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Язгуурын онцлог шинжтэй сургалтын хөтөлбөр боловсруулах философи: Даяарчлалын чиг хандлага ба дотоодын онцлог байдлыг уялдуулах ойлголтын тухайд

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ХУРААНГУЙ

Өнгөрсөн дөчөөд жилийн хугацаанд буурай хөгжилтэй орнууд хөгжингүй, капиталист орнуудын сургалтын хөтөлбөрийг эрчимтэй хуулбарлаж, боловсролын материал, нөөцийн хомсдлоос үүдэн гадаадын загваруудыг хуулбарлан дуурайж боловсролын шинэчлэлээ хийж байсан талаар судлаачид шүүмжилж иржээ. Боловсролын нөөц, эх сурвалжийн дутмаг байдлаас гадна энэ чиглэлд мэргэшсэн хүний нөөцийн хомсдол ч үүнд хүчтэй нөлөөлсөн гэж үздэг. Түүнчлэн хөгжиж буй улс орнууд, хөгжингүй орнуудад хэрэгжүүлдэг боловсролын бодлогыг ямар нэг шүүлтүүргүйгээр авч хэрэгжүүлж байсан талаар судалгааны ажлуудад олонтаа дурдагдсаар иржээ.

Энэхүү өгүүлэл нь бусад улс, орны сургалтын хөтөлбөрийг импортлох буюу шууд авч хэрэглэх нь ямар аюултай талаар, хоёрдугаарт математик боловсрол дахь нийгэм-соёлын асуудлуудыг, гуравдугаарт тодорхой баримт, нотолгоонд суурилж сургалтын хөтөлбөр боловсруулах талаар, төгсгөлд нь дээр дурдсан эдгээр гурван чиглэлийг нэгтгэн язгуурын онцлог, шинжтэй сургалтын хөтөлбөр боловсруулах философийн талаар тайлбарлахыг зорьсон болно.

Энэ судалгааны хүрээнд өндөр эрэмбэтэй боловсрол судлалын 2 сэтгүүлд 1980-2020 оны хооронд хэвлэгдсэн 150 гаруй өгүүллийг сонгон авч шинжилгээ хийсэн. Эдгээр өгүүллүүдийг шинжлэхэд “тэгш байдал”, “хэл шинжлэл”, “этноматематик”, “даяарчлал” гэсэн үндсэн 4 түлхүүр үгийг тодорхойлсон.

Нийгэм-соёлын бүх бүрдүүлэгч хэсэг нь тэгш байдлын үүднээс тайлбарлагдах ба энэ нь боловсролын зорилгын хүрээнд яригдана. Өөрөөр хэлбэл, тэгш байдал нь төвд буюу боловсролын зорилгод тусна. Хэл шинжлэл нь суралцагч бүр эх хэл нь ямар байхаас үл хамааран математикийн ухаанд суралцах тэгш байдлыг бий болгоход боловсролын үүргийг гүйцэтгэнэ. Этноматематик нь тодорхой соёл дахь математик практикаар илрэх ба боловсролын агуулгатай шууд холбогдоно. Өөрөөр хэлбэл, этноматематик нь тухайн соёл дахь боловсролын агуулга гэж ойлгож болох ба боловсролын агуулга дахь тэгш байдлыг төлөөлнө. Харин даяарчлал нь нийгэм-соёлын бүхий л хэсэгт нөлөөлнө. Тэгэхээр эдгээр 4 хэсэг нь тэгш байдал дээр уулзах ба хоорондоо харилцан үйлчилж, нийгэм-соёлын шинж байдлыг бий болгох бөгөөд улмаар язгуурын онцлог, шинжтэй сургалтын хөтөлбөр боловсруулах боломж бүрдэнэ хэмээн үзэв.

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The Philosophy of Endogenous Curriculum Development: Insights for Integrating Global Trends and Local Evidence

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THE PHILOSOPHY OF ENDOGENOUS CURRICULUM DEVELOPMENT: INSIGHTS FOR INTEGRATING GLOBAL TRENDS AND LOCAL EVIDENCE

1. INTRODUCTION

Curriculum reform has been a topic of extensive debate, as it involves addressing diverse and complex challenges. One of the most frequently discussed issues is the reliance on imitating or importing curricula from other countries. While adopting successful models from developed nations may seem like an efficient strategy to improve educational outcomes, it often leads to significant mismatches between the curriculum and the local context. This practice, sometimes referred to as "curriculum borrowing," fails to account for differences in cultural values, social structures, and economic realities, which can undermine the effectiveness of the curriculum in achieving its intended goals (Kusaka, 2021). For example, Mathematics education, in particular, has seen significant influence from international assessments such as TIMSS and PISA, which emphasize competencies like mathematical literacy, problem-solving, and critical reasoning. While these benchmarks offer valuable frameworks for improving educational outcomes, they also present significant challenges when applied across diverse cultural and economic contexts. The misalignment between globally standardized curricula and the unique needs of local communities highlights the critical need for a more adaptive and context-sensitive approach to curriculum reform. Recent studies underscore the complexity of these challenges. Steiner-Khamsi & Waldow (2018) argues that the global standardization of curricula often leads to a devaluation of local knowledge and pedagogical practices. Imported curricula may neglect indigenous perspectives and cultural nuances, creating learning environments that are disconnected from students' lived experiences. Similarly, Sahlberg (2021) highlights the growing tension between global pressures for standardization and the need for education systems to reflect local priorities, particularly in countries with limited resources. Economic constraints compound these issues, particularly in low-income countries where funding for comprehensive curriculum reform is often insufficient. Research by Tikly and Barrett (2013) identifies financial barriers as a key obstacle to implementing new curricula, noting that inadequate teacher training, limited access to materials, and infrastructural deficits undermine the effectiveness of even well-designed reforms. These challenges are exacerbated by the lack of sustained support for curriculum implementation, leading to inconsistencies and inequities in educational outcomes. Moreover, the rapid pace of global change has introduced new demands for curricula to address emerging challenges such as climate change, technological advancements, and growing social inequality. Reimers and Chung (2016) argue that education systems must go beyond traditional academic knowledge to prepare learners for an interconnected and uncertain future. However, many curriculum reform efforts remain slow to adapt, leaving gaps in preparing students for these global challenges.

The philosophy of endogenous curriculum development offers a promising framework to address these challenges. By prioritizing the integration of global trends with local knowledge, this approach emphasizes iterative cycles of reflection, evidence-based decision-making, and active collaboration among stakeholders. Endogenous curriculum development recognizes the importance of cultural relevance and contextual adaptability, ensuring that curricula are not only academically rigorous but also aligned with the sociocultural realities of learners. This philosophy advocates for curricula that honor local identities while equipping students with the skills and knowledge necessary to engage with a rapidly changing world. By bridging global standards and local needs, endogenous curriculum development provides a sustainable pathway for creating equitable and impactful education systems.

In this paper, the author proposes a framework for endogenous curriculum development and delve into its underlying philosophy, exploring how it can address the challenges of balancing educational needs.

2. DANGERS OF IMPORTING CURRICULA FROM OTHER COUNTRIES

The practice of adopting educational models from developed nations is a response to the lack of resources and expertise often faced by developing countries. While the intent is to improve educational outcomes, these imported models can create significant dissonance within local educational contexts. Gerdes (1986) noted that the rapid transfer of curricula from capitalist nations to developing countries often disregards local sociocultural conditions, creating a mismatch between the curriculum and the students' lived experiences. Jacobsen (1996) further argues that in attempting to replicate the educational systems of developed countries, many nations have neglected their indigenous educational needs, resulting in educational frameworks that are culturally alien

and challenging for students to relate to. The criticisms of curriculum importation have persisted for decades, as highlighted by Crossley & Watson (2003), who observed that these practices can lead to a lack of critical thinking and problem-solving skills that are essential for real-world application. Additionally, Cai & Howson (2012) warned that the standardization encouraged by TIMSS and PISA could narrow the scope of mathematics curricula by promoting content that aligns with an "international curriculum". Ultimately, a curriculum that is incompatible with local social and cultural dynamics may fail to engage students meaningfully, hindering their educational development.

3. SOCIOCULTURAL ASPECT OF THE MATHEMATICS CURRICULUM

A comprehensive analysis of 169 articles published between 1980 and 2020 in prominent journals such as Educational Studies in Mathematics and the Journal for Research in Mathematics Education highlights the critical role of sociocultural aspects in mathematics education (Kusaka, 2022). This study underscores equity as the overarching theme across sociocultural components in education. Equity in education involves multiple dimensions, including linguistic equity, which ensures that all students can learn mathematics in their native languages. This is particularly significant in multilingual countries, where language barriers can impede comprehension and engagement. Allowing students to learn in their native languages not only facilitates a deeper understanding of mathematical concepts but also creates a culturally validating environment where students feel respected and valued.

Ethnomathematics, as an evolving field, plays a pivotal role in addressing these sociocultural considerations. By acknowledging and incorporating indigenous knowledge and cultural practices into the mathematics curriculum, ethnomathematics aims to create an inclusive and culturally relevant learning environment. This approach does more than enhance academic performance; it fosters social values such as tolerance, equality, and mutual respect, thereby contributing to a broader sense of societal cohesion (D'Ambrosio, 2016). For example, students exposed to culturally meaningful mathematical concepts may develop a greater appreciation for their heritage, which in turn promotes a sense of pride and belonging. This inclusive strategy also encourages educators to rethink traditional methods and adopt innovative pedagogical practices that reflect the diverse cultural backgrounds of their students.

Globalization has further complicated the sociocultural dynamics of education by heavily influencing curricula worldwide. The increasing emphasis on standardization and competitiveness, often driven by international assessments such as TIMSS and PISA, tends to prioritize universal benchmarks over local cultural identities. While these global trends aim to raise academic standards and foster international comparability, they can inadvertently marginalize local contexts and values. The challenge lies in striking a balance between these globalized aspects of curriculum development and the need to preserve and celebrate local cultural identities. For instance, integrating local cultural practices into mathematical instruction can make the subject matter more accessible and engaging for students, while still meeting the broader academic goals set by global benchmarks.

Incorporating sociocultural factors into the mathematics curriculum not only improves learning outcomes but also nurtures a sense of identity and belonging among students. A curriculum that reflects the cultural realities of its learners helps bridge the gap between students' home environments and their educational experiences, fostering greater engagement and reducing disparities in achievement. Moreover, addressing sociocultural considerations contributes to equity by leveling the playing field for students from diverse backgrounds. This approach challenges the traditional notion that mathematics is a culturally neutral subject, emphasizing instead that it is deeply influenced by the societal and cultural contexts in which it is taught and learned.

In conclusion, Figure 2 illustrates the relationships among the four components of the sociocultural aspect. The sociocultural aspect of the mathematics curriculum is an essential element in achieving educational equity. By embracing linguistic diversity, integrating indigenous knowledge, and balancing global and local priorities, educators can design curricula that are not only academically rigorous but also culturally meaningful. This dual focus enhances student engagement and comprehension while promoting inclusivity, tolerance, and respect within the broader educational landscape. A mathematics curriculum that respects and integrates sociocultural components thus serves as a powerful tool for both personal and societal

transformation, equipping students with the skills, values, and cultural awareness necessary to thrive in an increasingly interconnected world.

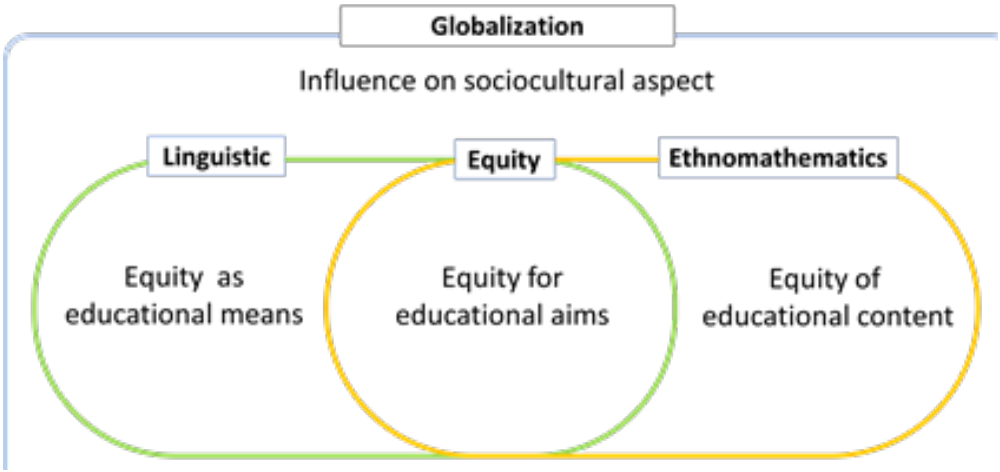

Figure 1. Four major sociocultural components

Source: Kusaka (2022)

4. EVIDENCE-BASED CURRICULUM DEVELOPMENT

Evidence-based curriculum development is a comprehensive and foundational approach that ensures educational content remains relevant, effective, and responsive to the diverse needs of learners by systematically utilizing empirical data and consistent feedback from various stakeholders. This approach begins with the systematic collection of data from multiple and diverse sources, including standardized test results, teacher surveys, focus group discussions, classroom observations, interviews, and community consultations. Standardized test results provide quantitative insights into student performance, highlighting patterns in achievement and areas of weakness, while qualitative inputs from teachers and community members capture the nuanced challenges and sociocultural factors that impact learning outcomes. These qualitative insights often reveal barriers such as linguistic mismatches, inequitable access to resources, and variations in pedagogical readiness, which may not be apparent from quantitative data alone.

Once collected, this wealth of data is analyzed rigorously to identify specific gaps in student understanding, areas requiring improvement in teaching practices, and the overall alignment of the curriculum with its intended objectives. For example, analysis may reveal that certain content areas are not sufficiently engaging for students or that pedagogical approaches need adjustment to accommodate diverse learning styles. By identifying these gaps, evidence-based curriculum development ensures that the curriculum evolves dynamically, addressing emerging educational needs and societal challenges effectively.

A critical component of this approach is the establishment of continuous feedback loops, which allow for real-time adjustments to curricula. Teachers play a central role in this process, as their day-to-day interactions with students provide invaluable insights into how specific teaching strategies and curricular content function in practice. Their observations can highlight whether particular topics require greater emphasis, whether pacing needs adjustment, or whether instructional methods need to be tailored to better meet the diverse needs of learners. Such feedback not only enhances the curriculum but also fosters a culture of adaptability within educational systems, ensuring that learning environments remain student-centered.

Transparency and meticulous documentation are essential to the success of evidence-based curriculum development. By recording the rationale behind decisions, the methodologies employed for data analysis, and the outcomes of implemented changes, educational systems establish a clear and accountable framework for curriculum design. This documentation serves as a foundation for iterative improvements, enabling policymakers and educators to build on previous revisions while avoiding redundant efforts. Furthermore, transparency helps build trust among stakeholders, demonstrating that decisions are informed by reliable evidence and collective input rather than arbitrary mandates.

Stakeholder collaboration is another cornerstone of evidence-based curriculum development. The active involvement of teachers, administrators, policymakers, parents, and students ensures that the curriculum reflects the aspirations, values, and needs of the community it serves. For instance, including student voices can highlight how well the curriculum resonates with their experiences and goals, while parents can provide perspectives on how educational content aligns with societal and familial expectations. Such collaborative decision-making not only enriches the curriculum but also fosters a sense of ownership among stakeholders, which is crucial for the successful implementation and long-term sustainability of reforms.

In addition to these foundational elements, evidence-based curriculum development is particularly well-suited to addressing the challenges of modern education, including rapid technological advancements, shifting societal priorities, and growing demands for equity and inclusivity. Advances in technology, such as digital learning platforms and real-time data analytics, have significantly enhanced the capacity for data collection and analysis, enabling educators to identify trends and patterns more efficiently. These tools also support personalized learning by tailoring educational content to individual student needs, ensuring that all learners, regardless of their starting point, have the opportunity to succeed.

By integrating systematic data collection, rigorous analysis, continuous feedback loops, transparent documentation, and active stakeholder collaboration, evidence-based curriculum development provides a robust and adaptable framework for designing and revising curricula. It ensures that educational programs remain aligned with both local realities and global standards, balancing the need for cultural relevance with the demands of an interconnected and rapidly evolving world. This approach not only addresses immediate educational challenges but also lays the groundwork for sustainable, equitable, and impactful learning environments that prepare students to thrive in diverse and dynamic contexts.

5. ENDOGENOUS CURRICULUM DEVELOPMENT: A SUSTAINABLE APPROACH

Endogenous curriculum development offers a sustainable and context-sensitive framework for educational reform (Figure 2). Unlike traditional approaches that rely on importing curricula from other contexts, this philosophy emphasizes the integration of local realities with global trends. By fostering continuity, adaptability, and inclusivity, endogenous curriculum development seeks to create curricula that are both academically rigorous and culturally relevant.

A key principle of this approach is continuity and iteration. Curriculum reform is not a one-time effort; rather, it requires ongoing refinement through regular cycles of evaluation, reflection, and revision. Each iteration builds upon the successes and lessons of previous versions, ensuring that the curriculum evolves in alignment with the changing needs of learners and society. This iterative process allows for continuous improvement and ensures that emerging challenges, such as advances in technology or shifting social priorities, are effectively addressed.

Another fundamental aspect of endogenous curriculum development is its commitment to contextual relevance. Curricula must reflect the cultural, linguistic, and social realities of the communities they serve. For example, incorporating indigenous knowledge and practices into the mathematics curriculum can enhance its relevance and accessibility, particularly in multicultural or multilingual societies. This approach not only fosters a deeper connection between students and their education but also validates and preserves local cultural identities.

Evidence-based decision-making is a cornerstone of endogenous curriculum development. The use of empirical data to inform curriculum revisions ensures that changes are grounded in reliable insights rather than theoretical assumptions. This involves systematically gathering feedback from stakeholders, analyzing student performance, and assessing the effectiveness of teaching methods. Such an evidence-based approach enhances transparency and accountability while promoting a curriculum that is responsive to the needs of learners.

One of the distinctive features of endogenous curriculum development is its ability to balance global trends with local priorities. While international benchmarks such as TIMSS and PISA provide valuable frameworks for improving educational quality, their direct application often overlooks the unique needs of individual contexts. Endogenous curriculum development incorporates global advancements while adapting them to fit local realities, creating a curriculum that prepares students for both local and global challenges. This dual focus ensures that students develop the skills and knowledge necessary to thrive in an interconnected world while remaining rooted

in their cultural heritage.

The success of endogenous curriculum development also depends on the active participation of local stakeholders. Teachers, policymakers, community leaders, and students themselves play a crucial role in shaping a curriculum that reflects their collective aspirations and values. This collaborative approach fosters a sense of ownership among stakeholders, increasing their commitment to the curriculum's implementation and success. Furthermore, the involvement of diverse voices helps reconcile differing perspectives and promotes a shared vision for education.

Transparency and documentation are essential components of this approach. Detailed records of curriculum revisions, including the rationale behind decisions and the outcomes of previous iterations, provide a clear framework for future improvements. This not only supports consistency across revisions but also facilitates knowledge-sharing among educators and policymakers.

Incorporating the sociocultural dimension into curriculum development is critical for achieving educational equity. As discussed in earlier chapters, recognizing the sociocultural realities of learners helps bridge gaps between policy and practice. For instance, ensuring linguistic equity by allowing students to learn mathematics in their native language can significantly enhance comprehension and engagement. Similarly, integrating ethnomathematics—indigenous knowledge systems and cultural practices—into the curriculum fosters inclusivity and respect for diversity.

In conclusion, endogenous curriculum development represents a forward-looking and sustainable model for educational reform. By combining local insights with global advancements, this approach addresses the challenges of relevance, adaptability, and equity in curriculum design. Through iterative refinement, evidence-based practices, and active stakeholder involvement, endogenous curriculum development provides a roadmap for creating impactful and culturally attuned curricula. As education systems worldwide grapple with the pressures of globalization, this philosophy offers a path toward meaningful reform that empowers learners and preserves cultural integrity.

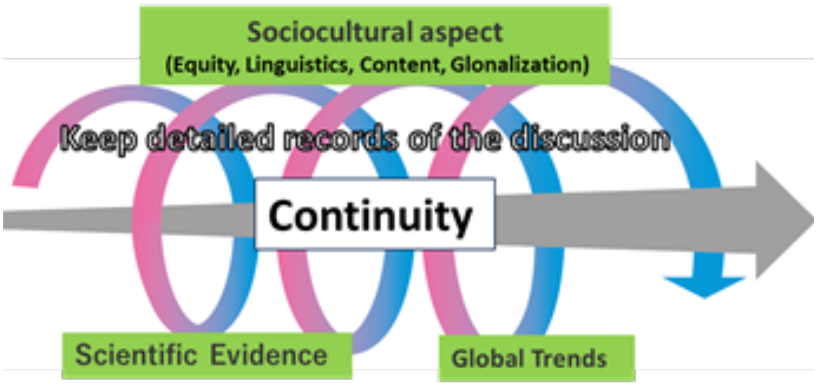

Figure 2. Structure of Endogenous curriculum development

Source: Developed by author

CONCLUSION

The philosophy of endogenous curriculum development represents a pivotal shift in how educational systems approach curriculum reform, particularly in mathematics education. By moving away from the often problematic practice of importing curricula wholesale from other contexts, this philosophy emphasizes the importance of grounding curriculum development in the unique cultural, social, and economic realities of local communities. This approach not only ensures greater relevance and acceptance of the curriculum but also empowers local educators and stakeholders to take ownership of the educational process.

Central to this philosophy is the concept of a cyclical, evidence-based process that integrates continuous reflection and data-driven decision-making. Through iterative cycles of development, implementation, and evaluation, endogenous curriculum development aligns international best practices with the specific needs and values of

local learners. This approach recognizes the value of global benchmarks, such as those provided by TIMSS and PISA, while also acknowledging that their direct application without adaptation can lead to dissonance and inequity. Instead, by incorporating sociocultural dimensions and the lived experiences of students, this philosophy promotes a curriculum that resonates with learners and enhances their engagement and understanding.

One of the most significant contributions of endogenous curriculum development is its ability to foster collaboration among stakeholders. By involving educators, local experts, policymakers, and the community in the development process, this approach creates a shared vision for education. Such collaboration not only ensures that diverse perspectives are represented but also builds a sense of collective responsibility and accountability for the success of the curriculum. The incorporation of stakeholder narratives, as explored in this paper, provides rich insights into the complexities of curriculum reform and highlights the importance of professional discourse in reconciling diverse viewpoints and achieving consensus.

Furthermore, endogenous curriculum development has profound implications for educational equity and sustainability. By prioritizing the needs of local learners and addressing the systemic challenges they face, this approach helps bridge the gap between policy and practice. It ensures that education remains a tool for empowerment, enabling students to connect their cultural heritage with the demands of a globalized world. This localized focus, coupled with an openness to global trends, creates a balanced framework that prepares learners for both local challenges and international opportunities.

In conclusion, the philosophy of endogenous curriculum development offers a compelling model for sustainable and meaningful reform in mathematics education and beyond. It advocates for a curriculum that is not only academically rigorous but also culturally and socially attuned to the needs of its learners. As educational systems worldwide grapple with the challenges of globalization, the principles of endogenous curriculum development provide a pathway for creating curricula that honor local identities while equipping students with the skills and knowledge needed for global participation. Future research should continue to explore the application of this philosophy in diverse contexts, examining how its principles can be adapted to address the unique challenges and opportunities of different educational environments. By doing so, we can move closer to a vision of education that is both globally informed and locally grounded.

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