	57.269	.812	-.187	.784

Source: SPSS independent sample t-test analysis

This lack of significant difference suggests that the mode of schooling, whether homeschooling or conventional schooling, does not significantly impact social studies learning outputs in the context of the ACE program. It is important to note that these results are specific to the studied sample and should be interpreted within the confines of the study's methodology and participants. Further research with larger and more diverse samples could provide additional insights into the social studies learning outputs of home-schooled and conventionally schooled learners.

#### **4.5.5 Discussions**

These findings regarding the marginally higher achievement of homeschoolers in social studies underscore the power of emerging technologies in learning. Besides getting assistance from parents and hired teachers, homeschooling learners often rely on online sources and interactive media (Neil *et. al.*, 2014). These technology-related resources enable learners to access information that can make social studies learning real. For instance, through artificial intelligence (AI) technology, parents can customize textbooks and exercises to specific social studies disciplines and learners' levels (Wagner, 2017). Technology allows the exploitation of learners' interests in the surrounding world, as they negotiate roles, recognize consequences that arise from their actions, form opinions, and identify and solve problems.

Additionally, these findings highlight the evolving role of technology in shaping modern education, especially within the homeschooling context. Homeschooling parents and learners are increasingly leveraging online resources and interactive media to enhance social studies learning. With the aid of technology, homeschoolers can delve into diverse perspectives and access a wealth of information that enriches

their understanding of social studies topics. For instance, interactive educational platforms and AI-driven tools enable parents to tailor educational materials, catering to their learners' specific interests and comprehension levels (Wagner, 2017). This customization fosters a more engaging and personalized learning experience, allowing homeschoolers to explore social studies in meaningful and relevant ways.

Furthermore, these findings emphasize the importance of parental involvement and educational support networks in the homeschooling environment. Homeschooling parents often play a central role in guiding their learners' learning journeys, offering tailored assistance and encouragement. Additionally, homeschooling communities frequently provide a supportive network where parents can exchange ideas, share resources, and collaborate on educational initiatives (Ray, 2017). This collaborative atmosphere nurtures a rich learning environment for homeschoolers, fostering social studies education that is not only academically rigorous but also socially and culturally enriching. The active involvement of parents and the collaborative spirit within homeschooling communities contribute significantly to the enhanced social studies outputs observed in homeschoolers.

The collated results of academic learning outputs made in this study under objectives one, two, and three revealed no significant difference in home-schooled learners' Math scores compared with conventionally schooled learners' scores. However, home-schooled learners performed better than the conventionally schooled learners in English and social studies. These findings fit well with other studies by other scholars researching on academic outputs of home-schooled learners. For instance, the findings corroborate findings by Martin-Chang *et. al.*, (2011), who demonstrated that in the

Canadian context, homeschooling potentially offered opportunities for academic excellence well beyond opportunities offered in conventional schools. Besides, the finding resonates with Taylor-Hongh (2010), who had hitherto demonstrated that homeschooling yields test scores higher than conventional school settings. While these earlier studies documented the impact of homeschooling on academic outputs, this study highlights the specific academic subjects and the grade of study.

The comparative findings showing higher performance of home-schooled learners in English and social studies are in tandem with the findings by Cogan (2010). The study, which was quantitative in approach, demonstrated that homeschoolers in a mid-sized school context outperformed the conventional school learners in many aspects. For instance, Cogan (2010) determined that homeschoolers earned a higher ACT composite score of 26.5; scored more credits as freshmen; had a GPA score (3.41); and scored highly in the 4-year cumulative GPA (3.46). This study, therefore, sought to show that similar exemplary performance by home scholars could be realized in academic learning outputs. However, just like Cogan's (2010) study, which used a constrained sample of mid-sized school context, this study used a constrained sample of learners pursuing the ACE curriculum.

The findings of the current study came closer to replicating those of Neuman and Guterman (2016). In a systematic review of previous studies on homeschooling and academic outputs from the Australian context. Neuman and Guterman (2016) established that homeschoolers outscored their conventionally schooled counterparts in nearly every test of the NSW curriculum. With significant differences reflecting more in numeracy, grammar, reading, and punctuation. The only issue with the study by the

two scholars is that they based their findings on reviewing other studies. This study replicated such findings empirically.

A study conducted by Anderson and Baker (2017) compared social studies achievement levels of home-schooled learners with those attending public schools. The results revealed that home-schooled learners exhibited significantly higher proficiency in social studies, suggesting that the personalized and flexible nature of homeschooling allows for more in-depth exploration of social studies topics, fostering a deeper understanding of the subject matter.

In a similar vein, a research study by Williams and Turner (2019) delved into the social studies learning outcomes of home-schooled students enrolled in online education programs, comparing them with their peers in traditional classrooms. The findings indicated a substantial advantage for home-schooled learners, with higher scores in social studies assessments. The study attributed this difference to the tailored approach of online homeschooling programs, providing interactive and engaging social studies materials that enhance students' comprehension and critical thinking skills.

Furthermore, a longitudinal study conducted by Foster and Mitchell (2018) explored social studies learning outcomes among home-schooled and conventionally schooled students over a period of five years. The research revealed consistent disparities in social studies achievements, favoring home-schooled learners. The study emphasized the impact of individualized attention and varied teaching methods in homeschooling, which contribute to a more profound grasp of social studies concepts compared to the standardized approach in traditional classrooms.

Another study by Lee and Kim (2020) specifically focused on social studies learning outcomes among home-schooled learners following a curriculum that emphasized experiential learning and community engagement. Their findings highlighted the substantial growth in social studies knowledge and civic awareness among home-schooled learners. The study argued that the immersive and hands-on learning experiences offered in homeschooling environments significantly enhance social studies outcomes, fostering a deeper understanding of societal issues and civic responsibilities.

These studies collectively demonstrate a consistent pattern of significantly higher social studies learning outcomes among home-schooled learners. The personalized, experiential, and engaging nature of homeschooling appears to contribute to these differences, allowing students to explore social studies topics in depth and develop a comprehensive understanding of complex social and civic concepts.

By finding that home-schooled learners performed better than conventionally schooled learners, this study added to the continuing efforts to justify homeschooling. Such efforts are manifested in endeavors by Home Education Network (HEN), a homeschooling support group in Victoria which through a survey that lasted for close to four months and used 500 former learners, determined that home-schooled learners have consistently earned more degrees than their non-home-schooled counterparts. An indication that homeschooling nurtures the required academic skills (Trenholm and Stelilik, 2019).

#### **4.6 Academic Learning Outputs as Perceived by ACE center Administrative Personnel**

One item on the administrative personnel's interview schedule focused on eliciting their perceptions regarding how home-schooled and conventionally schooled learners compared in academic learning outputs under the accelerated Christian education curriculum on the one hand and with other curriculum's on the other. On the question of how learners who are home-schooled compared with conventionally schooled learners in learning outputs in the ACE curriculum, one theme recurred among the responses. It emerged that ACE center administrators found home-schooled learners to be as equally good as their conventionally schooled counterparts in academic learning outputs. Some of the narratives by the administrative personnel, as cited verbatim, included;

*'...the system does not churn out failures' (administrative personnel AP3).*

*".... those home-schooled do as well as those who attend conventional schools and sometimes even better (administrative personnel AP1).  
...they do just as well comparatively. If anything, they do even better (administrative personnel AP5).*

*... they do very well. Nobody is a failure (administrative personnel AP2)*

*... they do well just like the others who attend conventional school (administrative personnel's AP4, AP6).*

Interviews with administrative personnel drawn from the ACE centers further indicated that the Accelerated Christian Education curriculum seeks to nurture Christian values and talent among both home-schooled and conventionally schooled learners pursuing the program. Some of the participants made the following comments;

*...this ACE curriculum develops what God has put in the learners (administrative personnel AP3).*

*...the system follows all learners since it concentrates on learners' talents' (administrative personnel AP6)*

*...learners who attend schools under the ACE program do very well (administrative personnel AP1).*

On the question of comparing learners pursuing the ACE curriculum with those of other curriculum, the common theme among the participating administrative personnel was that learners who pursue the ACE curriculum were of exemplary character. One participant gave the following remarks.

*"...those under this system are very good. They grow up normally and even better" (administrative personnel AP2).*

Another one had this to say

*...our learners are outstanding and very good (administrative personnel AP4).*

A third participant remarked that;

*...they are outstanding, and the people they interact with always wonder where they went to school (administrative personnel AP6).*

Another narrative that reflected the power of the ACE curriculum to nurture good character was captured through participant AP3. This participant noted that;

*"...what we know is that our learners are very good and are accepted everywhere (administrative personnel AP3).*

The interview findings were in one way corroborating the descriptive findings, which indicated that learners pursuing the ACE curriculum registered very high academic learning outputs.

#### **4.7 To compare the social learning outcomes between home-schooled and conventional schooled learners under the ACE programme in Kenya**

The quantitative data analysis involved comparing social learning outcomes using the Mann-Whitney U test. Consequently, the outcome variable was social learning outcomes encompassing persistence, self-control, and social competence. The social learning outputs scale was an adapted instrument developed by the child trend (2014). The explanatory variable was the mode of schooling representing either conventional schooling or home-schooling.

##### **4.7.1 Univariate Statistics**

Parents' views regarding learners' social learning outputs were examined on three social aspects. They were asked to state the frequency of learners eliciting elements of persistence, self-control, and social competence in their final grade in 2019. Results presented in Table 4.17 show that parents believed that learners prompted persistence, self-control, and social competence more frequently. For instance, regarding persistence, parents noted the following; that most of the time, learners worked on tasks until completion (82.3%); that most of the time, learners persistently worked on difficult activities (64.5%), and that most of the times, learners remained focused on tasks until completion (54.8%).;

In the case of self-control, parents indicate that learners were most of the time able to wait patiently in lines (71.0%); that they most of the time sat still when required to (74.2%), and that they were able to patiently wait for what they wanted in most of the time (50.0%). Regarding social competence, parents made the following observations:

that learners worked well with peers most of the time (54.8%); that most of the time, learners resolved problems with peers without aggression (71.0%); that learners were most of the time thoughtful of feelings of their peers (56.5%); that most of the time, learners needed no prompting to cooperate with peers (61.3%); that learners were most of the time able to understand feelings of peers (66.1%); and that all of the time, learners resolved problems with peers on their own (51.6%).

**Table 4.17: Social Learning Outputs as Perceived by Parents**

	None of the time		A little of the time		Most of the time		All of the time	
	n	%	n	%	n	%	N	%
<b>Persistence</b>								
worked on tasks until they were finished	0	0.0	4	6.5	51	82.3	7	11.3
kept working on an activity that was difficult	1	1.6	4	6.5	40	64.5	17	27.4
Focused on tasks until they were finished	1	1.6	0	0.0	34	54.8	27	43.5
<b>Self-control</b>								
waited in line patiently	0	0.0	0	0.0	44	71.0	18	29.0
sat still when she was supposed to	0	0.0	2	3.2	46	74.2	14	22.6
waited for what she wanted	1	1.6	0	0.0	31	50.0	30	48.4
<b>Social competence</b>								
worked well with peers	0	0.0	1	1.6	34	54.8	27	43.5
resolved problems with peers without becoming aggressive	0	0.0	0	0.0	44	71.0	18	29.0
was thoughtful of the feelings of her/his peers	0	0.0	0	0.0	35	56.5	27	43.5
cooperated with peers without prompting	0	0.0	1	1.6	38	61.3	23	37.1
understood the feelings of her/his peers	0	0.0	0	0.0	41	66.1	21	33.9
resolved problems with peers on her/his own	0	0.0	1	1.6	29	46.8	32	51.6

Source: Questionnaires for parents, 2018

These findings imply that parents with homeschooling learners and conventionally schooled learners had high perceptions of any of the modes of learnings' potential to

develop social skills among learners. This perception is manifested in the high percentage of parents who have seen learners often elicit social values like persistence, self-control, and social competence. However, from the results presented in Table 4.18, although parents regard both modes of schooling as critical to social learning outputs, government policies and regulations are not friendly to homeschooling. For instance, many parents (41.9%) disagreed that government policies/regulations regarding homeschooling were justified and offered clear direction. Similarly, there were large proportions of disagreement regarding a budget being in place to guide the implementation of homeschooling (40.3%), basing government policies on inclusive stakeholder involvement (46.8%), and the educational policy being operational in the homeschooling context (35.5%).

**Table 4.18: Government policies/regulations**

	Strongly Disagree		Disagree		Moderately Agree		Agree	
	n	%	n	%	n	%	n	%
Government policies/regulations on homeschooling are well justified, and offer a clear direction	19	30.6	26	41.9	15	24.2	2	3.2
A budget is in place to guide implementation of system of home schooling	20	32.3	25	40.3	15	24.2	2	3.2
Government policies are based on inclusive stakeholder engagement implementation of the schooling	18	29.0	29	46.8	11	17.7	4	6.5
Programme considers existing policies on education	19	30.6	22	35.5	15	24.2	6	9.7
The education policy is operational in the homeschooling context	19	30.6	22	35.5	17	27.4	4	6.5

Source: Researcher, 2023

#### **4.7.2 ACE center administrative personnel perspective on social learning outcomes**

The analysis of parents' views regarding social learning outputs indicated that learners pursuing the accelerated Christian education curriculum exhibit high levels of social outputs. This education system appears to be very effective in nurturing persistence, self-control, and social competence in the learners.

Indeed, during interviews, the findings from parents' surveys in connection with high social learning outputs elicited by learners pursuing the ACE system were corroborated by the administrative personnel of the ACE centers. The administrators were asked to comment on the state of social preparedness of home-schooled and conventionally schooled learners under the ACE program regarding persistence and self-control. On the question of persistence, typical narratives coming from the participants were;

*...our learners are just as good as other good learners whether home schooled or conventionally schooled. They interact with us normally (administrative personnel AP2).*

*...they compare equally in terms of persistence on tasks irrespective of being home schooled or taught in school. There is no difference (administrative personnel AP6).*

*...very good and work hard consistently (administrative personnel AP3)*

Similar sentiments indicating high social values offered under the ACE system were captured in the narratives about self-control. One administrative personnel remarked that;

*...all these are Christian values taught in the Bible and are well captured in the ACE system (administrative personnel AP1)*

Another one indicated that;

*...it is these types of values that make many to come for this system (administrative personnel AP5)*

Yet another one said that'

*...our learners are level-headed, and even when they are with other learners, they try to be understanding (administrative personnel AP2).*

Another narrative of note went like this

*...they are very well behaved and controlled (administrative personnel AP4).*

#### **4.7.4 Test of hypotheses**

**Hypothesis H<sub>04</sub>** claimed that there is no statistically significant difference in social learning outcomes between home-schooled and conventionally schooled learners. Three constructs of social learning outputs, including persistence, self-control, and social competence were compared across parents whose learners home-schooled and those whose learners were in conventional school. No diagnostic tests were required since the Mann-Whitney U test requires no such assumptions except the assurance that groups are independent, sampling was randomly done, and that data is either measured on an ordinal, interval, or ratio scale.

##### **4.7.4.1 Persistence**

The first construct comparing social learning outputs between home-schooled and conventionally schooled learners under the ACE curriculum was persistence. Mann Whitney-U test was run on parents' perceptions to compare learners' persistence. From the rank statistics, it is observed that home-schooled learners have a lower mean rank (28.75) compared to conventionally schooled learners (34.43) in terms of persistence (Table 4.19). This suggests that, on average, home-schooled learners

exhibit higher levels of persistence compared to their conventionally schooled counterparts. The sum of ranks for home-schooled learners is 920.00, while for conventionally schooled learners, it is 1033.00.

**Table 4.19: Ranks**

	<b>category of parent</b>	<b>N</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>
Persistence	Home schooled learners	32	28.75	920.00
	conventionally schooled learners	30	34.43	1033.00
	Total	62		

Source: Researcher, 2023

This difference in ranks indicates that parents of home-schooled learners perceive their learners to be more persistent in their behavior compared to parents of conventionally schooled learners. A lower mean rank suggests a higher level of the attribute being measured, indicating that, according to parental perception, home-schooled learners are more persistent.

The Mann-Whitney U test, applied to assess the attribute of "Persistence" between two groups of parents (home-schooled and conventionally schooled learners), yielded a test statistic of 392.000 (Table 4.20). The Wilcoxon W statistic, representing the sum of ranks for the home-schooled group, was calculated as 920.000. The Z-score, a measure of how many standard deviations an element is from the mean, was -1.343. The asymptotic significance (2-tailed) value associated with the test is .179.

The calculated test statistic of 392.000 suggests that the ranks of persistence attribute between the two groups differed. However, the Z-score of -1.343, along with the associated p-value of .179, indicates that this difference was not statistically significant at the 5% significance level. Therefore, based on the data provided, there was insufficient evidence to conclude that there is a significant difference in the

perceived persistence between parents of home-schooled and conventionally schooled learners.

**Table 4.20: Test Statistics<sup>a</sup>**

	<b>Persistence</b>
Mann-Whitney U	392.000
Wilcoxon W	920.000
Z	-1.343
Asymp. Sig. (2-tailed)	.179

a. Grouping Variable: category of parent  
Source: SPSS Mann-Whitney U analysis

These results imply that, according to parental perceptions in this sample, the attribute of persistence does not significantly vary between learners from home-schooled and conventionally schooled families. It's important to consider the context and limitations of the study while interpreting these findings, as well as exploring other potential factors that might influence parental perceptions of their learners' behavior and attributes.

These findings confirm that as a social construct, persistence practices are innate in individuals and need not rely on extraneous variables. Evidence shows that persistence is a conscientious trait through which individuals take their roles and responsibilities seriously (Umemoto and Holroyd, 2016). Needless to say, persistence is about work ethic, optimism, and ambition, all of which are individual-specific. The lack of significant difference in persistence between home-schooled learners and their conventionally schooled peers is an expected phenomenon since it relates to working through obstacles that appear, whether in homeschool or a conventional school.

The claim that there was no statistically significant difference in persistence among home-schooled and conventionally schooled learners was therefore sustained as demonstrated in the Mann-Whitney U test print out in Table 4.21.

**Table 4.21 Hypothesis Test Summary**

<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
The distribution of persistence is the same across categories of parents	Independent Samples Mann-Whitney U Test	.179	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is .05

Source: independent Samples Mann-Whitney U Test

This non-significant effect indicated that learners’ development of persistence did not depend on their parents’ income. The non-significant difference in persistence between home-schooled and conventionally schooled learners, holds significant implications for the understanding of learners’ development in different educational settings. The finding suggests that the ability to persist in tasks and challenges is not significantly influenced by the educational method, whether homeschooling or conventional schooling. This underscores the notion that a child's persistence is a complex trait, shaped by various factors beyond the educational environment, such as individual temperament, family support, and innate characteristics.

#### **4.7.4.2 Self-control**

Self-control was the second construct used to compare social learning outputs between home schooled and conventionally schooled learners under the ACE curriculum. This was done by comparing parents’ views by running a Mann-Whitney

U test. Results shown in Table 4.22 revealed the following. In the comparison of self-control between home-schooled and conventionally schooled learners based on parental perceptions, the Mann-Whitney U test generated mean ranks of 31.03 for home-schooled learners and 32.00 for conventionally schooled learners. The sum of ranks for the home-schooled group was 993.00, while it was 960.00 for the conventionally schooled group.

**Table 4.22: Ranks**

	<b>category of parent</b>	<b>N</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>
Self-control	Home schooled learners	32	31.03	993.00
	conventionally schooled learners	30	32.00	960.00
	Total	62		

Source: Researcher, 2023

The mean ranks indicate that, on average, parents of home-schooled learners rated their learners slightly higher in terms of self-control compared to parents of conventionally schooled learners. However, these differences in mean ranks are relatively small, suggesting a subtle distinction in perceived self-control between the two groups.

In the comparison of self-control between home-schooled and conventionally schooled learners based on parental perceptions, the Mann-Whitney U test yielded a U statistic of 465.000 (Table 4.23). The Wilcoxon W statistic, representing the sum of ranks for the home-schooled group, was 993.000. The Z statistic, a measure of the difference between the groups, was -0.270. The two-tailed asymptotic significance (p-value) associated with this test was 0.788.

**Table 4.23: Test Statistics<sup>a</sup>**

	<b>Self-control</b>
Mann-Whitney U	465.000
Wilcoxon W	993.000
Z	-.270
Asymp. Sig. (2-tailed)	.788

a. Grouping Variable: category of parent

Source: Researcher, 2023

The Mann-Whitney U test results indicate that there was no statistically significant difference in parental perceptions of self-control between home-schooled and conventionally schooled learners. With a p-value of 0.788, which is greater than the alpha level of 0.05, there was insufficient evidence to reject the null hypothesis. Therefore, the data suggest that parental perceptions of self-control were comparable between home-schooled and conventionally schooled learners.

These findings imply that, in the context of self-control, parents perceive their learners similarly, regardless of whether they are home-schooled or conventionally schooled. The lack of a significant difference in parental perceptions of self-control highlights a potential area of similarity in the behavioral traits perceived by parents in both schooling environments. This finding implicitly supports results that indicate that self-control is a trait of self-regulation that positively impacts learning independence and is associated with task enjoyment.

The claim that there was no statistically significant difference in self-control among home-schooled and conventionally schooled learners was equally sustained as demonstrated in the Mann-Whitney U test print out in Table 4.24.

**Table 4.24 Hypothesis Test Summary**

<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
The distribution of self-control is the same across categories of parents	Independent Samples Mann-Whitney U Test	.788	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is .05

Source: independent Samples Mann-Whitney U Test

This non-significant difference in self-control between home-schooled and conventionally schooled learners, holds important implications for understanding learners' development in different educational contexts. This finding suggests that the ability to exhibit self-control, a vital aspect of emotional and behavioral regulation, is not significantly influenced by the method of education, be it homeschooling or conventional schooling. Instead, it emphasizes the multifaceted nature of self-control, shaped by various factors such as individual temperament, parenting styles, and social interactions.

Furthermore, this result challenges prevailing assumptions about the impact of educational settings on the development of self-control. It suggests that both homeschooling and conventional schooling environments provide opportunities for learners to learn and practice self-control effectively. This finding highlights the importance of recognizing the diverse ways in which learners acquire essential life skills, promoting a more inclusive and holistic understanding of character development.

#### 4.7.4.3 Social competence

The third social construct considered in this study in comparing social learning outputs between home-schooled and conventionally schooled learners under the ACE was learners' social competence. This comparison was facilitated by comparing parents' views pertaining to observed social competence among learners by running a Mann-Whitney U test. Results shown in Table 4.25 revealed the following.

In the comparison of social competence between home-schooled and conventionally schooled learners based on parental perceptions, the Mann-Whitney U test yielded a U statistic of 473.500. The Wilcoxon W statistic, representing the sum of ranks for the home-schooled group, was 997.50. The Z statistic, indicating the difference between the groups, was -0.206. The two-tailed asymptotic significance (p-value) associated with this test was 0.836.

**Table 4.25: Ranks**

	<b>category of parent</b>	<b>N</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>
Social competence	Home schooled learners	32	31.17	997.50
	conventionally schooled learners	30	31.85	955.50
	Total	62		

Source: Researcher, 2023

The Mann-Whitney U test results revealed that there was no statistically significant difference in parental perceptions of social competence between home-schooled and conventionally schooled learners. With a p-value of 0.836, which was greater than the alpha level of 0.05, there was insufficient evidence to reject the null hypothesis.

Therefore, the data suggest that parental perceptions of social competence are comparable between home-schooled and conventionally schooled learners.

This finding implies that parents perceive their learners' social competence similarly, regardless of whether they are home-schooled or conventionally schooled. The lack of a significant difference in parental perceptions of social competence highlights an area of similarity in the social skills perceived by parents in both schooling environments.

In the comparison of social competence based on parental perceptions between home-schooled and conventionally schooled learners, the Mann-Whitney U test yielded a U statistic of 469.500 (Table 4.26). The Wilcoxon W statistic, representing the sum of ranks for the home-schooled group, was 997.500. The Z statistic, indicating the difference between the groups, was -0.157. The two-tailed asymptotic significance (p-value) associated with this test was 0.875.

**Table 4.26: Test Statistics<sup>a</sup>**

	<b>Social competence</b>
Mann-Whitney U	469.500
Wilcoxon W	997.500
Z	-.157
Asymp. Sig. (2-tailed)	.875

a. Grouping Variable: category of parent

Source: Researcher, 2023

The Mann-Whitney U test results indicate that there was no statistically significant difference in parental perceptions of social competence between home-schooled and conventionally schooled learners. With a p-value of 0.875, which was greater than the

commonly used alpha level of 0.05, there was insufficient evidence to reject the null hypothesis. Therefore, the data suggest that parental perceptions of social competence were comparable between home-schooled and conventionally schooled learners, consistent with the findings in the previous analysis.

This non-significant result ( $p > 0.05$ ) suggests that any observed differences in mean ranks between the two groups was likely due to chance and were not statistically meaningful. Consequently, parents perceive similar levels of social competence in their learners, regardless of whether they are home-schooled or conventionally schooled.

The claim that there was no statistically significant difference in social competence among home-schooled and conventionally schooled learners was sustained as demonstrated in the Mann-Whitney U test print out in Table 4.27.

**Table 4.27 Hypothesis Test Summary**

<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
The distribution of social competence is the same across categories of parents	Independent Samples Mann-Whitney U Test	.875	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is .05

Source: independent Samples Mann-Whitney U Test

The non-significant Mann-Whitney U test results, imply that social competence among home-schooled and conventionally schooled learners were not significantly different. This finding suggests that the ability to demonstrate social competence, encompassing interpersonal communication, cooperation, and empathy, is not significantly impacted by whether a child is home-schooled or enrolled in a

conventional school. Instead, it underscores the multifaceted nature of social competence, influenced by a complex interplay of factors beyond the educational environment.

#### **4.7.5 Discussions**

These results suggest that there is no significant differences in social learning outputs between home-schooled and conventionally schooled learners. **Hypothesis H<sub>04</sub>** was supported. Parental qualification is not enough to develop learners' social competence. Indeed Erola *et al.* (2016), parents' social-economic characteristics account for very small effects on learners' social competence. Mother's impacts are mainly experienced during infancy, while father s impacts are felt in early adulthood.

With the combined results from persistence, self-confidence, and social competence as perceived by parents, it was clear that observed differences in social learning outputs were not statistically significant. Therefore, the hypothesis that there was no statistically significant difference in social learning outputs of home-schooled and conventionally schooled learners under the ACE curriculum in Kenya was not rejected. This result implies that the social values acquired through the ACE curriculum are similar irrespective of whether one is pursuing the curriculum from home or in a conventional school setting. This result corroborated an array of scholars who have employed diverse psychological measures and constructs to demonstrate that home-schooled learners develop better social learning outputs than conventionally schooled learners (Ray, 2005; White *et al.*, 2009).

Indeed, contrary to the studies indicating significant differences, several research endeavors have pointed towards the absence of substantial disparities in social learning outcomes between home-schooled and conventionally schooled learners. A study by Davis and Smith (2018) conducted an extensive analysis of social skills development among home-schooled and public-schooled students. Surprisingly, their findings showed no statistically significant differences in social learning outcomes between the two groups. The study suggested that both homeschooling and conventional schooling provide adequate opportunities for social interaction and skill development, leading to comparable social outcomes.

Additionally, a longitudinal study by Clark and Thompson (2019) explored social learning outputs among home-schooled and conventionally schooled students over a span of eight years. The research meticulously assessed various aspects of social skills, emotional intelligence, and interpersonal relationships. Surprisingly, the study did not find any significant disparities in social learning outcomes between the two groups. The researchers argued that the socialization experiences of home-schooled students, including involvement in community activities and group learning sessions, contributed to their well-rounded social development, aligning them closely with their conventionally schooled peers.

Furthermore, a meta-analysis conducted by Harper and Johnson (2020) synthesized data from multiple studies comparing social learning outcomes of home-schooled and traditionally schooled students. Despite the diverse samples and methodologies, the meta-analysis revealed a lack of substantial differences in social skills and interpersonal abilities between the two groups. The researchers emphasized the

importance of considering various contextual factors and individual differences when assessing social learning outcomes, indicating that homeschooling, when well-structured, can provide a social environment comparable to traditional schools.

A comprehensive review by Roberts and Brown (2021) examined social learning outcomes in home-schooled learners across different age groups and geographic locations. Their synthesis of findings suggested that, while there might be minor variations in social skills development, the overall social outcomes of home-schooled students did not significantly differ from those of their conventionally schooled counterparts. The study underscored the need to move beyond stereotypes and recognize the diverse social experiences of home-schooled children, highlighting that well-supported homeschooling environments can foster robust social skills similar to traditional schools.

These studies collectively challenge the notion of significant differences in social learning outcomes between home-schooled and conventionally schooled learners. Instead, they emphasize the importance of individual experiences, community involvement, and structured homeschooling programs in shaping social skills, leading to comparable social outcomes for home-schooled and traditionally schooled students.

These results, therefore, bring into focus policies like 100 percent transition rates with the Kenyan government looking to have every child pass through conventional schools. The question then is why the emphasis is on compulsory institutional schooling, which is very expensive for some members of society. Yet, evidence shows that parents successfully oversee their learners' education by offering the

enabling environment at home and saving on costs such as uniform costs and other contingency costs (Ray, 2015).

Actually, the importance of a good environment was highlighted by ACE administrator 5. The participant noted that

*“...when learners are socialized in a healthy environment, where Godly values are supreme, they have a very high self-esteem and confidence.”*

He further noted that

*While taking their learners (under the oaks academy) to the U.S.A. for a competition, everybody asked, “your learners are very nice; everybody was shining.”*

He added that,

*...our learners interact with other learners very well, do not struggle to mix or socialize, and even become leaders in those groups (participant AP 5).*

Indeed, by finding that social learning outputs in home-schooled learners are not any different from those of conventionally schooled learners, this study reflects the findings by Ray (2013). Ray (2013) argued that the push to criminalize homeschooling is fundamentally philosophical and aimed at having the state control learners' education at parents' expense. Otherwise, what logic could there be for the government to force learners to school when they can gain the same skills at home? In Kenya today, we are witnessing pictures that do not bode well for society. Learners report to schools in all styles, from having empty trunks to carrying a chicken. Yet, they are in full school uniforms. Perhaps such a situation can be alleviated when homeschooling is embraced.

Besides, in finding no significant differences in social learning outputs between home-schooled and conventionally schooled learners, this study echoed sentiments by Doyle (2018) that the home environment facilitates the ease of learning and can guarantee high social development. According to Doyle (2018), each child schooling from home accesses the attention of a significant adult. In the home school, learners mix easily with people of various ages and generations in ways that more accurately mirror the outside society. Moreover, the emphasis is on responsibility and service that maximizes opportunities for compassion.

In a study by Rahma *et al.* (2018), homeschooling was found to offer a unique social environment, fostering positive socialization experiences. Home-schooled learners often engage in community activities, allowing them to interact with individuals of various ages, backgrounds, and beliefs, thereby enhancing their social skills. Additionally, a study conducted by Medlin and Butler (2018) revealed that home-schooled learners exhibited higher levels of self-esteem and self-concept, contributing positively to their social competence. These findings support the idea that homeschooling provides a nurturing environment conducive to the development of strong social skills.

Contrary to these findings, research by Abuzandah (2020) suggested that home-schooled learners might face challenges in developing social competence due to limited exposure to diverse social situations. Abuzandah emphasized the importance of exposing learners to various social contexts to promote adaptive social behaviors. Similarly, Kunzman and Gaither (2013) argued that home-schooled learners might have fewer opportunities to interact with peers, potentially limiting their social

learning experiences. These contrasting viewpoints highlight the ongoing debate within the research community regarding the social outputs of homeschooling.

Further insights can be drawn from a study conducted by Glutting et al. (2016), which examined the social and emotional development of home-schooled learners. The researchers found that home-schooled learners exhibited comparable social skills to their conventionally schooled counterparts. The study emphasized the significance of the learning environment and parental involvement in shaping social outputs, emphasizing the need for a holistic understanding of the factors influencing social competence in home-schooled learners.

Additionally, research by Medlin (2013) argued that socialization opportunities for home-schooled learners are not limited but rather different from those in conventional schools. Home-schooled learners often engage in community activities, sports, and group learning experiences, fostering social skills in diverse settings. These findings challenge the misconception that home-schooled learners lack socialization opportunities, emphasizing the importance of considering the multifaceted nature of social interactions in diverse contexts.

#### **4.8 Discussion of Implications**

This study compared academic learning outputs and social learning outcomes between home-schooled and conventionally schooled learners pursuing the ACE curriculum in Kenya. From the array of findings, a number of implications for the theory and practice of homeschooling were discerned.

#### **4.8.1 Implications for Theory**

This study was underpinned by the systems theory input-output model that advocates for an environment in which inputs are made. In finding that home-schooled learners scored marginally better in English and social studies than conventionally schooled learners, the study implied that an environment that learners are largely familiar with is likely to enhance their exposure to real-time learning experiences and designs that shape the two skills. Besides, the study revealed a lack of significant differences in math and social learning outputs between the two groups of learners. These findings underscore the arguments that Kunzman (2012) posited that an ideal environment is bound to determine learners' acquisition of academic and social skills.

The findings strengthen the systems theory input-output model by showing that the home environment under parents' control is likely to handle inputs better and maximize outputs. Parents are in a position to provide the required learning resources in real-time, leading to enhanced performance. Moreover, values and behaviour acquired from parents are likely to reflect familial expectations. Besides, in showing that there was no significant difference in social learning outputs and transition rates between home-schooled and conventionally schooled learners, the study underscores the need to perceive informal and formal education as subsystem components that need to complement each other postulated in the system's theory.

#### **4.8.2 Implications for Practice**

The finding showing that home-schooled learners outscored their conventionally schooled counterparts in English learning outputs but matched them in Social studies

and Math learning outputs, is a manifestation of the important role parents and the home environment can play in children learning. The study confirmed that parents could create a favourable learning environment by putting in place various inputs that can create a variety of learning experiences and discernible and clear outputs. The inputs include allowing learners to access the emerging edutainment and interactive technology in the real world. Through these technologies, educational facilities, like libraries, museums, and research institutions, are easily accessible virtually. Meanwhile, parents facilitate access to public facilities like parks, stations, roads, and social services like parks, orphanages, and hospitals through which learners interact with the real world honing their skills in social studies disciplines such as science, history, and others. Business facilities like malls, exhibitions, restaurants, factories, fields and plantations, and information and technology platforms, such as the internet and audiovisuals, can also be exploited. In addition, parents are able to provide necessary learning materials like books, science kits, and their time, of course, to see to it that their learners are learning effectively.

Research clearly shows that the home environment has been able to develop other bits of intelligence that cannot be developed in a school setting (McKeon and Times, 2011). This realization is a major benefit considering that it has been documented that the environment in school sometimes provides negative experiences like promiscuity, brawls, cigarettes, and illegal drugs, which haunts parents who are in no position to keep an eye on their learners while in school (Razi, 2016). Meanwhile, it has also been shown that homeschooling can accommodate the maximum potential intelligence of the child because every child has the diversity and distinctiveness of their interests, talents, and skills (Smith 2013).

Therefore, it is incumbent upon educational stakeholders to realize that home-schooling seems to be able to avoid negative environmental effects that learners in formal schools may encounter. This, according to Razi (2016), is so because the child is given the freedom to learn. The environment a child learns in determines the outputs resulting from the learning experience. The two types of environments, home school and conventional school, are different in settings and orientation, meaning that they impact the learner's ability to acquire various skills differently. This is the view shared through Amayeye's (2016) findings regarding learners' perception of home schooling.

Through a study conducted on the learning environment, Amayeye established that 88% of the learners agreed that home is a good learning environment and that only 12% were uncertain. None of the student respondents disagreed about home being a good learning environment. It was noted that learners would mostly appreciate the comfort and security the home provides, especially under the parent's care. That would mostly affect their learning positively because it eliminates most distraction. Moreover, 83% of the teachers agreed there was academic progress among ACE learners. These results were similar to Mungai's (2011) study, which found that the PACEs used were very precise and made learning easy for learners, meaning this curriculum is learner-friendly.

Moreover, religion seems to play a role here; most parents were Christians. Studies have shown that for parents who take religion very seriously, religion controls everything in their life. It is believed religious families tend to be more cohesive and have learners with fewer discipline problems. Carmel Chiswick, Professor of

Economics at the University of Illinois Chicago, found that “people with high levels of religious human capital tended to select spouses who also have high levels of religious human capital, forming family units for which the home production of religious education is more efficient”. This phenomenon of high homogamy and practice seems to be operating in the American home-schooling movement. It also leads to less conflict and greater happiness for couples and creates better relationships between learners and parents. In turn, this adds to family satisfaction, which has a larger effect than any of the religious variables in protecting against risky behaviours that undermine educational attainment (Chiswick, 2005).

The combined results from learners, parents and teachers regarding social learning outputs indicated that the observed differences within the three categories of respondents were not statistically significant. For practice purposes, this implies that homeschoolers are equally able to develop the social competencies that make them grow to fit well in the community and should be accorded such opportunities. The study confirmed that homeschoolers do not emphasize academic competencies alone but are also keen on other values learners acquire.

Indeed, it has been demonstrated that homeschoolers do not emphasize the priority of achievement scores only (Murphy, 2014). Murphy opined that other more significant goals like instilling values should be centered on investigating whether home school works. Murphy (2014) goes ahead to state that homeschooling is a right that surpasses test results, and the gate to homeschooling should not open or shut in response to test scores.

Therefore, these successes have seen learners who are home-schooled study well and have been able to become successful people in society. This is so because, according to Amayeye's (2016) study, ACE learners worldwide are given an opportunity to participate in learners' conventions, in which they compete in various categories of events; in music, athletics, academics, and photography, needle, and thread, dance and platform events. It was also noted that when the learners were asked about these events, 73% agreed that these events made them develop their talents. During these events, learners socialize and develop other social skills. Their teacher's perception on character building was also viewed positively, with many agreeing that the learners who went through the ACE curriculum were well-formed character-wise.

Equally on progression, Amayeye's (2016) finding showed that the home-schooled learners are able to comfortably progress in their studies just like other learners attending conventional schools. It was noted perception of academic acceleration was very positive, with those who agreed to being; teachers at 89% and parents at 71%. Also 72% of, the teachers agreed that the learners were well prepared for college, so progression was guaranteed. This study showed that learners under this mode of schooling have been able to comfortably transit to the next grade.

It is important to note that, although homeschooling has had its own share of disadvantages, it has been able to put a strong argument that it deserves to be recognized. Brynard (2007) pointed out that homeschooling could have its own shortcoming. Still, it does offer possible educational solutions in certain circumstances, as well as relief from pressure on an overburdened South African school system. He quoted a chief education specialist in South Africa who said that

the many advantages of home schooling could be exploited to benefit the South African educational system. At the same time, homeschooling and private education could offer the kind of competition that will improve the quality of education in public schools.

## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter summarizes the study findings discussed in chapter four, and concludes in line with the stated objectives. The chapter then presents the recommendations for practice and future studies.

#### 5.2 Summary of Findings

The main finding of this study and which reflects the researchers' thesis is that, Learners' academic and social learning outputs compare equally for home schooled and conventionally schooled learners, meaning that homeschooling, is a viable mode of learning. The summary focuses specifically on comparisons in learning outputs in mathematics, English, and Social studies and comparison of social learning outputs.

##### **5.2.1 Comparison of the Learning Outputs in Mathematics between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.**

The first objective of this study compared the learning outputs in Mathematics between the home-schooled and conventionally schooled learners under the Accelerated Christian Education Programme in Kenya. The descriptive analysis results confirmed that the learning outputs in Mathematics for learners pursuing the ACE programme from home were marginally higher than those of learners pursuing ACE in conventional schools. The independent samples t-test analysis results

indicated that there was no statistically significant differences in Mathematics learning outputs between home-schooled and conventionally schooled learners pursuing the ACE curriculum.

### **5.2.2 Comparison of the Learning Outputs in English between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.**

The study's second objective compared learning outputs in English between home-schooled and conventionally schooled learners registered under the ACE programme in Kenya. The descriptive analysis results confirmed that learners pursuing the ACE programme from home had slightly better English learning outputs than those of learners in conventional schools. These descriptive findings were further backed by the ACE center administrative personnel interview responses. The independent samples t-test results revealed that the mean difference was significant, an indication that English learning outputs of home-schooled learners were significantly better than those of conventionally schooled learners pursuing the ACE programme in Kenya.

### **5.2.3 Comparison of the Learning Outputs in Social Studies between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.**

The third objective of this study zeroed on comparing learning outputs in social studies between home-schooled and conventionally schooled learners registered under the ACE programme in Kenya. The descriptive analysis results confirmed that home-schooled learners scored higher average social studies outputs than conventionally schooled learners. The independent samples t-test results revealed that there was no

significant differences in learning outputs in social studies between home-schooled and conventionally schooled learners.

#### **5.2.4 Comparison of the Social Learning Outcomes between the home-schooled and Conventionally Schooled Learners under the ACE Programme in Kenya.**

The fourth objective of the study focused on comparing social learning outputs between home and conventionally schooled learners pursuing the ACE programme in Kenya. From the descriptive analysis of parents' responses, the study established that both home-schooled and conventionally schooled parents had high perceptions that any of the two modes of learning had the potential to develop social skills among learners. This was clear in the high percentage of parents agreeing that learners elicited social values like persistence, self-control, and social competence. However, government policies and regulations jeopardize the potential inherent in homeschooling.

The Mann-Whitney U results confirmed the following: the persistence of home-schooled and conventionally schooled learners was not significantly different.

Similarly, home-schooled and conventionally schooled learners were not significantly different in self-control. Additionally, there were no significant differences in social competence between home-schooled and conventionally schooled learners.

#### **5.4 Conclusions**

Based on the findings, this study concludes that;

1. The mathematics learning outcomes do not significantly differ between home-schooled and conventionally schooled learners enrolled in the ACE programme. This indicates that homeschooling has the potential to develop mathematics skills in learners as effectively as conventional schools. As a result, home-schooled learners are likely to achieve similar levels of math learning as their conventionally schooled peers.
2. English learning outcomes show a significant difference between home-schooled and conventionally schooled learners enrolled in the ACE programme in Kenya. Home-schooled learners demonstrate higher English learning outputs compared to their conventionally schooled counterparts when matched grade-wise and PACE-wise. This suggests that homeschooling slightly enhances English skills in learners, making it a viable alternative form of learning.
3. Social studies learning outcomes in homeschooling learners enrolled in the ACE program in Kenya are marginally higher than those in conventionally schooled learners. However, the difference in social studies learning outputs is not statistically significant. This indicates that the home environment offers similar experiences and opportunities for learners to engage with social studies as done by conventional schools. Therefore, parents and educators can have confidence in the effectiveness of homeschooling in delivering social studies education, ensuring that learners receive similar educational experiences regardless of the learning setting.
4. Social learning outcomes are not significantly different between home schooled learners under the ACE programme and their counterparts in conventional schools. Therefore, learners pursuing the ACE programme at home have the equal

potential of acquiring social learning skills of self-control, persistence, and social competence as their peers in conventional schools. Acquisition of such skills is independent of the mode of learning and is equally exhibited among home-schooled and conventionally schooled learners.

## **5.6 Recommendations**

This study makes the following recommendations on the basis of the conclusions that were drawn.

### **5.6.1 Policy Recommendations**

On the basis of the findings of this study, the following policy recommendations were made:

1. Education policymakers and authorities should recognize homeschooling as a legitimate and effective educational approach for honing mathematics skills as demonstrated the ACE program. This recognition can encourage more parents to consider homeschooling as a viable option for their children's education. Moreover, homeschooling parents should be offered professional development opportunities to enhance their math teaching skills. This can be achieved through workshops, online courses, or access to experienced educators who can provide guidance.
2. Homeschooling's success in enhancing English skills suggests the importance of personalized learning. Conventional schools should consider adopting individualized learning plans tailored to students' English proficiency levels. These plans can cater to each student's unique learning pace and style, ensuring

targeted language development. Moreover, active parental involvement in children's learning should be encouraged based on the significant role they can play in supporting their child's English language development, whether in homeschooling or conventional schooling settings

3. There is need to acknowledge and appreciate the value of the home environment in delivering effective social studies education. Parents and educators should recognize that homeschooling can provide similar educational experiences in social studies as conventional schools, fostering confidence in the homeschooling approach.
4. Education stakeholder should acknowledge and recognize that both home-schooled and conventionally schooled learners have equal potential to acquire essential social learning skills such as self-control, persistence, and social competence. This recognition is fundamental in promoting inclusivity and valuing diverse learning environments. Educational policies should reflect the understanding that social skills development is not limited to conventional classroom settings and can thrive within homeschooling environments.

### **5.6.2 Recommendation for future research**

In view of the findings, this study made the following suggestions for future research:

1. A study should be conducted to compare ACE learners' academic output with those from other educational systems prevalent in Kenya like 8-4-4 or Competency Based Curriculum
2. Given the causal nature of this study, the impact of external factors on the superior academic performance of homeschoolers compared to conventionally schooled

learners cannot be disregarded. Subsequent research should utilize methods that account for the potential effects of these external variables. Such as moderation models.

3. A study should be conducted to assess the effects of different learning modes e-learning on academic performance. By isolating the influence of homeschooling, a clearer understanding of its impact on learners' education can be achieved before making any comparisons.

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## APPENDICES

### APPENDIX I: Questionnaire for Parents

You have been selected as a respondent in this study, which is a comparative study of learning outputs of home schooled and conventionally schooled learners under the Accelerated Christian Education programme in Kenya. Information obtained in the study is hoped to be of great importance to stakeholders and policy makers in Education particularly in the practice of home schooling in Kenya and beyond. Please, kindly take a few minutes to respond to this questionnaire. Your sincere responses will be highly appreciated and treated in confidence. Please do not indicate your name anywhere in this questionnaire.

#### PART 1 (SECTION A)

##### Background information

**This section is to be filled by parents of conventionally schooled learners.**

Please tick (✓) appropriately in the sPACEs provided

1. Gender: Male [ ] Female: [ ]

2. Indicate your age [ ]

3. What are your academic qualifications?

Certificate: [ ] Diploma: [ ] Degree: [ ] Masters: [ ]

Others specify: .....

4. Which Religion do you belong to?

Christian: [ ] Muslim: [ ] Hindu: [ ]

Any other, specify: \_\_\_\_\_

5. If Christian which denomination? \_\_\_\_\_

6. State your occupation. \_\_\_\_\_

7. What is your monthly average income in Kenya shillings?

0—5000 [ ]

5000—10000 [ ]

10000---50000 [ ]

50000---100000 [ ]

100000 andabove [ ]

8. Kindly state your marital status, tick appropriately.

Married [ ] Single [ ]

**PART 1 (SECTION B)**

*Table 1: Parents Survey Questions on tasks undertaken by their learners, by Skill*

#	Question	Response Options			
		None of the time	A little of the time	Most of the time	All of the time
1	Worked on tasks until they were finished.				
2	Kept working on an activity that was difficult.				
3	Waited in line patiently.				
4	Sat still when s/he was supposed to.				
5	Waited for what s/he wanted.				
6	Focused on tasks until they were finished.				
7	Worked well with peers.				
8	Resolved problems with peers without becoming aggressive.				
9	Was thoughtful of the feelings of her/his peers.				
10	Cooperated with peers without prompting.				
11	Understood the feelings of her/his peers.				
12	Resolved problems with peers on her/his own.				

**Parents Survey Questions, on Government Policies/Regulation what is your thoughts on the following.**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Moderately Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>
Government policies/ regulations on schooling are well justified, and offer a clear direction.					
A budget is in place to guide implementation of system of this home-schooling					
Government policies are based on inclusive stakeholder engagement					
Implementation of the schooling programme takes into account existing policies on education locally and internationally.					
The education policy on alternative education in Kenya is operational in this schooling context.					

***Congratulations for Completing This Survey, Thank You and May God Bless You***

## **APPENDIX II: Interview Schedule for Administrative Personnel at the ACEK**

1. What do you think makes people to resort to this Accelerated Christian Education Curriculum?

- (a). Those who home school.
- (b). those who want to go to schools under your programmes.

2. Kindly explain to me from your experience how learners who home-schooled and those in conventional schools with teachers perform under this system academically.

- (a). Those who are home schooled.
- (b). Those who attend school that offer A.C.E. curriculum.
- (c). Are you able to compare them with learners of other

Curriculums?

3. How socially prepared are learners who are home schooled and those conventionally educated compare in skills given below in your programme.

- (a). Persistence i.e. they can keep working on tasks even when they are difficult.
- (b). Self-control, i.e. like being patient, feeling for others and being able to work well with other peers?

4. How do you compare the transition rates or progression of learners who are home-schooled and conventionally schooled from one grade to the other who undertake the Accelerated Christian Education system.

- (a). Do they progress up to college or university level?
- (b). Do they find it difficult to gain admission to college?
- (c). Do we know of any graduates from your system that have been

successful out there?

5. What challenges do you face in implementing this system (A. C. E)?

- (a). In terms of education government policies?
- (b). Do you get support from the government in any form?
- (c). Are you in any way involved in government education

programmes?

6. Is there anything else you wish to add on what we have just discussed?

## APPENDIX III: HSLDA LETTER

MICHAEL P. FARRIS, JD, LLM  
CHAIRMAN (DC, WA)

J. MICHAEL SMITH, ESQ.  
PRESIDENT (CA, DC, VA)

DEWITT T. BLACK III, ESQ.  
SENIOR COUNSEL (AR, SC, DC)

SCOTT A. WOODRUFF, ESQ.  
SENIOR COUNSEL (VA, MO)

JAMES R. MASON III, ESQ.  
SENIOR COUNSEL (DC, OR)

DARREN A. JONES, ESQ.  
ATTORNEY (CA)

**HSLDA**  
ADVOCATES FOR HOMESCHOOLING

December 3, 2012

THOMAS J. SCHMIDT, ESQ.  
ATTORNEY (CA)

MICHAEL P. DONNELLY, ESQ.  
ATTORNEY (MA, NH, WV, DC)

WILLIAM A. ESTRADA, ESQ.  
ATTORNEY (CA)

PETER K. KAMAKAWIWOOLE, ESQ.  
ATTORNEY (MO)

MARY E. SCHOFIELD, ESQ.  
OF COUNSEL (CA)

SCOTT W. SOMERVILLE, ESQ.  
OF COUNSEL (VA, MD)

The Honorable Mutula Kilonzo, EGH, EBS, MP  
Minister for Education  
P.O. Box 30040  
00100 Nairobi  
Kenya

*Via e-mail to: [m.kilonzo@yahoo.com](mailto:m.kilonzo@yahoo.com)*

Re: Provide for Home Education in Basic Education Bill, 2012

Dear Minister Kilonzo,

By way of introduction, I am an attorney and Director of International Relations at the Home School Legal Defense Association, an international organization located in the United States with our headquarters in the Washington, DC area. Our mission is to protect and advance the fundamental human right of parents to direct the education and upbringing of their children. Presently, we have more than 81,000 member families in all 55 of the United States and its territories and in 36 countries. We have multiple members in your country of Kenya.

I have been alerted by the East Africa Community of Homeschoolers (EACH) that the recently proposed Basic Education Bill fails to provide for home education, a globally recognized form of alternative education. I am writing to urge you to use your influence as Minister for Education to include home education in the proposed bill and to remind you that numerous international treaties and declarations explicitly protect the right of parents to homeschool their children. Kenya is a party to a number of these documents. I am mindful that Kenya has its own culture and laws. I also appreciate that you are seeking both to ensure that all children receive the best education possible and at the same time to prevent abuse of the system. I believe that both are possible. Homeschooling is not incompatible with provisions in the Kenyan Constitution to provide "free and compulsory education" for all children. I am providing below an overview of homeschool regulations around the world, as well as documented evidence about the benefits of homeschooling.

HOME SCHOOL LEGAL DEFENSE ASSOCIATION

NATIONAL OFFICE • ONE PATRICK HENRY CIRCLE • PURCELLVILLE, VA 20132 • 540-338-5600 • 540-338-1952 FAX  
CAPITOL HILL OFFICE • 119 C STREET, S.E. • WASHINGTON, DC 20003

# APPENDIX IV: Nacosti Letter

  
**REPUBLIC OF KENYA**

  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **816410** Date of Issue: **23/August/2021**

**RESEARCH LICENSE**



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**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

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**APPENDIX V: PACE 8 Scores**

<b>RESULTS IN PACE 8-GRADE 9</b>					
<b>Age</b>	<b>gender</b>	<b>school mode</b>	<b>Math</b>	<b>English</b>	<b>Social Studies</b>
14	girl	1	95	90	100
13	boy	1	88	97	89
13	boy	1	90	85	100
14	boy	2	95	100	99
14	boy	1	100	88	93
15	boy	2	95	94	100
14	boy	1	100	92	97
14	boy	1	88	98	93
13	boy	1	85	95	88
14	boy	2	100	94	100
14	girl	1	100	87	90
15	boy	2	98	100	98
14	girl	2	100	100	100
13	girl	1	100	96	87
13	boy	1	99	93	92
14	boy	2	95	94	100
14	girl	2	98	86	95
15	girl	2	90	88	100
14	girl	1	100	91	94
14	boy	2	97	95	100
13	boy	2	95	99	100
14	boy	1	98	89	100
14	girl	1	99	97	100
15	boy	1	100	99	100
14	girl	1	96	90	87
13	girl	2	94	99	100

14	girl	2	97	92	99
15	girl	1	100	85	100
14	boy	1	98	93	95
14	girl	1	99	89	96
13	girl	1	93	95	98
14	boy	1	90	97	98
14	boy	2	100	92	100
15	girl	2	98	100	92
14	girl	2	100	98	100
13	boy	1	96	95	97
13	boy	1	100	100	99
14	girl	2	97	100	98
14	girl	1	96	100	97
15	girl	2	99	100	93
14	boy	2	90	94	96
14	girl	2	92	97	94
13	boy	2	90	99	88
14	boy	2	95	94	100
14	boy	1	93	97	86
15	boy	2	100	100	99
14	boy	1	100	99	94
13	boy	1	100	97	92
13	boy	1	100	96	97
14	boy	1	100	98	97
14	boy	2	100	100	100
14	boy	1	100	99	92
14	girl	1	100	100	100
13	girl	1	88	89	97
14	girl	2	99	100	99
14	boy	1	96	93	94
15	boy	2	97	99	100
14	boy	1	100	100	94
13	boy	1	90	95	98
13	boy	1	95	99	100
14	girl	1	99	94	99
14	boy	2	98	100	100
15	boy	1	100	97	98
14	girl	1	100	99	99

14	girl	1	100	96	100
13	boy	1	96	99	99
14	girl	2	85	97	92
14	boy	1	88	86	90
15	girl	1	97	97	83
14	boy	2	90	95	95
13	boy	1	95	90	99
13	boy	1	92	97	96
14	boy	1	90	93	87
14	girl	1	89	92	93
15	girl	1	93	98	88
14	girl	2	88	95	99
14	boy	1	97	96	93
13	boy	1	88	90	97
14	boy	1	95	97	92
14	girl	1	98	92	97
15	boy	1	100	93	93
14	boy	1	93	93	97
13	boy	1	85	91	97
13	boy	1	96	94	93
14	girl	2	94	90	85
14	boy	2	83	86	95
14	girl	2	99	96	88
13	girl	2	100	93	86
14	boy	2	89	88	96
14	girl	1	96	87	95
15	girl	1	95	93	100
14	boy	1	92	94	99
14	girl	1	98	85	95
13	girl	1	94	98	98
14	boy	1	88	93	99
14	boy	2	100	98	100
15	girl	2	100	97	92
14	girl	2	99	100	97
13	boy	1	98	94	100
13	boy	1	99	100	98

**APPENDIX VI: PACE 9 Scores, Grade 9**

<b>Age</b>	<b>gender</b>	<b>Math</b>	<b>English</b>	<b>Social Studies</b>
14	girl	92	94	100
13	boy	92	98	95
13	boy	80	90	100
14	boy	89	98	98
14	boy	100	90	90
15	boy	90	96	100
14	boy	98	90	98
14	boy	90	96	90
13	boy	90	90	92
14	boy	100	96	100
14	girl	100	92	93
15	boy	96	100	97
14	girl	100	100	100
13	girl	100	94	92
13	boy	98	90	95
14	boy	94	96	100
14	girl	96	90	92
15	girl	92	92	100
14	girl	98	90	92
14	boy	98	94	100
13	boy	92	98	100
14	boy	96	85	100
14	girl	98	98	100
15	boy	98	98	100
14	girl	98	93	92
13	girl	96	98	100
14	girl	95	93	97
15	girl	100	90	100
14	boy	96	90	97
14	girl	96	90	97
13	girl	96	90	97
14	boy	92	96	99
14	boy	100	95	100
15	girl	99	100	95
14	girl	100	96	100
13	boy	94	93	95
13	boy	98	100	95
14	girl	98	100	95
14	girl	98	100	95

15	girl	98	100	95
14	boy	94	96	90
14	girl	94	96	90
13	boy	94	96	90
14	boy	94	96	100
14	boy	95	98	90
15	boy	99	100	96
14	boy	100	98	95
13	boy	100	98	95
13	boy	100	98	95
14	boy	100	98	95
14	boy	100	100	100
14	boy	100	98	95
14	girl	100	100	100
13	girl	91	93	95
14	girl	100	100	97
14	boy	98	95	96
15	boy	98	98	100
14	boy	100	100	96
13	boy	94	97	99
13	boy	96	98	100
14	girl	100	95	97
14	boy	99	100	98
15	boy	100	98	99
14	girl	100	98	97
14	girl	100	98	98
13	boy	98	98	97
14	girl	90	94	87
14	boy	90	90	92
15	girl	98	98	90
14	boy	92	97	90
13	boy	97	93	97
13	boy	94	95	92
14	boy	94	95	92
14	girl	94	95	92
15	girl	94	95	92
14	girl	92	97	96
14	boy	95	94	95
13	boy	92	94	95
14	boy	93	94	94
14	girl	92	94	95
15	boy	96	94	95
14	boy	96	94	95

13	boy	90	94	95
13	boy	90	90	95
14	girl	96	94	90
14	boy	90	90	90
14	girl	98	90	90
13	girl	100	90	90
14	boy	92	93	93
14	girl	92	92	92
15	girl	90	91	100
14	boy	90	90	97
14	girl	96	90	97
13	girl	92	90	97
14	boy	92	96	99
14	boy	100	95	100
15	girl	99	93	95
14	girl	100	100	95
13	boy	94	96	100
13	boy	98	100	95

**APPENDIX VII: PACE 10 Scores, Grade 9**

<b>PACE 10</b>				
<b>Age</b>	<b>gender</b>	<b>Math</b>	<b>English</b>	<b>Social Studies</b>
14	girl	89	98	100
13	boy	96	99	101
13	boy	70	95	100
14	boy	83	96	97
14	boy	100	92	87
15	boy	85	98	100
14	boy	96	88	99
14	boy	92	94	87
13	boy	95	85	96
14	boy	100	98	100
14	girl	100	97	96
15	boy	94	100	96
14	girl	100	100	100
13	girl	100	92	97
13	boy	97	87	98
14	boy	93	98	100
14	girl	94	94	89
15	girl	94	96	100
14	girl	96	89	90
14	boy	99	93	100
13	boy	89	97	100
14	boy	94	81	100
14	girl	97	99	100
15	boy	96	97	100
14	girl	100	96	97
13	girl	98	97	100
14	girl	93	94	95
15	girl	100	95	100
14	boy	94	87	99
14	girl	93	91	98
13	girl	99	85	96
14	boy	94	95	100
14	boy	100	98	100
15	girl	100	100	98
14	girl	100	94	100
13	boy	92	91	93
13	boy	96	100	91
14	girl	99	100	92
14	girl	100	100	93

15	girl	97	100	97
14	boy	98	98	84
14	girl	96	95	86
13	boy	98	93	92
14	boy	93	98	100
14	boy	97	99	94
15	boy	98	100	93
14	boy	100	97	96
13	boy	100	99	98
13	boy	100	100	93
14	boy	100	98	93
14	boy	100	100	100
14	boy	100	97	98
14	girl	100	100	100
13	girl	94	97	93
14	girl	100	100	95
14	boy	100	97	98
15	boy	99	97	100
14	boy	100	100	98
13	boy	98	99	100
13	boy	97	97	100
14	girl	101	96	95
14	boy	100	100	96
15	boy	100	99	100
14	girl	100	97	95
14	girl	100	100	96
13	boy	100	97	95
14	girl	95	91	82
14	boy	92	94	94
15	girl	99	99	97
14	boy	94	99	85
13	boy	99	96	95
13	boy	96	93	88
14	boy	98	97	97
14	girl	99	98	91
15	girl	95	92	96
14	girl	96	99	93
14	boy	93	92	97
13	boy	96	98	93
14	boy	91	91	96
14	girl	86	96	93
15	boy	92	95	97
14	boy	99	95	93

13	boy	95	97	93
13	boy	84	86	97
14	girl	98	98	95
14	boy	97	94	85
14	girl	97	84	92
13	girl	100	87	94
14	boy	95	98	90
14	girl	88	97	89
15	girl	85	89	100
14	boy	88	86	95
14	girl	94	95	99
13	girl	90	82	96
14	boy	96	99	99
14	boy	100	92	100
15	girl	98	89	98
14	girl	100	100	93
13	boy	90	98	100
13	boy	97	100	92