

RESEARCH ARTICLE



Impact of Educational Policies and Reforms on Human Capital Development in Rwanda

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Abstract: Rwanda, a landlocked country in East Africa, has undergone a remarkable transformation in the decades following the 1994 genocide against Tutsi. The investment made in the technology and education system is a means of fostering the development of human capital. Thus, recognizing the role of education in the achievement of human capital development, the country has undertaken significant education reforms and policy initiatives in recent years to improve the quality and accessibility of education across the country. Therefore, this study aimed at examining the extent to which educational policies and reforms contributed to human capital development. Conducted in 30 districts, the study employed a cross-sectional survey research design under an explanatory quantitative research approach to collect data from 310 teacher respondents. The data collected were analyzed using bivariate correlation and regression analyses. The findings revealed a positive and significant relationship ($p < 0.05$) between current educational policies and reforms on the development of human capital in Rwanda. Additionally, the linear regression model indicated that the implementation of the competence-based curriculum (CBC) ($\beta = 0.207$, $p < 0.5$), designed content in the CBC ($\beta = 0.364$, $p < 0.05$), the infrastructure and resources ($\beta = 0.151$, $p < 0.05$), and the provided teaching and learning materials ($\beta = 0.113$, $p < 0.05$) contributed significantly to human capital development in Rwanda. They contributed 35.6% (adjusted $R^2 = 0.356$, $p < 0.05$) of the variance. Recommendations include regular teacher training programs on innovative teaching approaches, information and communication technology integration in teaching and learning, inclusive education, and gender-responsive pedagogy, as well as planning activities that involve student engagement directly, such as diverse competitions in their respective subjects and field visits.

Keywords: continuous professional development, competence-based curriculum, education for development, ICT in education, learning by doing

1. Introduction

The ability of a nation to provide high-quality education to all its citizens is dependent on its ability to attract, recruit, train, and support competent, caring, and dedicated teachers [1]. Education thrives in societies that value and support their educators and public education systems, where teacher status and morale are elevated. This approach to education emphasizes that quality education is closely linked to the strength of the teaching force and supportive educational environments [2, 3].

Quality education encompasses various factors within the education system that contribute to effective student achievement, including resource allocation, pedagogical support, school climate, and administrative efficiency [3]. Similarly, Rwanda Education Board stresses the importance of equipping all students with the

skills, knowledge, attitudes, and values necessary for personal and societal development [2].

Furthermore, quality education as a continuously evolving system or product meets specific criteria, suggesting that standards must be continuously improved and maintained. The application of principles such as effectiveness, empowerment, equity, sustainability, appropriateness, and well-being and safety is crucial to maintaining quality education [4, 5].

The research further explores quality education as the effective outcome of various educational factors, including resource allocation, pedagogical methods, environmental conditions, and administrative practices, aimed at societal well-being and progress. This includes elements such as education spending, efficiency, access, equity, relevance, literacy, and teacher motivation [6].

The global educational agenda, encapsulated in Sustainable Development Goals 4 (SDGs 4), seeks to ensure inclusive, equitable, and quality education for all by 2030, recognizing the shortcomings of previous goals like Millennium Development

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Goals (MDGs) [4, 7]. Rwanda's education strategy aligns with this goal, focusing on equitable access to quality education to promote socioeconomic development and combat ignorance and illiteracy [8]. Therefore, education policies and reforms play a role in strengthening the development of human capital [9].

Nesterova and Young [10] describe the education policies, systems, and progress of Africa, including Rwanda, with a focus on different periods of the Rwandan education system: during German rule, education was left in the hands of Catholic missionaries, focusing on religion, French language, and culture, while during the Belgian rule, the focus was on training clerks, aides, and technicians for low-level colonial administrative roles. The Belgians introduced an ethnic-elitist education system that favored children of Tutsi chiefs and thus started the system that perpetuated social injustices across groups. It resulted in ethnic tensions, mass killings, and the exile of Tutsi in 1959 [11].

In 1962, the Hutu government introduced an ethnic and regional quota system that barred many Tutsi from education [12]. The constitution declared primary education free and obligatory and imposed national standards on a six-year primary curriculum. The objective was to adapt education to the local cultural context and to make it accessible to all. The reform led to a sharp increase in enrollment in primary schools and in the number of classrooms. In 1963, Rwanda established the first University in Huye. In 1994, the genocide almost destroyed the school system. Policies enacted to ensure equitable access to quality education (e.g., literacy, science and technology, critical thinking, and positive values) in order to equip the citizenry with the necessary skills and knowledge for the socioeconomic development of the country. From 2000 to 2015, there has been an alignment of education policies with the MDGs, especially Goal 2 (universal primary education), as well as a shift from French to English as the language of instruction. Currently (2016–2030), the target is to align the education policies with the SDGs, especially Goal 4 (inclusive and equitable quality education and promotion of lifelong learning for all).

From 2023, the Government of Rwanda through the Ministry of Education has made significant steps in achieving its educational goals, including universal primary education, gender parity, and empowerment of women, while also implementing reforms such as abolishing school fees and transitioning to competency-based curricula [13]. In this regard, significant education reforms and policy initiatives have been taken to enhance the quality and accessibility of education across the country. One of the most notable reforms is the implementation of the 9-6-3-4 education system, which restructured the education system from nine years of basic education to 12 years, followed by tertiary education. This reform aimed to align Rwanda's education system with international standards and provide students with a more comprehensive and competitive education [13]. Other reforms and policies include the shift from a knowledge-based curriculum to a competence-based curriculum (CBC), the use of English as the medium of instruction, and the integration of information and communication technology (ICT) in the process of teaching and learning, and universal primary and secondary education, technical and vocational education and training (TVET), and teacher training and professional development have been implemented to accelerate the development of human capital development in Rwanda [8].

Another key focus of education reform in Rwanda has been the promotion of STEM education (Science, Technology, Engineering, and Mathematics). The government has invested heavily in the construction of STEM infrastructure, training teachers, and

developing relevant curricula to equip students with the skills needed for the modern workforce. Initiatives such as the One Laptop per Child program and the establishment of STEM-focused schools aim to bridge the digital gap and prepare students for careers in technology and innovation, hence improving their interest to pursue careers in STEM-related subjects [8, 13].

The educational policies and reforms in Rwanda from 1963 to 1993 and from 2000 to 2023 reflect significant shifts in the country's approach to education, influenced by sociopolitical changes and developmental goals.

1.1. The period from 1963 to 1993

1.1.1. Colonial legacy and post-independence transition

In this period, Rwanda was transitioning from colonial rule to independence. The education system inherited from the colonial era was primarily focused on serving the interests of the colonial powers, with limited access for the majority of the population, particularly in rural areas [12].

1.1.2. Ethnic divide

During this time, Rwanda experienced deep-seated ethnic tensions between the Hutu and Tutsi populations, which also influenced educational policies. The education system was often used as a tool for reinforcing social hierarchies and maintaining the dominance of certain ethnic groups [14].

1.1.3. Centralized system

The educational system was centralized, with limited resources allocated to rural areas. Access to education was unequal, with urban areas having some facilities and educational opportunities compared to rural regions [10].

1.1.4. Curriculum and language

The curriculum predominantly reflected colonial influences, with French being the primary language of instruction. The education system did not adequately promote Rwandan culture and languages, contributing to a sense of cultural alienation among many students.

1.2. The period from 2000 to 2023

1.2.1. Post-genocide reconciliation and reconstruction

Following the Rwandan genocide in 1994, there was a significant emphasis on reconciliation, nation-building, and social cohesion. Educational policies aimed to promote unity and tolerance, with a focus on healing the wounds of the past.

1.2.2. Decentralization and access

There was a shift toward decentralization in the education system, with efforts to improve access to education for all Rwandan citizens, including those in rural areas. Initiatives such as the Nine-Year Basic Education program aimed to increase enrollment and retention rates.

1.2.3. Curriculum reform

The curriculum was revised to include more inclusive and culturally relevant content, with an emphasis on promoting Rwandan history, values, and languages. English was introduced as the medium of instruction alongside French, reflecting Rwanda's desire to integrate into the global economy.

1.2.4. Technical and vocational education

Recognizing the importance of skill development for economic growth, there was an expansion of TVET programs to equip students with practical skills for the workforce.

1.2.5. ICT integration

Rwanda placed a strong emphasis on integrating ICT into education, aiming to bridge the digital divide and prepare students for the demands of the modern economy.

1.3. Comparison of education policies and reforms between the period from 1963 to 1993 and from 2000 to 2023

1.3.1. Focus and goals

While the pre-1994 period was marked by ethnic tensions and a focus on maintaining social order, the post-2000 period prioritized reconciliation, inclusivity, and economic development.

1.3.2. Decentralization

There was a shift toward decentralization and inclusive policies in the post-2000 period, aimed at improving access and quality of education for all Rwandans, regardless of their background or location.

1.3.3. Curriculum and language

The curriculum underwent significant reforms in both periods, with efforts to make it more relevant to Rwandan society and culture. Moreover, the post-2000 period marked the shift from French to English as the medium of instruction for global competitiveness.

1.3.4. Technical education and ICT

The post-2000 period prioritized technical education and ICT integration to prepare students for the demands of the modern economy, reflecting Rwanda's aspirations for economic growth and development.

Overall, while both periods saw significant changes in Rwanda's educational policies and reforms, the post-2000 period was characterized by a stronger focus on reconciliation, inclusivity, and economic development, reflecting the country's post-genocide reconstruction efforts and aspirations for a brighter future [10, 12, 14].

Human capital formation (HCF) plays a critical role in the development of nations worldwide. It encompasses the process of enhancing individuals' skills, knowledge, abilities, and overall productivity through education, training, health care, and other related factors. Across the globe, countries with well-developed human capital tend to experience higher economic growth, innovation, and social development. This is evident in nations where significant investments have been made in education, health care, and skills training, leading to a more skilled and productive workforce capable of driving sustainable development [15].

In Africa, the importance of HCF cannot be overstated. Many African countries face challenges such as limited access to quality education, healthcare services, and skills training, which hinder their development prospects. However, there have been efforts to address these issues through various initiatives aimed at improving education systems, expanding healthcare access, and promoting vocational training. Despite these efforts, disparities in human capital development persist across the continent, with some countries making significant progress while others lag behind [16]. Nevertheless, recognizing the pivotal role of human capital in driving economic growth and development, many

African governments and international organizations continue to prioritize investments in this area to unlock the continent's full potential [16].

Rwanda stands as a compelling case study of the transformative power of HCF. In the aftermath of the 1994 genocide, Rwanda embarked on an ambitious journey of rebuilding and reconciliation, with human capital development at the forefront of its agenda. The government implemented sweeping reforms in education, health care, and vocational training, leading to remarkable improvements in literacy rates, life expectancy, and skills development [17]. Today, Rwanda boasts one of the fastest-growing economies in Africa, fueled in large part by its highly skilled and educated workforce. The country's success underscores the crucial link between HCF and sustainable development, serving as a model for other nations striving to unleash the full potential of their people [17].

In addition to academic reforms, Rwanda has prioritized exclusivity and equity in education. Efforts have been made to improve access to education for marginalized groups, including girls, children with disabilities, and those living in rural areas. Measures such as the construction of new schools, the provision of scholarships, and community outreach programs have helped increase enrollment and retention rates among vulnerable populations [18].

Furthermore, Rwanda has placed a strong emphasis on vocational and technical education to address the demand for skilled labor in various sectors of the economy. Partnerships have been established with industries and vocational training centers to offer hands-on learning opportunities and apprenticeships, preparing students for careers in fields such as agriculture, tourism, and manufacturing. These comprehensive education reforms and policies underscore Rwanda's commitment to building a knowledgeable and skilled workforce capable of driving sustainable development and economic growth as reported by the International Institute for Educational Planning [17].

Reference made to the transformative journey of the government of Rwanda, this research was motivated by a lack of understanding of how education policies contribute to human capital development in Rwanda, particularly in the post-genocide context.

2. Literature Review

2.1. Roles of educational policies and reforms on human capital development

Educational policies and reforms play a crucial role in shaping human capital development by providing the framework and resources necessary for individuals to acquire knowledge, skills, and competencies necessary for personal and societal advancement. First, these policies set the direction for curriculum development and instructional methodologies, ensuring that educational systems are aligned with the demands of the modern economy. By emphasizing subjects such as STEM (Science, Technology, Engineering, and Mathematics) and critical thinking skills, policymakers aim to equip learners with the capabilities required for success in a rapidly evolving globalized world [19].

Second, educational policies and reforms contribute to the improvement of educational access and equity. Through measures such as the provision of scholarships, expansion of school infrastructure, and targeted support for marginalized groups, policymakers strive to ensure that all individuals, regardless of

socioeconomic background or demographic characteristics, have equal opportunities to access quality education. By reducing barriers to entry and promoting inclusivity, these policies enable a more diverse and skilled workforce, thereby fostering greater innovation and productivity [18].

In addition, educational policies and reforms serve to strengthen the connection between education and employment. By collaborating with industries, businesses, and labor market stakeholders, policymakers can better align educational offerings with the needs of employers, thus improving the employability of graduates. Initiatives such as vocational education, apprenticeship programs, and industry certifications enable learners to acquire practical skills and work experience, increasing their competitiveness in the job market and facilitating smoother transitions from school to work [17].

Furthermore, educational policies and reforms contribute to lifelong learning and continuous skill development. Recognizing the importance of adaptability in today's dynamic labor market, policymakers promote a culture of lifelong learning by providing opportunities for upskilling, reskilling, and professional development. By investing in adult education programs, online learning platforms, and workforce training initiatives, policymakers support people to remain relevant and competitive throughout their careers, ultimately contributing to the overall growth and sustainability of human capital development [20].

Education policies and reforms have played a pivotal role in the development of human capital in developed countries, contributing to their economic prosperity and social advancement. One notable example is the focus on universal access to education and compulsory schooling laws [21]. By ensuring that all children have the opportunity to receive a formal education, governments have laid the foundation for a skilled and knowledgeable workforce [22]. Countries like Finland have implemented comprehensive education systems that prioritize equity and inclusivity, leading to high levels of literacy, numeracy, and critical thinking skills among their citizens [23].

Furthermore, developed countries have recognized the importance of investing in early childhood education and care (ECEC) as a means of fostering cognitive, social, and emotional development from an early age. Policies supporting access to high-quality preschool programs, such as those implemented in countries like Sweden and Norway, have been linked to improved educational outcomes, reduced inequality, and increased labor market participation rates among parents. By investing in ECEC, governments cultivate a strong educational foundation that prepares children for future academic success and lifelong learning [24].

Furthermore, education policies in developed countries often prioritize innovation and adaptability to meet the demands of the knowledge economy. Initiatives such as curriculum revisions, teacher professional development programs, and investments in educational technology aim to equip learners with the skills and competencies needed to thrive in a rapidly changing world [23]. For example, countries like South Korea and Singapore have implemented ambitious education reforms that emphasize STEM education, digital literacy, and interdisciplinary learning, positioning their citizens to excel in fields such as technology, engineering, and innovation [18].

Also, developed countries recognize the importance of higher education in driving economic growth and fostering a culture of innovation. Policies supporting affordable and accessible tertiary

education, as seen in countries like Germany with its tuition-free university system, enable individuals to pursue advanced degrees and acquire specialized skills relevant to emerging industries [7]. Furthermore, investments in research and development, coupled with strong collaborations between academia and industry, facilitate knowledge creation, technology transfer, and entrepreneurship, driving sustained economic competitiveness and human capital development in developed countries [25].

2.2. Education reforms and policies in some African countries

Education reforms and policies in African countries have been a focal point for governments that are striving to address the challenges of low literacy rates, inadequate infrastructure, and limited access to quality education. One common area of reform is the expansion of educational access, particularly at the primary and secondary levels. Many African nations have implemented policies that aim to increase enrollment rates by abolishing school fees, building new schools, and providing scholarships to disadvantaged students. For example, Ethiopia's Education Sector Development Program has been instrumental in improving access to education, resulting in a significant increase in primary school enrollment over the past two decades [10].

Furthermore, African countries are increasingly recognizing the importance of quality education in driving economic development and the formation of human capital. Education reforms often emphasize curriculum development, teacher training, and improvements in educational infrastructure to enhance the quality of learning experiences. For example, Rwanda's CBC and teacher professional development initiatives aim to equip learners with the skills and knowledge needed for success in the modern economy. Similarly, Kenya's ambitious efforts to digitize the education sector through initiatives such as the Digital Literacy Program are aimed at improving learning outcomes and fostering innovation [1].

In addition to expanding access and improving quality, education reforms in African countries also prioritize exclusivity and equity. Governments are implementing policies to address gender disparities, ensure access for children with disabilities, and promote education in marginalized communities. For example, Malawi's National Education Sector Plan includes specific strategies to increase girls' enrollment and retention rates through targeted interventions such as cash transfer programs and school feeding initiatives. Similarly, South Africa's inclusive education policy aims to provide equitable access to education for all learners, regardless of their background or abilities [4].

Furthermore, education reforms in African countries increasingly emphasize the importance of vocational and technical education in addressing youth unemployment and skills gaps. Governments are investing in vocational training centers, apprenticeship programs, and partnerships with industries to provide learners with practical skills and prepare them for the workforce [5]. Countries like Ghana and Nigeria have introduced reforms in vocational education to promote entrepreneurship and job creation, recognizing the critical role of technical skills in driving economic development and reducing poverty. In general, education reforms and policies in African countries are critical for building a skilled workforce, fostering social inclusion, and unlocking the full potential of the continent for sustainable development [26].

2.3. Teacher training program and human capital development

Teacher training programs play a crucial role in the development of human capital and the overall development of countries by equipping educators with the skills, knowledge, and competencies needed to foster learning and innovation in the classroom. First, effective teacher training programs ensure that educators are well-versed in pedagogical techniques, instructional methodologies, and subject-specific content knowledge. By providing teachers with the tools and resources necessary to provide high-quality instruction, these programs contribute to improved student outcomes, including academic achievement, critical thinking, and problem-solving skills [8, 27].

Furthermore, teacher training programs have a significant impact on educational equity and exclusivity. By promoting culturally responsive teaching practices, diversity awareness, and inclusive classroom environments, these programs enable educators to meet the diverse needs of students from various backgrounds, including those from marginalized and underrepresented communities. Countries like Finland and Singapore have implemented comprehensive teacher training initiatives that prioritize equity, social justice, and cultural competence, leading to more inclusive education systems and reduced achievement gaps [23, 28].

Additionally, teacher training programs play a critical role in fostering innovation and adaptability in education. As technology continues to transform the way we teach and learn, it is essential that educators stay up-to-date on the latest pedagogical trends, educational technologies, and teaching strategies. Teacher training programs that incorporate professional development opportunities, such as workshops, seminars, and online courses, enable educators to enhance their skills, experiment with new instructional methods, and integrate innovative technologies into their classrooms, thus preparing students for success in the digital age [29].

Lastly, teacher training programs contribute to the professionalization of the teaching profession and the development of a skilled workforce [8]. By offering pathways for career advancement, ongoing mentorship, and opportunities for collaboration and networking, these programs attract talented individuals to the teaching profession and support their professional growth and development over time [30]. Countries with strong teacher training systems, such as Japan and Canada, prioritize continuous professional learning and provide teachers with the support they need to excel in their roles, ultimately contributing to the overall development and prosperity of their societies [31].

The current study aims to examine the impact of educational policies and reforms on the development of human capital in Rwanda with the following research questions:

- 1) To what extent do education policies and reforms contribute to the development of human capital in Rwanda?
- 2) What is the relative contribution of education reforms and policies to the development of human capital in Rwanda?
- 3) What are the specific areas where teachers need further training to improve human capital development?

3. Research Methodology

3.1. Research design

This study used a cross-sectional survey research design with an explanatory research approach to collect quantitative data. The main

goals of quantitative research methods include objective measurements, statistical analysis, and the collection of numerical data. Many techniques are used to collect data, including surveys and questionnaires [32]. The design was appropriate for this study; hence, it was possible to investigate the link between the independent (educational policies and reforms) and dependent variable (human capital development).

3.2. Participants

The study was carried out in 30 districts of Rwanda; the respondents were 10 teachers in each district (3 from boarding schools, 4 from day schools, and 3 from primary schools) and 2 educational officials in each of the four provinces and the city of Kigali, which made a total of 310 respondents.

3.3. Instrument

Survey questionnaires were used to collect data. They were developed, reviewed, and approved by experts (experienced researchers) in the field. The two questionnaires were meant to collect data on the extent to which educational policies and reforms impacted human capital development and data on specific areas where teachers still need training. The questionnaire about the extent to which educational policies and reforms impacted human capital development is made up of eight items about the areas in which teachers still need training. It has nine items. The elements were classified into strongly disagree = 1, disagree = 2, undecided or no opinion = 3, agree = 4, and strongly agree = 5 and very high priority = 5, high priority = 4, medium priority = 3, low priority = 2, and very low priority = 1, respectively. The questionnaires were tested for validity and reliability and yielded a Pearson's correlation coefficient of 0.81 and 0.77 which proves the positive reliability of the two questionnaires [32].

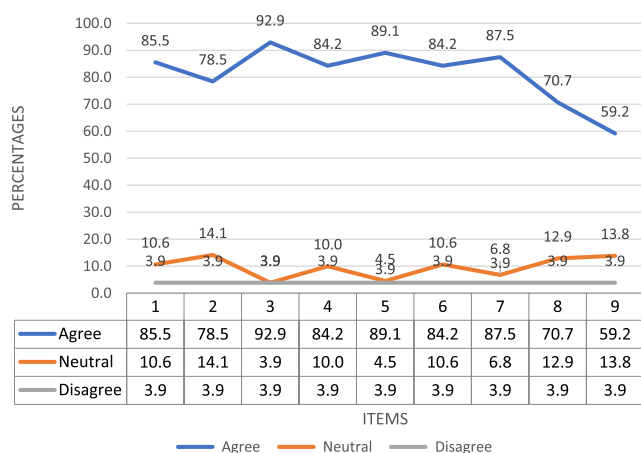
3.4. Data analysis

Frequency and percentages, as well as bivariate correlation and regression analyses, were used to analyze data.

4. Findings

4.1. To what extent do education policies and reforms contribute to the development of human capital in Rwanda?

Figure 1 shows the level of agreement and disagreement on the impacts of educational policies and reforms on human capital development. It is evidenced by the overall agreement level of 80.7% that education policies and reforms impacted positively on human capital development. Collaboration between educational institutions and industries in Rwanda improves the development of practical skills of students (78.5%), the infrastructure and resources (classrooms, ICT devices) in Rwandan schools adequately support the implementation of educational policies for human capital development (92.9%), the implementation of the CBC encourages critical thinking and problem-solving skills among students (84.2%), the competency-based assessments used in Rwandan schools align with educational goals and contribute to meaningful human capital development (89.1%), teacher training programs (training on innovative teaching methods, training on gender-responsive

Figure 1**Impacts of educational reforms and policy agreement and disagreement level on human capital development**

Note: A 100% stacked column chart is used to compare the percentages that each value contributes to a total. It has grouped respondents in agreement, neutral, and disagreement scales.

pedagogy, training on inclusive education) in Rwanda are effective in preparing educators to meet the evolving needs of students (84.2%), the integration of ICT in the process of teaching and learning in Rwandan schools has improved the quality of education and human capital development (87.5%), training on content mastery (70.7%), and the provided teaching and learning materials are adequate and enough to implement CBC in schools (59.2%).

Generally, educators appreciate the impacts of educational reforms and policies on the development of human capital development, as summarized in Figure 1.

The overall level of agreement is greater than 80.7%, demonstrating the contribution of educational reforms and policies on human capital development in Rwanda.

To fully understand the relationship between the study variables (implementation of the CBC, infrastructure and resources, teacher training programs, CBC assessments, integration of ICT, designed content in the CBC, and provided teaching and learning materials) and human development, regression analysis was applied. The findings are summarized in Table 1.

The results of the multiple regression analysis indicated that the implementation of CBC, infrastructures and resources, training in innovative teaching methods, CBC assessments and integration of ICT, designed content in CBC (content mastery), and the

provision of teaching and learning materials contributed to human capital development in Rwanda (adjusted $R^2 = 0.356$; $F(7, 303) = 25.473$; $p = 0.000$, < 0.05).

This finding indicated that approximately 35.6% of the variance in human development can be accounted for by the linear combination of the implementation of the CBC, infrastructures and resources, teacher training programs, CBC assessments, integration of ICT, training on content mastery, and the provided teaching and learning materials. The remaining 64.4% could be due to factors and other initiatives or errors not considered in the study.

Furthermore, the study used multiple regression models to examine the combined effects of educational policies and reforms serving as independent variables and the human development scales as dependent ones. Additionally, standardized regression coefficients (β) were observed to determine educational policies and reforms that significantly account for variance in human development. Table 2 displays the findings.

From the predictor variables model shown in Table 2, the implementation of the CBC ($\beta = 0.207$, $p < 0.5$), designed content in the CBC ($\beta = 0.364$, $p < 0.05$), the infrastructure and resources (classrooms, ICT devices) ($\beta = 0.151$, $p < 0.05$), and the provided teaching and learning materials ($\beta = 0.113$, $p < 0.05$) contributed significantly to the development of human capital in Rwanda.

4.2. What are the specific areas where teachers need further training to improve human capital development?

As indicated in Figure 2, all trainings (T1–T9) are still needed at a very high priority of 31.5% and above. Figure 2 also shows that content mastery and special needs education trainings are needed with very high priority compared to others (48.6% and 47.9%, respectively). Similarly, the training on entrepreneurship and business creation, training on mentoring and coaching as part of the community of practice (CoP), training on teaching using locally available materials/improvisation, and training on digital literacy (integration of ICT in the process of teaching and learning) are needed at very high priority by 35.7%, 36%, 36.7%, and 38.6%, respectively, while there is very high need of the training on gender-responsive pedagogy and comprehensive sexuality education (CSE) at 34.4%, and the training on leadership and human resource management and the training on innovative teaching methods, especially the effective implementation of the CBC, project-based learning, problem-based learning, design thinking, and teaching using hands-on activities, are needed at a very high priority on the percentage of 31.5%.

Table 1
Summary of regression analysis

Model	<i>R</i>	<i>R</i> square	Adjusted square	Std. error of the estimate	
1.	0.609 ^a	0.370	0.356	0.640	
Model	Sum of squares	<i>Df</i>	Mean of squares	<i>F</i>	<i>P</i> -value
Regression	73.086	7	10.441	25.473	0.000 ^b
Residual	124.194	303	0.410		
Total	197.280	310			

Note: ^aCriterion variable: human capital development

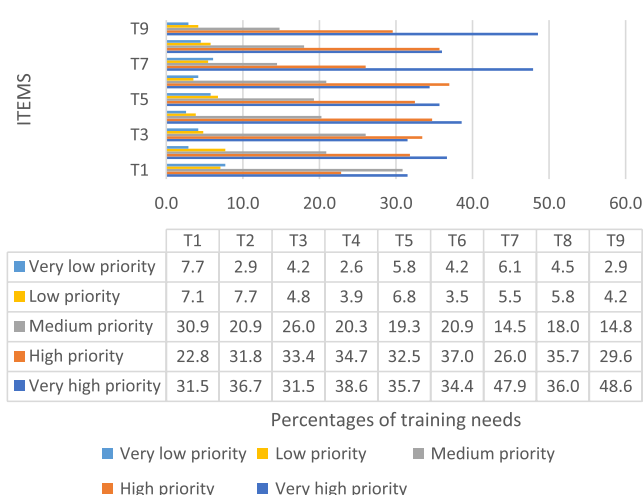
^bPredictors: (Constant), educational reform policies

Table 2
Predictors of human capital development

Model	Unstandardized coefficients		Standardized coefficients		
	<i>B</i>	Std. error	Beta	<i>t</i>	Sig.
(Constant)	1.494	0.237		6.297	0.000
Implementation of CBC	0.207	0.058	0.207	3.550	0.000
Infrastructure and resources	0.130	0.055	0.151	2.349	0.019
Training on innovative teaching methods	0.039	0.050	0.045	0.791	0.429
Competence-based assessment	0.081	0.060	0.088	1.345	0.179
Integration of ICT	0.052	0.061	0.058	0.850	0.396
Content mastery	0.270	0.046	0.364	5.830	0.000
Provided teaching and learning materials	0.069	0.033	0.113	2.072	0.039

Note: Dependent variable: educational policies and reforms

Figure 2
Specific areas where teachers need further training to enhance human capital development



Note: A 100% stacked column chart is used to compare the percentages that each item contributes to a total. It has grouped respondents in very high priority, high priority, medium priority, low priority, and very low priority. **T1:** Training on leadership and human resource management; **T2:** Training on teaching using locally available materials/improvisation; **T3:** Training on innovative teaching methods, especially the effective implementation of the competence-based curriculum, project-based learning, problem-based learning, design thinking, and teaching using hands-on activities; **T4:** Training on digital literacy; **T5:** Training on entrepreneurship and business creation; **T6:** Training on gender education and comprehensive sexuality education (CSE); **T7:** Training on special needs and inclusive education; **T8:** Training on mentoring and coaching as part of the community of practice (CoP); **T9:** Training on content mastery.

5. Discussions

The findings indicate that educational policies and reforms positively impacted human capital development in Rwanda, as indicated by the general level of agreement that is greater than 80.7%. Besides, the results of the multiple regression analyses indicate that the implementation of the CBC, infrastructures and resources, teacher training programs, competence-based assessments, integration of ICT, designed content in the CBC, and

the provided teaching and learning materials have a significant influence on human capital development in Rwanda (adjusted $R^2 = 0.356$; $F(7, 303) = 25.473$; $p = 0.000, < 0.05$). These results indicate that approximately 35.6% of the variance in human development is accounted for by the variables under study (training on content mastery, special needs education, implementation of CBC, infrastructures and resources, training on innovative teaching methods, CBC assessments, integration of ICT, and the provided teaching and learning materials).

The above findings reveal a transformative journey in Rwanda's education system toward its commitment to rebuilding the nation centered on an ambitious technology, education policy for quality, and relevance of education for all. These findings are in line with the study by Nkundabakura et al. [8], which shows the importance of teacher training in improving educational outcomes. Practical implications include the need for policies that focus more on innovative training for teachers.

It is also in the same vein as the findings of Sibomana et al. [13] that interventions that speed up the implementation of education policies and reforms boost the intention of learners to know and choose careers that align with the government priorities to contribute to sustainable development.

Furthermore, the study reveals that educators appreciate the importance of being trained on some concepts and still need to be trained on all of the interventions mentioned in this study with a very high priority of 31.5% and above. They also indicated that they need to be trained in content mastery and special needs education at a very high priority of 48.6% and 47.9%, respectively. This indicates how education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability as found by Dange and Siddaraju [29].

6. Conclusion and Recommendations

The study aimed at examining the extent to which educational policies and reforms contributed to human capital development using a cross-sectional survey research design revealed a positive and significant relationship ($p < 0.05$) between current educational policies and reforms on human capital development in Rwanda, as they contributed 35.6% of the variance. The study concludes that current education policies contribute significantly to human capital development in Rwanda; this was evidenced by the overall agreement level of 80.7% that education policies and reforms impacted positively human capital development. Furthermore, the research revealed that teachers still need training in a number of areas including training on leadership and human resource

management, training on using locally available materials (improvisation), training on innovative teaching methods, training on digital literacy, training on entrepreneurship and business creation, training on gender-responsive pedagogy and CSE, training on special needs and inclusive education, training on mentoring and coaching as part of the community of practice (CoP), and training on content mastery.

Recommendations include providing ongoing teacher training in various areas and ensuring regular continuous professional development to enhance teaching skills and keep educators updated on the latest teaching methods and educational trends. This will help improve the overall quality of education and support teachers in their professional growth.

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Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support this work are available upon reasonable request to the corresponding author.

Author Contribution Statement

Aimable Sibomana: Conceptualization, Methodology, Formal analysis. **Emmanuel Bizimana:** Formal analysis, Validation, Writing – review & editing. **Louis Havugiyaremye:** Conceptualization, Writing – original draft. **Pancras Ndokoye:** Investigation, Resources, Project administration.

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