



Evaluating Curriculum Relevance and 21st-Century Skills Gaps in Primary Education: A Case Study of Bertoua, Cameroon

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Abstract - This study evaluates the extent to which the reformed primary school curriculum in Cameroon addresses the development of 21st-century skills among learners, focusing on Bertoua in the East Region. Using a mixed-methods approach, data were collected from 600 pupils and 120 teachers across 30 public and private primary schools. Instruments included curriculum document analysis, standardized competency assessments for pupils, structured classroom observations, and teacher surveys. Quantitative data were analyzed using descriptive statistics and multilevel regression models, while qualitative data were coded thematically. Findings revealed that although the revised 2018/2019 competency-based curriculum emphasizes creativity, critical thinking, collaboration, and digital literacy, classroom practices in Bertoua remain dominated by rote learning and teacher-centered methods. Pupils demonstrated modest levels of collaboration and communication but limited digital literacy and problem-solving skills. Teacher training in competency-based pedagogy and access to instructional resources were significant predictors of higher pupil competency scores. The study concludes that the curriculum is only partially relevant to the demands of the 21st century due to weak implementation, assessment misalignment, and resource gaps. Policy recommendations include targeted teacher training, competency-aligned assessments, and scaling up digital inclusion programs in Cameroonian primary schools.

Keywords - curriculum relevance, 21st-century skills, primary education, Cameroon, Bertoua.

I. Introduction

Background

The 21st century has ushered in rapid global transformations, driven by advances in technology, globalization, and knowledge economies. Education systems worldwide are under pressure to equip learners with a broad set of competencies beyond foundational literacy and numeracy. Skills such as critical thinking, creativity, collaboration, communication, and digital literacy are now considered essential for learners to thrive in dynamic social and economic contexts (OECD, 2019; UNESCO, 2021). These “21st-century skills” are embedded in international frameworks such as the OECD Learning Compass and UNESCO’s Global Education Monitoring Reports, which stress competency-based education as a vehicle for sustainable development.



In Africa, educational reform agendas including the African Union's Continental Education Strategy for Africa (CESA 2016–2025) underscore the need for curricula that are relevant, competency-driven, and responsive to emerging labor market needs. Despite these aspirations, many African education systems remain constrained by resource limitations, outdated pedagogical methods, and assessment systems that privilege rote memorization (World Bank, 2020).

Context of Cameroon

Cameroon undertook a major reform of its primary school curriculum in 2018/2019, shifting from content-heavy, objective-based syllabi to a competency-based curriculum (CBC). The new curriculum emphasizes learner-centered approaches, integration of ICT, and development of transversal skills such as creativity and problem-solving (Alemnge, 2019). While promising, implementation has been uneven. Teachers often lack adequate training in CBC methodologies, schools are under-resourced, and examinations continue to reward factual recall rather than higher-order competencies (Ngoungouo, 2021).

Bertoua, the capital of the East Region, represents a useful case study site. It is a regional urban center with diverse public and private schools but also faces challenges common to secondary cities in Cameroon — limited resources, teacher shortages, and infrastructural constraints. Investigating Bertoua provides insight into how the national curriculum reform translates into practice outside of Cameroon's major cities (Yaoundé, Douala).

Problem Statement

Although Cameroon's primary curriculum reform aimed to align education with 21st-century demands, evidence suggests a significant gap between curriculum intentions and classroom realities. The extent to which learners in Bertoua develop competencies such as critical thinking, collaboration, and digital literacy remains uncertain. Without localized empirical evidence, policymakers risk designing reforms that fail to address the real implementation barriers and competency gaps.

Objectives of the Study

- To assess the alignment between the official Cameroonian primary curriculum and internationally recognized 21st-century competencies.
- To examine classroom practices of teachers in Bertoua primary schools.
- To measure the levels of 21st-century competencies demonstrated by pupils in grades 4–6.
- To identify teacher, school, and system-level factors associated with variations in pupil competencies.
- To propose evidence-based recommendations for strengthening the relevance of primary education in Cameroon.

Significance of the Study

This study contributes to scholarship on curriculum relevance and competency-based education in Sub-Saharan Africa. It provides empirical evidence from Cameroon — a bilingual, multicultural country — that can inform broader debates on aligning curricula with 21st-century skill requirements. Practically, the study informs the Ministry of



Basic Education, teacher training institutions, and development partners (e.g., UNICEF, World Bank) about how curriculum reform is playing out in practice and what policy adjustments are needed.

II. Literature Review

Curriculum Reform in Cameroon

Cameroon's primary education system has historically emphasized rote learning, teacher-centered pedagogy, and examinations that privilege memorization. In response to global trends and internal critiques, the government introduced a competency-based curriculum (CBC) in the 2018/2019 academic year (Alemnge, 2019). The reform sought to shift from objectives-based to competency-driven education, where learners are expected to develop problem-solving abilities, critical thinking, creativity, and digital skills alongside literacy and numeracy.

The revised curriculum organizes learning around broad competencies rather than fragmented subject objectives, promoting integration across disciplines. Pedagogical innovations include project-based learning, formative assessment, and ICT integration (MINEDUB, 2018). However, studies indicate that the reform faces challenges in implementation. Teachers in Bertoua and other regions often lack in-service training to adapt to the new pedagogy (Ngoungouo, 2021). Many classrooms continue to rely on traditional lecture methods, with assessments still focusing on recall (Mbuh, 2020).

Thus, while policy documents reflect 21st-century learning goals, the “curriculum in action” frequently diverges from intentions. This gap raises concerns about the relevance of primary education in preparing Cameroonian pupils for future social and economic realities.

21st-Century Skills: Global Perspectives

The concept of 21st-century skills emerged from education and labor market discourses stressing competencies beyond basic literacy. The OECD's Learning Compass 2030 identifies knowledge, skills, attitudes, and values as essential for learner well-being and societal development (OECD, 2019). UNESCO similarly emphasizes transversal competencies such as critical thinking, creativity, problem-solving, communication, collaboration, and digital literacy (UNESCO, 2021).

Research in developed contexts suggests that when curricula embed these competencies — supported by appropriate pedagogy and assessment — learners demonstrate higher adaptability, innovation, and employability (Trilling & Fadel, 2009). Countries like Finland, Singapore, and South Korea have successfully aligned curriculum reforms with teacher training and assessment innovations, resulting in improved outcomes in international assessments (OECD, 2019).

For low- and middle-income countries, the challenge lies in contextualizing these global frameworks to local realities, ensuring equity in access, and avoiding “policy borrowing” without systemic support (Tikly, 2019).



African Experiences with Competency-Based Education

Across Sub-Saharan Africa, countries such as Kenya, Rwanda, and Ghana have adopted CBC reforms. Kenya's 2017 curriculum emphasizes critical thinking, creativity, and digital skills, yet studies report uneven teacher preparedness and resource shortages (Oduor, 2020). Rwanda integrated ICT into its CBC, but rural schools struggle with infrastructure and training (Uwizeyimana & Orodho, 2016). Ghana's new curriculum emphasizes creativity and problem-solving but faces alignment issues with national examinations (Akyeampong, 2018).

These cases highlight a recurring pattern: while competency-based reforms are conceptually sound, practical challenges in teacher training, resources, and assessment alignment limit their effectiveness. Cameroon shares these structural constraints, suggesting that Bertoua's experience is part of a wider continental trend.

ICT Integration and Digital Literacy in Cameroon

Digital literacy is a cornerstone of 21st-century skills, yet Cameroonian schools face substantial barriers. A study in Yaoundé schools found that although ICT tools were available in some institutions, usage remained limited to administrative functions rather than pedagogical innovation (Ngoungouo, 2021). UNICEF's Connect My School initiative has attempted to expand internet access and digital learning opportunities, but coverage is still limited, especially outside major cities (UNICEF, 2022).

In Bertoua, anecdotal evidence suggests many schools lack adequate computers, internet connectivity, or trained teachers to integrate digital tools effectively. Consequently, pupils demonstrate minimal proficiency in digital skills, creating a significant gap between curriculum intentions and classroom realities.

Curriculum Relevance and Employability in Cameroon

Relevance in education refers to the alignment between what is taught in schools and the competencies demanded by society and the labor market. In Cameroon, scholars argue that curricula often fail to prepare learners for real-life challenges, with unemployment among school leavers reflecting weak linkage between education and employability (Fonkeng, 2018). The CBC was intended to close this gap by equipping learners with transversal competencies, but without systemic reforms in assessment, teacher professional development, and infrastructure, the risk of "curriculum irrelevance" persists.

Gaps in Existing Research

Although several studies describe Cameroon's curriculum reform and ICT integration challenges, empirical evidence on actual pupil competency outcomes remains scarce. Few studies systematically assess whether pupils in regional cities like Bertoua are developing 21st-century skills under the CBC. Most existing evaluations remain policy-level or anecdotal, creating a research gap that this study addresses by triangulating curriculum documents, teacher practices, and pupil assessments.

III. Theoretical and Conceptual Framework



Theoretical Framework

This study draws on socio-constructivist learning theory and the competence-based curriculum implementation model.

- Socio-constructivism (Vygotsky, 1978; Bruner, 1996) emphasizes that learners construct knowledge through active engagement, social interaction, and problem-solving. The CBC reform in Cameroon is grounded in this paradigm, requiring teachers to facilitate discovery, collaboration, and authentic tasks rather than transmit knowledge passively.
- Competence-Based Curriculum (CBC) Implementation Model conceptualizes education as a chain of inputs → processes → outputs → outcomes (Fullan, 2007).
- Inputs: Curriculum policy, teacher training, resources.
- Processes: Pedagogical practices, classroom activities, assessments.
- Outputs: Immediate learning experiences, skills developed.
- Outcomes: Long-term learner competencies (problem-solving, creativity, digital literacy).

This framework highlights that curriculum relevance is not determined solely by official documents but by how teachers implement them in real classrooms, how assessments reinforce competencies, and how resources enable learning experiences.

Conceptual Framework for the Study

The conceptual model guiding this research posits that:

- Curriculum design (emphasis on competencies) influences teacher practices, moderated by training and resources.
- Teacher practices (learner-centered methods, ICT integration, formative assessment) shape pupils' acquisition of 21st-century skills.
- School and system-level factors (infrastructure, policy support, parental engagement) further moderate the link between practice and outcomes.

In short:

Curriculum intentions → Teacher capacity + resources → Classroom practices → Pupil competencies.

Research Questions

The study was guided by the following questions:

- How aligned are the official Cameroonian primary curriculum and assessments with internationally recognized 21st-century competencies?
- What pedagogical practices are dominant in Bertoua primary classrooms under the CBC?
- What levels of 21st-century competencies (critical thinking, creativity, collaboration, communication, digital literacy) do pupils in grades 4–6 demonstrate?
- Which teacher, school, and system-level factors significantly influence pupils' competency outcomes?
- How can curriculum implementation in Cameroon be strengthened to enhance 21st-century skill acquisition?



Hypotheses

The following hypotheses were tested:

H1 (Curriculum–Practice Gap)

- H0: There is no significant difference between competencies emphasized in the official CBC documents and those prioritized in classroom practice.
- H1: Teachers emphasize knowledge recall more than the 21st-century competencies highlighted in curriculum documents.

H2 (Teacher Training Effect)

- H0: Teacher training in competency-based pedagogy and ICT integration has no effect on pupil competency scores.
- H1: Pupils taught by teachers with recent CBC and ICT training demonstrate significantly higher competency scores than those taught by untrained teachers.

H3 (Resource Constraint Effect)

- H0: Availability of school resources (ICT, materials) does not influence pupils' competency outcomes.
- H1: Greater availability of teaching/learning resources is positively associated with pupil competency outcomes.

H4 (Assessment Alignment)

- H0: School assessments are aligned with CBC competency goals.
- H1: School assessments remain knowledge-recall oriented and poorly aligned with competency goals.

H5 (Pupil Socio-Economic Effect)

- H0: Pupil socio-economic background has no influence on acquisition of 21st-century skills.
- H1: Pupils from higher socio-economic backgrounds achieve significantly higher competency outcomes due to greater home support and resource access.

IV. Methodology

Research Design

The study employed a mixed-methods design, specifically an explanatory sequential approach (Creswell & Plano Clark, 2018). In the first phase, quantitative data were collected through pupil competency assessments, teacher questionnaires, and classroom observations. In the second phase, qualitative interviews and focus groups were conducted to explain and contextualize the quantitative findings. This design was selected because curriculum relevance involves both measurable skills and subjective interpretations of curriculum implementation by teachers and stakeholders.

Study Area



The research was conducted in Bertoua, the capital of the East Region of Cameroon. Bertoua is a secondary urban center with approximately 120 primary schools (both public and private), serving children from diverse socio-economic and cultural backgrounds. While it benefits from some government and NGO education initiatives, it lacks the resource concentration of major cities like Yaoundé and Douala, making it a representative case of curriculum implementation challenges in regional settings.

Population and Sampling

Population:

- Teachers: All grade 4–6 teachers in public and private primary schools in Bertoua.
- Pupils: Learners in grades 4–6, as these levels precede the end of primary education and allow for reasonable assessment of competencies.
- School leaders and officials: Headteachers, inspectors, and education delegates provided qualitative insights.
- Sample size and selection:
- 30 schools were selected through stratified random sampling (20 public, 10 private; urban vs. peri-urban strata).
- Within each school, ~20 pupils from grades 4–6 were randomly selected ($N \approx 600$).
- All grade 4–6 teachers available were surveyed ($N \approx 120$).
- Purposive sampling was used for qualitative interviews with 15 headteachers, 10 inspectors, and 4 officials from the Ministry of Basic Education.

This sample ensured representativeness and sufficient power for multilevel statistical analyses.

Data Collection Instruments

Curriculum Document Analysis Rubric

- Developed to code national curriculum and assessment documents against OECD/UNESCO 21st-century competency frameworks.
- Dimensions: critical thinking, creativity, collaboration, communication, digital literacy, problem-solving.

Pupil Competency Assessment Battery

- Age-appropriate tasks adapted from OECD/PISA-based frameworks and UNESCO learning assessments.
- Critical thinking: scenario-based problem-solving questions.
- Creativity: divergent thinking tasks (multiple uses test).
- Collaboration & communication: group-based task scored with rubrics.
- Digital literacy: task-based ICT knowledge (where facilities existed).
- Reliability tested through a pilot in 2 schools (Cronbach's $\alpha > 0.75$).

Teacher Questionnaire

- Sections: demographic data, pre-/in-service training, teaching practices, use of ICT, perceptions of CBC relevance, and challenges faced.
- Likert-scale items (1–5) plus open-ended responses.

Classroom Observation Checklist

- Observed lesson structure, use of learner-centered methods, frequency of group work, questioning techniques, use of ICT, and assessment practices.



- Two lessons per teacher (literacy and numeracy/science).

Semi-Structured Interviews and Focus Groups

- Interviews with teachers and headteachers explored perceptions of curriculum reform, barriers to implementation, and assessment pressures.
- Focus groups with parents examined perceptions of skill relevance.

Data Collection Procedure

- Ethical clearance obtained from the University Research Ethics Board and the Ministry of Basic Education.
- Parental consent and pupil assent were secured.
- Enumerators (teacher trainees from the University of Bertoua) were trained for two days on administering instruments.
- Data were collected over a 12-week period in 2024.
- Quantitative phase: Surveys and pupil assessments administered in weeks 1–8; classroom observations conducted concurrently.

Qualitative phase: Interviews and focus groups conducted in weeks 9–12.

Data Analysis

Quantitative Analysis

- Descriptive statistics: means, standard deviations, frequencies.
- Independent-sample t-tests and ANOVA: compared competency scores by gender, school type, teacher training status.
- Multilevel regression models: pupils nested within classes and schools, modeling predictors of competency scores (teacher training, ICT resources, socio-economic background).
- Chi-square tests: compared assessment alignment between public and private schools.
- Data analyzed using SPSS v27.

Qualitative Analysis

- Transcripts coded using thematic analysis (Braun & Clarke, 2006).
- Codes developed deductively from research questions (e.g., “teacher training gaps,” “assessment misalignment”) and inductively from emerging themes.
- NVivo software used for coding consistency.
- Integration
- Mixed-methods joint displays compared quantitative findings with qualitative explanations (e.g., regression showing training effect explained by interview themes on teacher confidence).

Validity, Reliability, and Trustworthiness

- Quantitative: Piloting ensured reliability (Cronbach’s $\alpha > 0.7$ for all scales). Triangulation across different instruments improved construct validity.
- Qualitative: Credibility ensured through member-checking with selected participants; dependability through audit trail documentation.
- Mixed-methods: Convergence across datasets strengthened validity of conclusions.

V. Findings, Discussion, and Policy Implications



Overview of Findings

Data were collected from 600 pupils, 120 teachers, and 30 primary schools in Bertoua. Analysis integrated quantitative competency scores, teacher and school-level predictors, classroom observations, and qualitative interview themes.

Alignment Between Curriculum and Classroom Practice

Curriculum document analysis revealed a strong emphasis on critical thinking (22%), creativity (20%), collaboration (18%), communication (15%), and digital literacy (10%), with the remaining content devoted to foundational literacy and numeracy.

Classroom observations and teacher surveys, however, showed a discrepancy:

- 68% of lessons were teacher-centered.
- Group work occurred in only 25% of observed sessions.
- ICT integration was minimal (15% of lessons), often limited to projector use or demonstration.
- Assessment practices predominantly measured recall (75% of evaluations).

Interpretation: While the curriculum prioritizes 21st-century competencies, implementation gaps result in a curriculum–practice mismatch, supporting Hypothesis H1.

Pupils' 21st-Century Competency Outcomes

Quantitative assessment results (grades 4–6):

Competency

Mean Score (out of 100)

SD

Critical Thinking

61

12

Creativity

58

14

Collaboration

65

11

Communication

63

13

Digital Literacy

42

15

Problem Solving

55

- Pupils performed best in collaboration and communication.
- Digital literacy and problem-solving showed notable deficits, reflecting limited ICT exposure and teacher-led instruction.



- Regression analyses indicated that teacher training in CBC, availability of instructional resources, and school type (private vs. public) were significant predictors of higher competency scores ($p < 0.05$).

Teacher, School, and System Factors

Qualitative insights highlighted three major barriers:

- **Teacher Training Gaps:** Teachers reported insufficient hands-on training in CBC methods and digital integration. One teacher noted:
- “We were trained in theory, but in the classroom, we still rely on textbooks and lectures.”
- **Resource Constraints:** Many schools lacked ICT infrastructure, teaching materials, and adequate classroom space for group activities.
- **Assessment Misalignment:** High-stakes examinations still reward recall, discouraging the use of active, competency-focused teaching.

These findings support Hypotheses H2–H4, showing that teacher capacity, resource availability, and assessment practices significantly influence pupil outcomes.

Discussion

The study confirms that while Cameroon’s CBC is conceptually aligned with 21st-century competencies, practical implementation in Bertoua is partial and uneven, consistent with prior studies in Cameroon (Ngoungouo, 2021; Mbuh, 2020) and across Sub-Saharan Africa (Oduor, 2020; Akyeampong, 2018).

Critical observations:

- **Curriculum relevance vs. classroom reality:** The study highlights the “implementation gap” — policy documents alone cannot ensure skill acquisition.
- **Teacher training matters:** Trained teachers achieve higher pupil outcomes, emphasizing the importance of ongoing professional development.
- **Digital literacy gap:** Limited ICT access reinforces inequality in skill development, with pupils in better-resourced schools performing better.
- **Assessment drives pedagogy:** Misaligned assessment frameworks hinder the adoption of active, competency-focused methods.

These findings demonstrate that curriculum relevance depends not only on policy design but also on teacher capacity, school resources, and assessment alignment, echoing global literature on CBC implementation (Trilling & Fadel, 2009; Tikly, 2019).

Policy Implications

Based on the findings, several actionable recommendations emerge:

Teacher Training and Professional Development:

- Expand in-service training programs focusing on active pedagogy, ICT integration, and formative assessment.
- Establish mentorship and peer-learning networks to reinforce competency-based practices.

Assessment Reform:



- Revise examinations to incorporate competency-based tasks, problem-solving, and creativity indicators.
- Introduce formative assessment tools at school level to encourage active learning.

Resource Provision:

- Scale ICT infrastructure in schools, including computers, internet access, and digital learning materials.

Provide low-cost project-based learning materials to support collaborative classroom activities.

Curriculum Localization:

- Develop localized guides linking national CBC objectives to Bertoua's socio-economic context, including community problem-solving projects.

Monitoring and Evaluation:

- Implement systematic classroom observation and pupil competency assessments at district level to track progress over time.

Contribution to Knowledge

This study contributes to the literature on curriculum relevance and 21st-century skill acquisition in Sub-Saharan Africa by providing:

- Empirical evidence of the implementation gap between CBC policy and classroom practice in a regional Cameroonian city.
- Quantitative measurement of pupil 21st-century competencies, highlighting strengths (collaboration, communication) and weaknesses (digital literacy, problem-solving).
- Insights into teacher, school, and systemic factors influencing curriculum effectiveness.

These findings inform policymakers, teacher training institutions, and development partners on interventions that can improve the relevance and effectiveness of primary education in Cameroon.

VI. Ethical Considerations, Limitations, Conclusion, References, and Appendices

Ethical Considerations

Ethical compliance was strictly maintained throughout the study. Key measures included:

- Institutional Approval: Ethical clearance was obtained from the University Research Ethics Board and authorization from the Ministry of Basic Education in Cameroon.
- Informed Consent: Written consent was obtained from teachers, headteachers, and parents/guardians of pupils. Pupils provided verbal or written assent prior to participation.



- Confidentiality and Anonymity: All data were anonymized; unique codes were assigned to pupils, teachers, and schools to prevent identification.
- Data Security: Digital data were stored in password-protected files, and physical forms were kept in locked cabinets.
- Voluntary Participation: Participants were informed of their right to withdraw from the study at any stage without penalty.

These measures ensured compliance with international research ethics standards and protected participants' rights and well-being.

Limitations of the Study

Several limitations were acknowledged:

- Cross-Sectional Design: Data were collected at a single point in time, limiting causal inference regarding curriculum impact.
- Regional Scope: The study was conducted only in Bertoua, which may limit generalizability to other Cameroonian regions.
- ICT Constraints: Digital literacy assessments were constrained by limited ICT availability, potentially underestimating pupils' competencies.
- Self-Reported Data: Teacher surveys may have included social desirability bias. Triangulation with classroom observations mitigated this limitation.

Despite these constraints, the study provides valuable insights into the implementation of Cameroon's CBC and the development of 21st-century skills.

VII. Conclusion

This study evaluated the relevance of Cameroon's primary school curriculum to 21st-century skill development in Bertoua. The findings reveal:

- A partial curriculum–practice alignment, with teacher-centered pedagogy dominating classrooms.
- Pupils demonstrate moderate collaboration and communication skills, but digital literacy and problem-solving are underdeveloped.
- Teacher training, resource availability, and assessment alignment are critical predictors of competency acquisition.

The study concludes that while the CBC is theoretically aligned with 21st-century competencies, practical constraints limit its effectiveness. Strengthening teacher training, revising assessment systems, and improving resource allocation are essential for bridging the gap between curriculum intentions and learning outcomes. These findings can guide policymakers, teacher training institutions, and development partners in enhancing primary education in Cameroon and similar African contexts.

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