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APPLIED PHILOSOPHY IN EMPOWERING THE GIRL CHILD: FOSTERING INNOVATIVE LEADERSHIP, TECHNOLOGIES, AND DISCIPLINE FOR SOCIAL CHANGE

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ABSTRACT

This research explores the intersection of innovation, technologies, leadership, and discipline in shaping the empowerment of the girl child. Focusing on the application of philosophical principles, the study aims to examine how these concepts can be utilized as catalysts for social change and empowerment. The study applies a desktop analysis methodology to gather, evaluate, and synthesize relevant literature on the role of innovation and leadership in fostering opportunities for young girls in education, technology, and social engagement. With the rapid development of innovation and artificial intelligence (AI), new opportunities exist for addressing these challenges through proactive and supportive disciplinary systems. It explores how discipline and leadership, underpinned by an applied philosophical framework, can guide the development of a more inclusive and sustainable society. Findings suggest that fostering a balance of innovation, leadership, and discipline can significantly enhance the potential of the girl child in the 21st century. This research provides practical recommendations for stakeholders, including educators, policymakers, and activists, to ensure that these forces are harnessed effectively for the girl child's empowerment.

KEYWORDS

Girl Child, Innovation, Technologies, Leadership, Discipline, Applied Philosophy, Empowerment, Social Change, Gender Equality, Artificial Intelligence

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Introduction

The empowerment of the girl child is a critical aspect of achieving gender equality and broader social development goals. In the contemporary world, innovation and technologies have emerged as transformative forces that can reshape access to education, economic opportunities, and leadership roles for young girls. Leadership and discipline are foundational in guiding the girl child through these opportunities, offering not only practical skills but also the moral and philosophical framework needed to navigate a rapidly changing world. Applied philosophy, particularly in the context of social justice and ethical development, can provide a valuable lens to examine the structures and strategies that underpin empowerment efforts. This research investigates how innovation, technology, leadership, and discipline, when underpinned by philosophical principles, can support the girl child in realizing her full potential.

In South Africa, secondary schools are critical environments for shaping young minds. However, gender-based violence, bullying, and other forms of misconduct remain pervasive challenges that compromise the safety and well-being of girl learners. Positive disciplinary practices that focus on prevention, education, and restorative approaches have been promoted as more effective strategies than traditional punitive methods. Innovation and Artificial Intelligence (AI) can play a transformative role in improving these practices by providing real-time data, supporting personalized interventions, and enhancing the overall school environment.

This research aims to explore how innovation and AI can contribute to the advancement of positive disciplinary practices in secondary schools, with a specific focus on protecting girl learners. A multi-level approach is taken, considering global, continental, national, and regional (KwaZulu-Natal) perspectives to provide a holistic understanding of the context in which these technologies can be applied.

Research Methodology

The methodology employed in this research is desktop analysis, which involves reviewing and synthesizing existing literature on the role of innovation, technologies, leadership, and discipline in empowering the girl child. This approach allows for the collection of secondary data from diverse academic sources, including peer-reviewed articles, books, reports from international organizations, and policy papers. Through this method, the study aims to uncover patterns, theories, and frameworks that are commonly discussed in the context of girl child empowerment. A systematic review process was used to ensure the identification of relevant and credible sources.

Theory Underpinning the Study

The study is underpinned by Social Constructivism, a theory in educational psychology and philosophy which emphasizes that knowledge and skills are constructed through social interactions and experiences. This theory suggests that the development of the girl child's capabilities—whether in leadership, innovation, or discipline—cannot be seen as an isolated individual process. Instead, these capacities are shaped and nurtured within social contexts, such as family, educational systems, and broader community structures. Applied philosophy in this context helps to highlight the ethical and societal obligations that individuals, institutions, and governments have to create environments that allow the girl child to flourish (Vygotsky, 1978).

A qualitative desktop analysis was conducted using a range of academic and policy-oriented literature. The review process involved sourcing relevant studies, reports, and publications from global, continental, national, and regional (KwaZulu-Natal) contexts to understand the role of AI and innovation in addressing disciplinary challenges in schools. The study examines both the theoretical frameworks surrounding discipline and the practical applications of AI in educational settings.

Global Overview:

At a global level, the use of technology and AI in education is increasingly recognized for its potential to improve not only academic outcomes but also behavioral management. For example, AI-powered systems in some countries are used to monitor student behavior, detect patterns of misconduct, and provide insights into potential risks, such as bullying or violence (Anderson & Rainie, 2018). Moreover, positive behavioral support systems (PBIS) in schools, which have been integrated with AI tools, show promise in creating safer environments for girls by predicting and preventing incidents of violence or bullying (Horner et al., 2016).

Subtopic: The Role of AI in Behavioral Monitoring and Intervention:

AI technologies, such as predictive analytics and facial recognition, are increasingly being used to monitor and assess student behavior. These technologies can identify students who may be at risk of exhibiting harmful behaviors, allowing teachers and administrators to intervene early (McAlister, 2020). For girl learners, this kind of early intervention is particularly important in preventing gender-based violence, harassment, and bullying.

Continental (SADC) Overview:

In the Southern African Development Community (SADC) region, many countries face similar challenges in ensuring the safety and well-being of girls in schools. Innovations in AI and digital technologies have been relatively slow to be adopted in educational institutions, but several pilot projects in countries such as Botswana, Zambia, and Zimbabwe have shown promise in leveraging technology for behavioral monitoring and improvement (Chimombo, 2018). The use of AI in educational settings in SADC countries is still in its infancy, but growing interest and investment in these technologies are paving the way for future adoption.

Subtopic: Technology-Based Solutions for Gender-Based Violence (GBV) in Schools:

Several studies have highlighted the importance of AI-driven platforms in combating gender-based violence (GBV) in schools. AI tools are capable of analyzing students' behaviors and interactions to identify early signs of bullying, harassment, and violence (Mubangizi, 2019). These tools can be used to develop strategies that prevent and address GBV effectively, creating a safer environment for girls.

National (South Africa) Overview:

In South Africa, the prevalence of gender-based violence in schools has led to significant policy reforms aimed at protecting girl learners. According to the Department of Basic Education (DBE), positive disciplinary practices, including restorative justice, are increasingly being promoted to create safer school environments

(DBE, 2020). The integration of AI and technological innovations into school management systems could further enhance these efforts. For instance, AI-powered systems could be used to monitor classroom environments, ensuring that incidents of bullying or misconduct are quickly addressed and reported.

Subtopic: Restorative Justice and AI-Driven Solutions in South African Schools:

South Africa has made significant strides in promoting restorative justice practices in schools, which focus on repairing harm and restoring relationships rather than simply punishing offenders (Duncan & Hanekom, 2020). The integration of AI tools with restorative justice processes can help track incidents, assess the severity of issues, and provide data-driven recommendations for interventions.

Regional (KwaZulu-Natal) Overview:

KwaZulu-Natal (KZN), one of South Africa's most populous provinces, faces unique challenges in school discipline, with high incidences of bullying, gender-based violence, and other forms of misconduct. Innovations in school discipline in KZN have seen limited AI integration, although there are some initiatives, such as school-based monitoring systems that track student behavior using mobile applications. These innovations are particularly useful in protecting girl learners by allowing teachers and administrators to identify and address potential issues more efficiently (Nkosi & Tenge, 2021).

Subtopic: AI as a Tool for Preventing Violence and Bullying in KZN Schools:

The use of AI tools in KZN schools has shown promise in reducing incidents of bullying and violence. Schools in the region have begun piloting AI-based behavioral monitoring systems that provide real-time alerts about potential threats to students' safety (Nkosi & Tenge, 2021). Such technologies are especially important for preventing violence against girl learners, who are disproportionately affected by bullying and harassment.

Literature Review

This literature review draws on critical themes relevant to the empowerment of the girl child through education, innovation, leadership, technology, and discipline. In particular, the discussion revolves around historical and philosophical frameworks, theories of education, social imperatives, and sustainable development in the context of secondary education in South Africa. The goal is to identify new and innovative strategic theories for transforming education to support the girl child's empowerment and social transformation.

1.1 Innovation and Technology in Empowering the Girl Child

Recent literature highlights those innovations in technology, particularly in the fields of digital education, mobile connectivity, and online platforms, offer transformative opportunities for the girl child. For example, mobile learning platforms have been critical in providing access to education in rural and underserved areas. Additionally, technology plays an essential role in equipping girls with skills in science, technology, engineering, and mathematics (STEM), an area where women and girls are traditionally underrepresented. Scholars such as Smith (2020) argue that by integrating technology into education, girls can access tailored learning experiences that challenge traditional gender roles and stereotypes.

Furthermore, Binns and Hamilton (2019) emphasize the role of digital innovation in enabling girls to gain skills in coding, design, and robotics, areas traditionally dominated by males. They argue that by bridging the digital divide, we create an environment where the girl child can actively participate in technological advancements, thereby fostering leadership in an increasingly tech-driven world.

1.2 Leadership Development for the Girl Child

Leadership training is another key component for the empowerment of the girl child. Leadership programs, both in schools and in the community, help cultivate confidence, critical thinking, and decision-making skills. Research by Johnson & Lee (2019) emphasizes that providing leadership opportunities for girls enhances their agency and allows them to take active roles in their communities, leading to greater involvement in governance, social entrepreneurship, and activism. Leadership education for girls must also be embedded with a sense of ethical responsibility and cultural awareness, as explored by Williams (2018) in her work on leadership frameworks for women.

The importance of mentorship in leadership development is also stressed by Ogunyemi (2021), who argues that mentorship programs designed for young girls provide critical support in enhancing their self-efficacy and breaking down barriers in male-dominated leadership spaces. According to Kabeer (2019), leadership training that incorporates social justice perspectives can help girls understand their roles in shaping societal norms and overcoming gender-based barriers.

1.3 Discipline as a Cornerstone of Development

Discipline in the context of empowerment is not just about conformity; it is about teaching girls resilience, self-regulation, and the ability to focus on long-term goals despite challenges. Literature on this topic focuses on how discipline enables girls to overcome social and institutional barriers. Kumar & Patel (2021) suggest that when discipline is paired with supportive mentorship and a clear understanding of personal goals, it can motivate girls to pursue ambitious careers and leadership roles. Discipline also helps develop a sense of responsibility towards societal well-being, reinforcing the girl's role as a changemaker.

Gokhale and Choudhury (2020) further argue that discipline, when linked to technology-enhanced learning environments, cultivates a sense of responsibility and self-motivation in girls. By fostering autonomy in educational choices, girls can navigate challenges more effectively, contributing to their overall empowerment.

1.4 Applied Philosophy in Guiding Empowerment

Applied philosophy provides the ethical foundation needed to guide empowerment efforts. Ethical theories, particularly those in social justice and human rights, emphasize the inherent dignity and worth of every individual, regardless of gender. Scholars such as Beck (2017) argue that philosophical frameworks can guide decision-making, ensuring that the empowerment of the girl child is not only an educational or economic matter but a moral imperative. Philosophical approaches to leadership, ethics, and education help identify and dismantle systems of inequality that prevent girls from achieving their full potential.

Incorporating Social Constructivism into applied philosophy allows for a more personalized approach to empowerment, where girls' educational experiences and leadership development are seen as socially constructed through interactions with their peers, mentors, and society at large (Vygotsky, 1978). Beck (2017) further notes that a philosophical commitment to social justice in education allows for the dismantling of traditional gender roles that have historically hindered the girl child from achieving her full potential.

This literature review draws on critical themes relevant to the empowerment of the girl child through education, innovation, leadership, technology, and discipline. In particular, the discussion revolves around historical and philosophical frameworks, theories of education, social imperatives, and sustainable development in the context of secondary education in South Africa. The goal is to identify new and innovative strategic theories for transforming education to support the girl child’s empowerment and social transformation.

1.5 History of Education and Democracy

The historical development of education has been inextricably linked to the political and social evolution of societies. In the case of South Africa, the history of education is marked by apartheid-era policies that intentionally marginalized black, particularly female, students in terms of educational opportunities. The history of South African education, as described by Kallaway (2002), shows how colonial and apartheid educational systems were designed to suppress the intellectual and social capacities of non-white South Africans, especially women, limiting their access to knowledge, leadership positions, and technologies.

After the end of apartheid in 1994, South Africa underwent a process of educational transformation, guided by the principles of democracy and equality. According to Fleisch (2008), the post-apartheid education reforms aimed to provide equal opportunities for all learners, regardless of race or gender. However, the challenges of gender inequality in education persist, and this is where applied philosophy can be pivotal. Philosophical debates about justice, equity, and inclusivity must shape educational practices that provide equal opportunities for both boys and girls, especially in leadership and technological spaces.

Findings and Implications: Historical injustices in education, particularly gendered disparities, still influence contemporary schooling in South Africa. Applied philosophy, particularly Rawls’ Theory of Justice (Rawls, 1971), can inform policies aimed at fostering equity in educational access for girls. By ensuring that girls are not excluded from leadership and technology-focused curricula, the educational system can become a tool for social transformation.

1.6 Paradigm and Meta-Theories in Education

Educational paradigms and meta-theories provide a broad lens through which the evolving objectives of schooling can be understood. Pinar (2004) discusses how education is often framed through the lens of various paradigms, including essentialism, progressivism, and critical theory. Critical pedagogy, championed by Paulo Freire (1970), has been particularly influential in conceptualizing education as a tool for social liberation, focusing on the empowerment of marginalized groups, such as women and girls. Freire’s work on

conscientization calls for an education that fosters critical thinking and awareness of social injustices, including gender inequalities.

In the context of South Africa, Biko's (1978) advocacy for education as a means to "empower the oppressed" aligns with critical pedagogy. His vision places the responsibility on educators to help students, particularly girls, navigate societal structures that often marginalize them. Giroux (2009) further emphasizes that educational spaces should not only focus on the transmission of knowledge but also on cultivating the leadership and innovative capacities of marginalized groups.

Findings and Implications: Applying critical pedagogy and post-colonial theories to South African education can foster a more inclusive environment for the girl child. The integration of Feminist Theory (hooks, 2000) can support the creation of educational practices that empower girls by challenging patriarchal norms and encouraging girls to become leaders and innovators in their communities.

1.7 Social Imperatives Perspective for Education and Discipline in Secondary Schools in South Africa

From a social imperative perspective, education serves not only as an individual right but as a societal responsibility. In South Africa, the educational system plays a pivotal role in addressing social inequities. Jansen (2001) highlights how education should be used as a tool for fostering democratic values, citizenship, and social responsibility. This aligns with the notion that discipline in education should go beyond mere conformity and focus on cultivating responsible, informed citizens who can contribute to social transformation.

Discipline in South African secondary schools, however, remains a contested issue. While traditional disciplinary practices have often been focused on compliance and authority, modern educational theory advocates for approaches that foster intrinsic motivation, self-regulation, and ethical leadership (Brophy, 2006). Govender (2017) emphasizes that discipline, when understood as a form of empowerment, can guide students, particularly girls, in navigating the challenges they face in a patriarchal society while developing leadership qualities.

Findings and Implications: Social imperatives and discipline can intersect to foster an environment of ethical leadership for girls. The Disruptive Innovation Theory (Christensen, 1997) could be used as a model for creating educational environments that challenge traditional power dynamics, introducing innovative teaching practices that empower the girl child to develop leadership skills and technological literacy.

1.8 Competitive Perspectives and Theories of Transforming Education

Theories of educational transformation often focus on competitive perspectives that prioritize outcomes such as equity, quality, and relevance. Hargreaves (2003) advocates for a competitive and dynamic educational system that emphasizes personalized learning experiences. In the case of the girl child, personalized education can address specific barriers to participation in leadership, STEM education, and technology.

Competition in education is often seen as a means of driving innovation and ensuring that learners are equipped with the skills necessary for the global economy. Schleicher (2018) advocates for the competitive integration of digital tools and leadership training to prepare students for a rapidly changing world. This approach suggests that innovation should not just be about technological access but also about fostering the skills needed to lead and create change. By embracing competition in the form of technological innovations and leadership programs, secondary schools can empower the girl child to succeed both locally and globally.

Findings and Implications: Competitive perspectives must be framed around inclusivity and gender equity. Schools should implement Project-Based Learning (PBL) and Design Thinking (Brown, 2009) to enhance creativity and critical thinking, enabling girls to lead projects and initiatives that contribute to social and technological progress.

1.9 Bringing Education for Sustainable Development to the Mainstream

The concept of Education for Sustainable Development (ESD) is gaining traction globally, focusing on equipping learners with the knowledge, skills, and attitudes necessary to address global challenges, such as climate change, poverty, and inequality. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2014) emphasizes that education should promote sustainability by fostering environmental stewardship, economic fairness, and social justice.

In South Africa, ESD can be particularly transformative for the girl child. By integrating sustainability principles into school curricula, students can develop innovative solutions to problems facing their communities, especially in areas of economic inequality and access to resources. Girls, in particular, benefit

from ESD frameworks that allow them to create solutions that address gender-based disparities in education and the workforce.

Findings and Implications: A focus on sustainability can help girls become agents of change in their communities. The Theory of Change (ToC) (Weiss, 1995) offers a strategic framework for implementing sustainable development goals in education. By using ToC to design educational interventions for the girl child, policymakers can ensure that learning outcomes contribute to broader societal goals, such as gender equality, leadership development, and technological innovation.

2. Innovative Strategic Theories for Empowering the Girl Child

2.1 The Gendered Innovation Framework

Building on the findings from the literature, an innovative strategic theory can be the Gendered Innovation Framework. This approach combines the principles of gender equality and technological innovation to create education models that explicitly address the gender gap in leadership and technology. This framework proposes that education systems should be designed to actively challenge gender biases in STEM fields and empower girls to become leaders in innovation and technology (Faulkner, 2007).

2.2 The Leadership-in-Tech Model

This model emphasizes the integration of leadership and technological training for girls, with a focus on fostering ethical leadership through digital tools. It combines the Disruptive Innovation Theory with Servant Leadership (Greenleaf, 1977) to create an education system that prioritizes ethical leadership, collaboration, and social responsibility. Schools would foster leadership skills among girls by engaging them in tech-driven community projects and initiatives, providing real-world experiences in leadership and innovation.

2.3 The Philosophy of Relational Empowerment

Underpinned by feminist theory and critical pedagogy, this theory focuses on the importance of relationships in education. By promoting collaborative learning environments and mentorship programs, this model emphasizes the need for emotional, social, and academic support to foster the holistic development of the girl child. It integrates Relational Cultural Theory (Jordan, 2008), which emphasizes the importance of connection and relational empowerment in overcoming social and gendered barriers.

This section focused on promoting the participation of girls in STEM (Science, Technology, Engineering, and Mathematics) subjects in secondary schools, a key component in empowering the girl child. STEM education was critical for creating a future where girls could lead in innovation, technological development, and scientific exploration. The study, employing a qualitative, interpretivist, and exploratory design, sought to examine the underlying challenges and propose a model for increasing female representation in STEM education. Drawing from epistemological and ontological frameworks, the study aimed to understand the social and cultural contexts that influenced the choices of girls to engage with STEM disciplines. Additionally, it integrated applied philosophy to create a framework that enhanced access to leadership roles in STEM through educational policies, strategies, and teacher support.

3. Promotion of Girls in STEM: Why It Mattered

The promotion of girls in STEM subjects proved essential for several reasons. Historically, girls had been underrepresented in STEM fields, resulting in missed opportunities for them to contribute to technological advancements and economic growth. According to Smith (2020), STEM subjects opened pathways to careers that offered higher wages and professional opportunities, yet girls continued to face cultural, social, and institutional barriers that prevented them from pursuing these fields. For example, Binns and Hamilton (2019) found that gender stereotypes about who was "naturally" suited for STEM careers persisted, discouraging girls from choosing STEM subjects in school.

Despite these challenges, efforts to encourage girls to choose STEM subjects remained crucial, as women continued to be underrepresented in leadership positions within technology and engineering industries. The lack of female role models in STEM education remained particularly concerning, as studies suggested that the presence of female mentors and teachers helped break down gender-based stereotypes and increased girls' confidence to pursue STEM careers (Johnson & Lee, 2019).

Findings and Implications: The study found that by increasing the visibility of female role models, addressing cultural and social biases, and creating a supportive educational environment, schools could encourage more girls to pursue STEM subjects. Therefore, the research proposed an innovative model that

combined the promotion of STEM education with the enhancement of leadership skills, disciplinary approaches, and technology-driven learning.

Creating a Model to Promote STEM Education for Girls: A Conceptual Framework

The promotion of STEM subjects for girls in secondary schools required a multifaceted model that addressed educational, social, and cultural barriers. Based on the findings from the literature and empirical data, the study proposed the "STEM Empowerment Model". This model integrated several key components derived from the study's findings:

3.1 Empowered STEM Curriculum Design

The STEM curriculum needed to do more than just focus on academic content; it also had to encourage leadership, innovation, and creativity. Government policies and educational systems should have prioritized gender-inclusive curricula that:

Emphasized real-world applications of STEM concepts.

Used gender-neutral language and avoided stereotypes that could discourage girls.

Introduced project-based learning (PBL) and design thinking strategies (Brown, 2009), allowing students to engage in creative problem-solving and hands-on learning. This approach allowed students, particularly girls, to see the relevance of STEM subjects in real life and enabled them to create tangible projects that showcased their innovation and leadership potential.

Brown (2009) advocated for Design Thinking in curriculum design to promote creativity and problem-solving while Schleicher (2018) discussed personalized learning approaches, which included embedding leadership components in STEM subjects to provide a platform for female students to thrive.

3.2 Role Models and Mentorship Programs

One of the most effective ways to encourage girls to choose STEM was by providing access to female mentors who were leaders in STEM fields. Research by Johnson and Lee (2019) and Ogunyemi (2021) demonstrated that mentoring significantly increased girls' confidence in STEM disciplines. Mentorship programs were intended to connect girls with women in science and technology careers who could guide, inspire, and offer career insights.

Key features of an effective mentorship program:

Role models from diverse backgrounds: These role models reflected the diversity of the girl students in terms of race, socioeconomic status, and cultural background.

Long-term mentorship relationships: Girls had the opportunity to build sustained relationships with their mentors, rather than short-term interactions.

Findings: Girls who participated in mentorship programs were more likely to persist in STEM subjects, develop leadership skills, and pursue STEM careers after graduation. Williams (2018) posits the importance of mentorship in breaking down barriers to leadership roles. Beck (2017) argued that mentorship in education could serve as an ethical framework for promoting gender equality.

3.3 Inclusive Teaching Methods and Gender-Sensitive Pedagogy

In secondary schools, teaching practices could have been a significant barrier to girls' engagement in STEM. Gender-sensitive pedagogy, which actively worked to eliminate biases and supported the diverse learning needs of girls, should have been prioritized. Hargreaves (2003) suggested integrating cooperative learning techniques where both male and female students worked together on STEM projects. Jansen (2001) emphasized the need for teachers to understand the dynamics of gendered learning and to actively counteract biases in classroom interactions.

Key strategies for inclusive teaching:

Active learning techniques: Incorporating collaborative group work, project-based learning, and debates, where all students, regardless of gender, had equal opportunities to express their ideas and lead projects.

Differentiated instruction: Adjusting teaching methods to suit different learning styles, ensuring that girls received the support they needed to excel in challenging STEM subjects.

Findings: By creating a gender-inclusive and supportive learning environment, teachers could have encouraged girls to take ownership of their learning and increase their participation in STEM subjects.

Giroux (2009) discussed the importance of critical pedagogy in eliminating educational barriers. Govender (2017) stressed the role of gender-sensitive teaching in encouraging discipline and leadership in girls.

3.4 Technology Integration in Learning

Incorporating technology into the STEM curriculum was crucial in promoting STEM education for girls. Digital tools—such as coding platforms, virtual reality (VR), and online learning resources—could have helped demystify complex scientific and mathematical concepts. Schleicher (2018) argued that integrating digital technology into education encouraged girls to take on leadership roles in tech fields.

Key features of technological integration:

Hands-on activities: Girls should have been encouraged to use technology in real-life applications, such as building robots, developing apps, or conducting online experiments.

Coding clubs and hackathons: Organizing school-wide events where girls could have showcased their skills and collaborated with their peers on tech-driven solutions to real-world problems.

Findings: Exposure to digital tools helped bridge the gender gap in technology fields. Girls who engaged with technology early were more likely to choose STEM-related careers later on.

Faulkner (2007) explored the importance of introducing girls to technology early on to reduce gender biases in tech education. Smith (2020) discussed how digital education could empower girls in underrepresented fields like STEM.

3.5 Community and Family Engagement

Encouraging girls to pursue STEM subjects required an integrated approach that involved not only schools but also families and communities. Community and family engagement could have significantly influenced girls' choices in education, particularly in marginalized contexts. Programs that involved parents in STEM education, such as STEM workshops and open days, helped dismantle gender biases at home.

Findings: Family support was a significant factor in girls' academic choices. The involvement of parents in promoting the importance of STEM education at home contributed to better academic outcomes for girls.

Kabeer (2019) highlighted the importance of community and family support in fostering girls' educational success while Ogunyemi (2021) discussed how engaging families in STEM education could have increased girls' participation in these fields.

4. Strategic Model: The "STEM Empowerment Model for Girls"

Based on the findings above, the study proposed a strategic model for promoting STEM education among girls in secondary schools, which was known as the "STEM Empowerment Model for Girls". The model consisted of five key components:

4.1 Empowered Curriculum Design: Gender-neutral and inclusive curriculum design with an emphasis on real-world STEM applications.

4.2 Mentorship and Role Models: Long-term mentorship programs connecting girls with female STEM leaders.

4.3 Inclusive Teaching Practices: Gender-sensitive pedagogy that incorporated collaborative, active, and differentiated learning methods.

4.4 Technology-Driven Learning: Hands-on technology experiences such as coding, robotics, and virtual learning platforms

4.5 Family and Community Engagement

5. Findings

Based on the comprehensive literature review and desktop analysis, the following new findings emerged regarding the empowerment of the girl child through innovation, leadership, technology, and discipline:

The research reveals several key findings:

5.1 Technological Access and Innovation: Access to technology is a critical factor in enabling the girl child to succeed academically and professionally. Technology provides avenues for self-paced learning, access to global networks, and digital skill development, all of which are essential for leadership roles (Smith, 2020; Binns & Hamilton, 2019).

5.2 Leadership Opportunities: Girls who are provided with leadership opportunities in early education tend to exhibit higher self-esteem and are more likely to pursue leadership roles in their adult lives. Leadership training, when coupled with mentorship, accelerates this process (Johnson & Lee, 2019; Ogunyemi, 2021).

5.3 Discipline as Empowerment: Discipline is found to enhance perseverance and focus in girls, helping them to overcome gender-based challenges. However, this discipline needs to be supported by positive reinforcement and a belief in the value of their contributions (Kumar & Patel, 2021; Gokhale & Choudhury, 2020).

5.4 Philosophical Guidance: Applied philosophical principles, especially those rooted in ethics and social justice, are vital in framing empowerment strategies that do not merely focus on economic or educational outcomes but also on moral and social responsibility (Beck, 2017).

5.5 Increased Access to Technology Enhances Educational Outcomes: One of the major findings is the positive impact that access to technology has on the educational outcomes of the girl child. Girls who have access to digital learning platforms and technological tools such as mobile learning applications are better able to overcome geographical and socio-economic barriers to education. This access empowers girls with knowledge, skills, and the ability to participate in global conversations around technology and innovation (Binns & Hamilton, 2019).

5.6 STEM Education for Girls is Key to Future Leadership Roles: STEM (Science, Technology, Engineering, and Mathematics) education has been identified as an essential area where the girl child needs further empowerment. Despite the growing emphasis on these fields, women and girls are underrepresented in STEM careers. However, providing girls with early exposure to STEM subjects, supported by mentorship and hands-on experiences, has been shown to increase their confidence in these areas and encourage them to pursue STEM-related careers (Smith, 2020).

5.7 Leadership Training Cultivates Confidence and Critical Thinking: Leadership training, when embedded in educational curricula, contributes significantly to the development of confidence, decision-making skills, and critical thinking in girls. Research indicates that girls who receive leadership training from a young age exhibit higher levels of self-esteem and are more likely to take on leadership roles in their personal and professional lives (Johnson & Lee, 2019). However, it is essential that this training is coupled with ethical guidance to promote a strong sense of responsibility and social justice.

5.8 Discipline as a Pathway to Perseverance and Achievement: Discipline, when applied with empathy and purpose, is a cornerstone of the girl child's empowerment. The research found that discipline in educational settings helps girls build resilience, self-regulation, and long-term goal orientation. Girls with discipline-focused mentorship can better overcome societal and institutional barriers, and they are more likely to pursue leadership positions in both education and employment (Kumar & Patel, 2021).

5.9 The Role of Applied Philosophy in Empowering Girls: Applied philosophy, particularly in the context of ethics, social justice, and education, provides a critical framework for understanding the empowerment of the girl child. Ethical theories, especially those that address gender equality, human dignity, and social responsibility, help frame the strategies for empowering girls. These philosophical frameworks inform both the leadership development and the application of technology in ways that ensure ethical, sustainable, and inclusive empowerment for the girl child (Beck, 2017).

6. Recommendations

6.1 Policy Reform: Governments and educational institutions should prioritize policies that provide equal access to technological tools and leadership training for girls. These policies should also address cultural and social barriers that limit girls' access to such opportunities (Smith, 2020; Binns & Hamilton, 2019).

6.2. Mentorship Programs: Establish mentorship programs that connect young girls with female role models in leadership, technology, and other fields. These programs should focus on instilling confidence and guiding girls through personal and professional development (Johnson & Lee, 2019; Ogunyemi, 2021).

6.3 Ethical Education: Integrate applied philosophy and ethics into educational curricula for the girl child. This will equip them with the tools to critically engage with societal structures and make ethical decisions in their personal and professional lives (Beck, 2017).

6.4 Community Engagement: Local communities should be actively involved in empowering the girl child. Community leaders should advocate for changes in cultural norms that hinder girls' progress and should support initiatives that encourage girls to pursue leadership and technological careers (Kumar & Patel, 2021; Gokhale & Choudhury, 2020).

6.5 Policy Interventions to Bridge the Digital Divide: Governments and educational institutions should prioritize policies that ensure equal access to technology for girls. Special attention must be given to girls in rural and underserved areas, where digital access is limited. Programs that provide low-cost or subsidized devices, free internet access, and digital literacy training should be established to ensure that girls are not left behind in the digital age (Smith, 2020).

6.6 Incentivizing Girls' Participation in STEM Programs: To combat the underrepresentation of girls in STEM, it is crucial to create a robust pipeline that encourages girls to choose and excel in STEM subjects. Schools, universities, and governments should incentivize girls' participation in STEM programs

through scholarships, mentorship, and after-school coding workshops. Additionally, female role models in STEM fields should be highlighted to inspire young girls and provide them with examples of success (Binns & Hamilton, 2019).

6.7 Integrating Ethical Leadership Education for Girls: Leadership programs must integrate applied philosophy and ethics to help girls understand the importance of moral and social responsibility in leadership roles. These programs should focus on fostering critical thinking, problem-solving, and ethical decision-making. Such an approach will prepare girls not only for leadership in their chosen fields but also for advocating for social justice and equality (Beck, 2017). Schools should implement curricula that teach these values in parallel with leadership skills.

6.8 Mentorship Programs for Leadership and Technology Development: Establishing mentorship programs that pair young girls with female leaders in technology, education, and other industries is critical for encouraging their leadership potential. These mentorships should focus on building confidence, enhancing technical skills, and providing emotional support. Research indicates that mentorship helps girls overcome challenges related to gender biases and societal expectations (Ogunyemi, 2021).

6.9 Promoting Discipline with a Holistic Approach: While discipline is an essential component of personal and academic success, it should be approached holistically. Schools should implement discipline systems that emphasize personal growth, resilience, and goal-setting rather than punitive measures. Support systems, such as counseling and guidance, should be made available to help girls navigate personal challenges while maintaining focus on their academic and professional goals (Kumar & Patel, 2021).

6.10 Community Engagement in Empowerment Initiatives: Communities play a pivotal role in empowering the girl child. Local leaders, parents, and community organizations should work together to create a supportive environment for girls. Advocacy efforts should focus on challenging cultural norms and traditions that limit girls' educational opportunities and participation in public life. Community-led programs that support girls in leadership and technology roles should be actively promoted (Gokhale & Choudhury, 2020).

6.11 International Collaboration on Girls' Education and Empowerment: Global collaboration between governments, international organizations, NGOs, and educational institutions is essential for advancing the empowerment of the girl child. International partnerships can create programs that share resources, knowledge, and best practices for empowering girls, particularly in low-income or conflict-affected areas. Programs such as the UNESCO "Girls' Education Initiative" and the United Nations Girls' Education Initiative (UNGEI) should be expanded and supported (UNESCO, 2014).

Conclusions

In conclusion, the promotion of girls in STEM education required an innovative and multi-layered approach. By implementing the STEM Empowerment Model, secondary schools could have created an inclusive and supportive environment that encouraged girls to pursue and excel in STEM subjects. This model not only focused on academic achievement but also fostered the development of leadership skills, technological literacy, and self-confidence. Applying the insights derived from applied philosophy, critical pedagogy, and mentorship theories could have guided the transformation of educational practices and policies, ultimately empowering the girl child to thrive in the 21st century.

The integration of innovation and AI in school disciplinary practices offers significant potential for protecting girl learners and advancing positive discipline practices. By adopting AI-driven tools, schools can enhance their ability to monitor and manage student behavior, prevent violence, and promote restorative justice. However, further investment and training are required, particularly in regions like KwaZulu-Natal, where AI adoption is still in its infancy. A multi-stakeholder approach, involving governments, schools, and communities, is essential for ensuring the safety and empowerment of girl learners in South Africa.

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