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Evaluating the Implementation of the Competency-Based Approach in School Textbooks: A Case Study of the Unified Textbook for Mathematics, Science, and Technology for the First Cycle of Primary Education

واقع المقاربة بالكفاءات في الكتاب المدرسي: – الكتاب الموحد للرياضيات والتربية العلمية والتكنولوجية للطور الأول من التعليم الابتدائي أنموذجا –

La réalité de l'approche par compétences dans le manuel scolaire : le livre unifié de mathématiques, d'éducation scientifique et technologique pour le premier palier de l'enseignement primaire comme modèle

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ملخص:

يهدف بحثنا هذا إلى اظهار مدى تطبيق ما جاء في الوثائق الرسمية لوزارة التربية الوطنية عن المقاربة بالكفاءات في الكتاب الموحد للرياضيات والتربية العلمية والتكنولوجية للطور الأول من التعليم الابتدائي، وقد تم الاعتماد على المنهج الوصفي التحليلي، وعينة بحث هي الكتاب المدرسي الموحد للرياضيات والتربية العلمية والتكنولوجية للطور الأول (**السنة الأولى والثانية**) من التعليم الابتدائي طبعة 2016 -2017، حيث تم تقييم هذين الكتابين من خلال تطبيق شبكة تقييم الكتب المدرسية المنجزة من طرف لجنة الاعتماد والمصادقة بالمعهد الوطني للبحث في التربية، وقد أظهرت نتائج التقييم أن تصميم هذا الكتاب الموحد يقوم على تجميع المواد التعليمية التي تخدم الكفاءات العرضية نفسها، في حين كان من الضروري إيلاء العناية بالكفاءات المتنوعة الأخرى التي ينبغي تعزيزها لدى المتعلم، كما أوضح التقييم ان اعتماد أسلوب تجميع الدروس لمختلف المواد في كتاب واحد لا يخدم الأهداف التربوية المسطرة، بل قد يشكل عبئا إضافيا على المعلم والمتعلم

الكلمات المفتاحية: المقاربة بالكفاءات؛ المنهاج؛ الكتاب المدرسي؛ الطور الأول.

Abstract:

This study aims to evaluate the extent to which the Competency-Based Approach, as stipulated in the official documents of the Ministry of National Education, has been implemented in the unified textbook for Mathematics and Scientific & Technological Education for the first cycle of primary education. Employing a descriptive-analytical methodology, the research sample consists of the 2016-2017 edition of the unified textbook for the first and second grades. These textbooks were assessed using the official evaluation grid developed by the Accreditation and Validation Committee

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of the National Institute for Research in Education. The findings indicate that the design of the unified textbook did not prioritize the meaningful integration of subjects that foster the same cross-curricular competencies. Instead, the approach was a mere compilation of lessons from different subjects into a single volume. This structure fails to achieve the established pedagogical objectives and ultimately imposes an additional burden on both teachers and learners.
Keywords: Competency-Based Approach (CBA); curriculum; Textbook; First cycle of primary education.
Résumé:

Cette recherche vise à montrer le degré d'application des documents officiels du ministère de l'éducation nationale sur l'approche par compétences dans le manuel unifié de mathématiques et d'enseignement scientifique et technologique pour le premier cycle de l'enseignement primaire, et l'échantillon de recherche est le manuel unifié de mathématiques et d'enseignement scientifique et technologique pour le premier cycle (première et deuxième année) de l'enseignement primaire, édition 2016-2017, où ces deux manuels ont été évalués en appliquant la grille d'évaluation des manuels complétée par le comité d'accréditation et de validation de l'Institut national de recherche en éducation.
Mots clés : l'approche par compétences ; curriculum ; le premier cycle ; le manuel.

Introduction:

The Competency-Based Approach (CBA) is a prominent pedagogical methodology that educational systems worldwide are increasingly seeking to implement. Its core principle is to center the educational process on the learner, fostering their ability to apply acquired knowledge and devise innovative solutions to real-world problems. Algeria adopted this approach following the recognized shortcomings of the objectives-based approach, which no longer met the evolving social, economic, and scientific needs of the nation. Beginning with the 2003/2004 academic year, the Ministry of National Education initiated comprehensive reforms focused on three main axes: improving the quality of pedagogical supervision, reforming teaching methods, and reorganizing the educational system. Curricula were redesigned based on the CBA to enhance knowledge, improve performance, and ensure adaptability to the rapid changes in modern life.

This research seeks to uncover some of the deficiencies that hinder the effective implementation of the CBA and, consequently, prevent the achievement of the educational system's stated goals as articulated in the national curriculum.

Problem Statement

The contemporary world is witnessing unprecedented development in all spheres of life, with digital technology being a defining feature of our era. Consequently, nations are striving to integrate technology and digitization into all sectors. As education is the primary vehicle for achieving technological progress and modernization, it is incumbent upon states to harness all available resources to enhance their educational systems through continuous and comprehensive reforms.

The success of any educational reform hinges on the quality of its curricula, which are the primary tools for effective teaching. A curriculum can be defined as the set of planned educational, social,cultural, athletic, artistic, and scientific experiences that learners engage with to acquire or modify behaviors (Qaladah, 1987, p. 33). Algeria has undergone several educational reforms, beginning with the 1976 ordinance that laid the foundation for the modern educational system. A key milestone was the establishment of the "Fundamental School" (l'école fondamentale) in the early

1980s, an initiative aimed at decolonizing the educational content and democratizing access to science and technology.

However, after two decades, the curricula of the Fundamental School became inadequate to address the challenges of the 21st century and the internal and external transformations facing the country. This necessitated new reforms. In line with the reform plan approved by the Council of Ministers in April 2002, the Ministry of National Education began implementing the CBA in 2003. This pedagogy places the learner at the heart of the learning process by enabling them to acquire knowledge holistically and apply it in relevant contexts, thereby developing their skills and abilities (Farhaoui, 2012, p. 21). This new direction led to a comprehensive review of all elements of the educational process—curricula, objectives, teaching aids, strategies, and assessment methods. The National Committee for Curricula was established to design new curricula and oversee the authoring of textbooks aligned with the CBA.

This study aims to investigate the reality of the CBA's implementation within the Algerian educational system by focusing on a cornerstone of this approach: the school textbook. Specifically, we analyze the unified textbook for Mathematics, Science, and Technology for the first cycle of primary education. The study addresses the following questions:

1. What were the primary objectives of the educational system in adopting the Competency-Based Approach?

2. To what extent does the unified textbook for Mathematics, Science, and Technology for the first cycle of primary education reflect the requirements of the Competency-Based Approach?

Study Objectives

This research aims to achieve the following:

- To identify the goals that the educational system sought to achieve by adopting the CBA, as stipulated in official documents from the Ministry of National Education.

- To determine the degree of alignment between the content of the integrated textbook for scientific subjects (Mathematics, Science, and Technology) for the first cycle of primary education and the requirements of the CBA.

Significance of the Study

The importance of this study lies in its focus on the following points:

1. It provides researchers and readers with a clear overview of the official directives from the Ministry of National Education concerning the application of the CBA.

2. It contributes to the evolving concept of the "unified textbook," a model that could significantly advance CBA principles if designed and prepared in accordance with its requirements.

3. It offers valuable feedback to textbook authors and curriculum developers by identifying the strengths and weaknesses of this new type of integrated textbook.

4. It serves as a resource for future research on textbook analysis and evaluation, particularly for integrated textbooks, and builds upon the work of previous researchers in this field.

Scope of the Study

This research is limited to:

- The educational mission of the school as defined in the Orientation Law No. 08-04 of January 23, 2008.
- The pedagogical framework for curriculum development as outlined in the General Reference Framework for Curricula.
- The unified textbook for Mathematics, Science, and Technology for the first and second years of primary education (2016-2017 edition).

Definition of Key Concepts

1. Competency-Based Approach (CBA):

Boualleg (2004) defines an "approach" as a strategy for nearing a truth at a specific moment (p. 15). Philippe Perrenoud (2004) defines "competency" as "the ability to act effectively in a given situation, an ability that rests on knowledge but is not limited to it" (p. 7). The CBA, therefore, is a framework for designing and implementing an action plan that considers all intersecting factors for effective performance, including objectives, methods, resources, child characteristics, environment, pedagogical theories, and time (Accompanying Document to the Curriculum, 2003, p. 31).

2. The Textbook:

A textbook is a comprehensive system that embodies the content component of the curriculum, including objectives, content, activities, and assessment. It is designed to assist teachers and learners in a specific grade and subject to achieve the curriculum's intended goals (Mar'i & Al-Hilah, 2000, p. 35). It is a document specifically prepared for school use, primarily directed at students at various educational levels (Choppin, 1992, p. 16). In this study, the textbook refers to the unified instructional tool for Mathematics, Science, and Technology for the first and second years of primary education, designed to build targeted competencies.

3. The Curriculum:

This refers to the pedagogical component of the Mathematics, Science, and Technology curriculum for the first cycle of primary education, as issued by the Ministry of National Education. This component is one of four fields that constitute the curriculum, alongside the ethical (values), epistemological (knowledge), and methodological fields.

4. First Cycle:

The first cycle of primary education in Algeria is the stage where students learn the fundamentals of reading, writing, and arithmetic, in addition to other subjects like science, social studies, and arts. This stage aims to build a strong educational foundation by developing these core skills.

Summary of Official Directives

The following points summarize key provisions from official Algerian educational documents:

2.1. The Educational Mission of the School (Orientation Law No. 08-04, 2008):

Article 4 of the law stipulates that the school must provide quality education that ensures the full, harmonious, and balanced development of students' personalities. The school shall:

- Ensure students acquire knowledge in various subjects and master intellectual and methodological tools.
- Enrich students' general culture by deepening their scientific, literary, and artistic learning, adapted to societal and technological developments.
- Develop students' cognitive, psychological, and physical capacities, as well as their communication skills.
- Provide cultural education in arts, literature, and cultural heritage.
- Equip students with robust and lasting competencies that can be judiciously applied in real-life communication and problem-solving situations, enabling lifelong learning and active participation in society.
- Ensure mastery of the Arabic language as the national and official language.
- Promote and expand the teaching of the Amazigh language.
- Enable students to master at least two foreign languages to open up to the world.
- Integrate modern information and communication technologies (ICT) into the learning environment and ensure students can use them effectively from the early years.
- Grant all students the opportunity to participate in sports, cultural, artistic, and recreational activities.

2.2. The Pedagogical Framework for Curricula (General Reference Framework, 2009): This framework emphasizes pedagogical change as a cornerstone of educational reform. Key principles include:

- **Pedagogical Change and Innovation:** The reform relies on pedagogical flexibility, bold change, and openness. It requires a systemic approach that ensures coherence between educational stages, interdisciplinary connections, and alignment between textbooks and curricula.
- **Application of the Competency-Based Approach:** The CBA shifts the focus from a logic of teaching (transmitting knowledge) to a logic of learning (centered on the student's actions). Students are trained to act (seek information, analyze situations, formulate hypotheses) in problem-based scenarios drawn from daily life. Competency is defined as "the ability to act based on the mobilization and effective use of a set of resources" (p. 19). This imposes several requirements on curriculum designers:
    - **Integration:** A process of acquiring and applying knowledge, both within the school context (interdisciplinarity) and in life situations.
    - **Coordination:** Collaboration between subjects and among all educational stakeholders to streamline learning and encourage integration.

- **Pedagogical Differentiation:** Addressing the individual needs of each student to optimize their learning progress.
- **Formative Assessment:** To monitor progress and identify learning gaps that require timely intervention.

- **Integration of ICT:** ICT is not a panacea but an essential tool that can enhance student learning, support teacher professional development, and modernize the school. It enables new learning situations, encourages problem-solving skills, and supports higher-order thinking.
- **Organization of Subjects and Timetables:** The framework calls for moving away from fragmented knowledge and rigid timetables. It recommends allocating flexible time for supplementary activities like remedial support, project-based work, and personal development.
- **Opening the School to its Environment:** Schools should have greater autonomy and the right to take initiatives aligned with national educational policy. This fosters an environment where intellectual and moral competencies can flourish alongside academic learning.
- **Promoting New Roles for Educators:** The teacher's role evolves from being the sole transmitter of knowledge to a facilitator and guide. This requires a shift towards interdisciplinary approaches and collaborative work among the educational team.

Methodology

Given the research objective of assessing the reality of the CBA in textbooks by analyzing official documents and their application, the **descriptive-analytical method** is most appropriate. This method is a key tool in educational evaluation, especially for judging the quality and comprehensiveness of instructional materials and curricula (Hamdan, 2002, p. 35).

Sample: The study sample consists of the unified textbook for Mathematics, Science, and Technology for the first and second years of primary education (2016-2017 edition), officially approved by the Ministry of National Education.

Instrument: The primary tool for data collection was the **Textbook Evaluation Grid** developed by the Accreditation and Validation Committee at the National Institute for Research in Education (INRE). This grid, created by a multidisciplinary team of experts, teachers, and inspectors, assesses textbooks based on pedagogical and socio-cultural criteria, each broken down into sub-criteria and specific indicators.

Results

The analysis yielded the following findings:

1. Regarding Alignment with the Curriculum:

- A complete absence of resource integration and a lack of coherence and connection between the subjects.
- A significant deficiency in assessing acquired knowledge and a failure to build a progressive and accurate understanding of surrounding phenomena.
- The textbook merely alternates between the two subjects using a traditional list of lessons, resulting in an unclear pedagogical sequence.

- The overarching vision for each learning segment is unclear. Integration tasks at the end of each segment are perfunctory and do not serve the purpose of a unified textbook.
- An imbalance in content, with a much higher number of mathematics lessons compared to science and technology lessons, forcing teachers to disrupt the sequence to maintain pace.

2. Regarding the Design of Learning and Textbook Logic:

- Learning-construction situations do not facilitate the gradual discovery of new knowledge and predominantly feature individual activities, neglecting collaborative work.
- The learning design often fails to adequately scaffold tasks, leading to a failure to establish and assess learning in accordance with CBA principles.

3. Regarding the Relevance of Assessment Situations:

- Assessment is limited to simple exercises with no interdisciplinary connection. The textbooks are devoid of complex, integrated problem-solving tasks that combine resources from both subjects.
- Assessment primarily targets declarative knowledge, neglecting the integration of methodological skills, values, and attitudes.
- Integrated assessment sections consist of simple exercises rather than complex problems.

4. Regarding the Accuracy and Clarity of Instructional Content:

- A lack of precision and clarity in several visual aids (illustrations, diagrams).
- Instructions in both the first and second-year textbooks are frequently ambiguous.

5. Regarding the Quality of Pedagogical Aids:

- Instructions are generally imprecise and unclear.
- Visual aids are not authentic; most are drawings rather than photographs, which is inappropriate for this age group. Many are unclear and hinder comprehension.

Regarding Respect for Socio-Cultural Aspects:

- **First-Year Textbook:**
    - National constants and symbols (flag, map) received minimal and superficial attention.
    - Representation of social diversity (e.g., rural vs. urban life) was unbalanced and stereotypical, failing to reflect the true fabric of society or reinforce positive values.
    - The textbook largely ignored national and global heritage, as well as religious and universal values.
- **Second-Year Textbook:**
    - The findings were even more concerning. The textbook is completely devoid of any symbols of national sovereignty or elements of national identity.

- Representation of social diversity was minimal and stereotypical.
- The book is almost entirely lacking in references to cultural heritage (national or global) and universal or religious values.

Conclusion on Findings:

The analysis reveals that most of the targeted cross-curricular competencies were not achieved in either textbook. The pedagogical criteria are not aligned with CBA principles, as the books largely disregard curriculum recommendations regarding integration, project-based learning, and self-assessment. Furthermore, the socio-cultural dimension was severely neglected, with only sporadic and seemingly accidental references, failing to connect learning to the student's reality and moral framework.

Recommendations

Based on the study's findings, the following recommendations are proposed:

- The unified textbook for Mathematics, Science, and Technology for the first cycle must be fundamentally redesigned to align with the pedagogical principles of the curriculum.
- Unified textbooks should be designed to genuinely integrate subjects that serve common cross-curricular competencies, rather than simply compiling separate lessons into a single volume.
- The authoring process for unified textbooks should be opened to national competition, involving a wide range of experts from different specializations.
- Sufficient time must be allocated for the development of unified textbooks, with a system for periodic review and revision.
- Training workshops should be conducted for textbook authors, reviewers, and evaluators.
- The curriculum and associated textbooks must be continuously reviewed and updated.
- A formal, ongoing process of textbook review using specialized evaluation grids should be institutionalized to ensure they remain relevant and aligned with modern pedagogical theories.

Conclusion

By adopting the Competency-Based Approach, Algeria aimed to break with outdated, rote-learning practices and to elevate the quality of its education to international standards. This research sought to bridge the gap between policy and practice by examining the application of CBA principles in the unified textbook for the first cycle. Our analysis of official documents and the textbooks themselves confirms that despite the clear directives in ministry publications and the Orientation Law, the CBA has not been successfully translated into practice in these materials. The vast majority of pedagogical and socio-cultural indicators do not align with official requirements.

This leads to the unequivocal conclusion that the unified textbooks for Mathematics, Science, and Technology for the first and second years of primary education fail to meet the objectives set by the curriculum and, by extension, the core tenets of the Competency-Based Approach. We, therefore, assert that a fundamental revision of these textbooks is not merely recommended but essential to achieve the educational goals for which they were created.

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