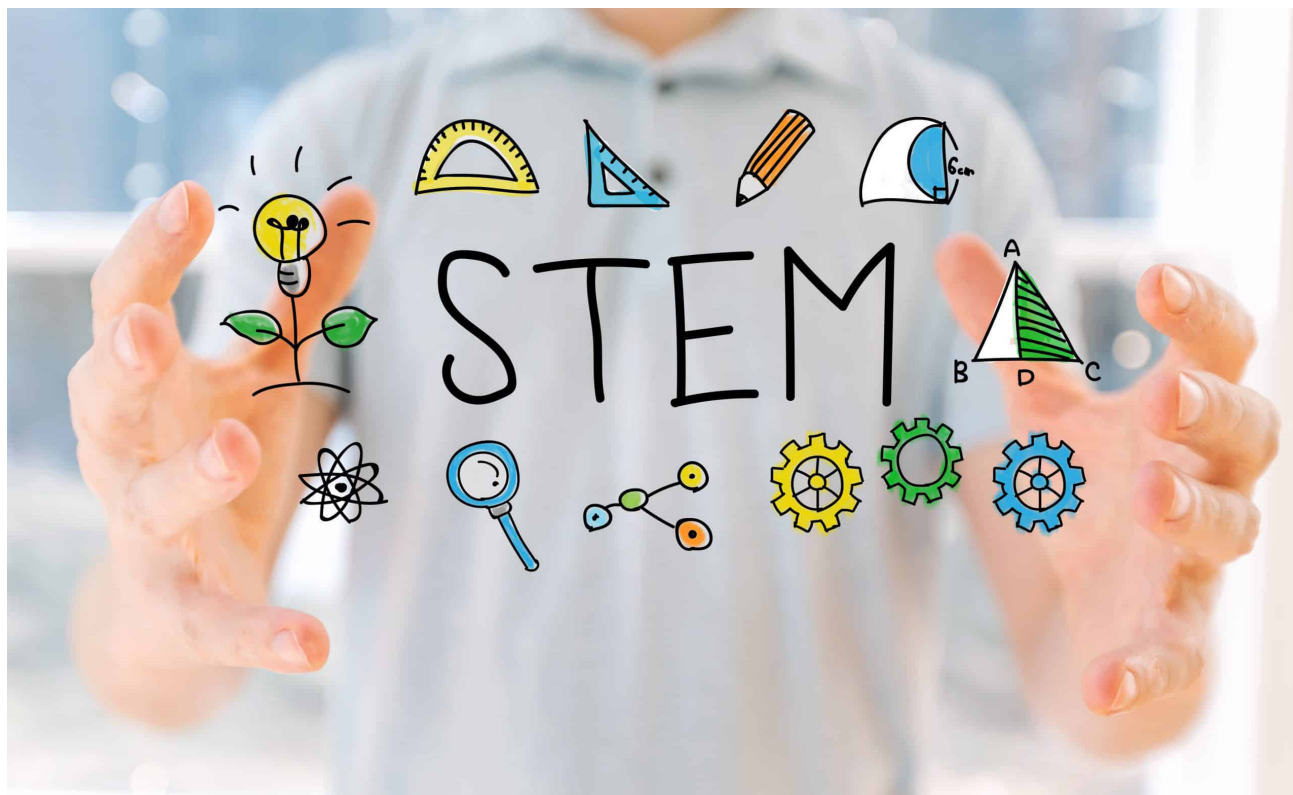




CURRICULUM AS CONCEPT AND COMPASS: A Century of Theoretical Evolution and Its Relevance to Sri Lankan STEM Education

I. INTRODUCTION

In the 21st century, the concept of curriculum has evolved beyond a static list of subjects to become a dynamic and reflective framework. This evolution is particularly critical in Science, Technology, Engineering, and Mathematics (STEM) education, where curricula must respond rapidly to emerging technologies and global competencies.

The University of Moratuwa (UoM), Sri Lanka's leading institution in engineering and technological studies, is actively advancing curriculum reforms that align with these global changes. The Department of Languages at UoM plays a pivotal role through two complementary programs: the English for Specific Academic Purposes (ESAP-Engineering) and the Academic Literacy for STEM Studies initiative.

The ESAP for Engineering course is embedded within the engineering undergraduate curriculum and is tailored to support discipline-specific writing, oral presentation skills, and formal technical documentation. It engages learners in authentic genres such as technical reports, data commentaries, and research abstracts [5]. For instance, students preparing an end coursework project learn to convert raw experimental data into IEEE-aligned abstracts, reflecting both precision and rhetorical clarity.

In contrast, the Academic Literacy for STEM Studies programme is a pre-university bridging course that introduces prospective STEM undergraduates to academic reading strategies, referencing conventions, reflective thinking, and foundational writing tasks. It is especially tailored to support students from Sinhala and Tamil medium backgrounds transitioning into English-medium tertiary education. An illustrative moment is when learners must summarise a research article in a discipline they have yet to formally study—encouraging deductive thinking and early disciplinary engagement.

These initiatives respond to pressing pedagogical concerns in Sri Lanka: a gap between school-level English education and university-level communication demands in STEM fields, and the underutilization of assessment as a formative, metacognitive tool. Accordingly, this article provides a conceptual and contextual review of curriculum theory across the 20th and 21st centuries and positions these two programmes as reflective case responses to evolving curriculum paradigms. It also explores how curriculum functions not just as a prescriptive template but as a philosophical compass that informs the direction

and depth of educational practice in increasingly complex learning ecosystems. These curricular explorations seek to generate practical insights for scholars, policy actors, and educators invested in reforming STEM communication in the Global South.

II. Theoretical Evolution of Curriculum

A. Early 20th Century: Learner-Centered Approaches (1900s–1930s)

John Dewey positioned curriculum as a continuous reconstruction of experience that connects learners' present understandings to future insights [1]. This philosophy underscored learner agency and experiential learning. Franklin Bobbitt viewed curriculum as encompassing the full range of life experiences that contribute to personal development [2]. Harold Rugg championed curricula designed to address real-world social issues, thereby linking learning to civic consciousness [3].

These learner-centered models inspired early reform efforts in Sri Lanka that encouraged student engagement beyond rote memorization. For example, schools piloting group-based science projects as early as the 1940s attempted to shift focus from textbook recitation to practical demonstration. At UoM, such principles influence the design of the ESAP programme, which fosters application-based communication and student participation in disciplinary language practices.

B. Mid-20th Century: Standardization and Accountability (1940s–1970s)

This period marked the rise of behaviorist and structuralist views. Robert Gagné proposed that instruction should be sequenced to support hierarchical learning outcomes [4], while Popham and Baker emphasized the importance of defining measurable objectives to ensure educational accountability [5].

These models found resonance in Sri Lanka's curriculum planning, which increasingly emphasized structured learning and evaluative frameworks. For instance, O-level and A-level

syllabi began integrating specific learning outcomes and itemized assessment objectives. The ESAP for Engineering course at UoM embodies this logic, embedding learning outcomes into scaffolded engineering communication tasks such as process description, technical writing, and oral presentation.

C. Late 20th Century: Embracing Complexity and Subjectivity (1980s–1990s)

Glen Hass introduced subjective dimensions, framing curriculum as lived experience [6]. Madaus and Kellaghan developed multi-component evaluation frameworks, such as the Context, Input, Process, Product (CIPP) model, to assess educational effectiveness holistically [7]. Tanner and Tanner viewed curriculum as a means of reconstructing knowledge for critical and moral growth [8].

These conceptual shifts informed broader reforms in Sri Lankan education, encouraging reflective and inclusive curricula. The curriculum reforms of 1997, for example, placed emphasis on critical thinking and bilingual education. UoM's Academic Literacy initiative reflects this movement by fostering metacognitive skills, promoting ethical writing practices including proper source attribution (e.g., IEEE referencing), and supporting learners' self-regulation through formative tasks. One exercise requires students to peer-review each other's lab report introductions—a practice that blends technical clarity with interpersonal critique.

D. 21st Century: Curriculum as Competency and Transformation (2000s–Present)

Contemporary curricula prioritize 21st-century skills: critical thinking, collaboration, creativity, and communication. D.F. Brown, Elena Silva, and A.V. Kelly advocate for learning designs that foster adaptable, lifelong learners [9][10][11]. Zongyi Deng extends this by arguing for a synthesis of knowledge and capability to support global citizenship [12].

At UoM, these ideals underpin both the ESAP and Academic Literacy programmes. The ESAP course aligns genre-based instruction with technical and professional demands, while the Academic Literacy programme supports new undergraduates

in cultivating foundational literacies required for higher education and research. Together, these initiatives address local challenges while aligning with international curricular ideals. The deliberate inclusion of reflective writing, source triangulation, and discipline-specific rhetorical strategies ensures that students are not only equipped to consume knowledge but to critique and contribute to it. A notable example is an activity where students analyse climate change discourse in engineering publications, fostering both lexical agility and socio-environmental awareness.

III. Conclusion: Curriculum as a Living Framework

The evolution of curriculum theory over the past century underscores its adaptive, responsive nature—shaped by the needs of learners, educators, and societies. From the experiential visions of Dewey to competency-based frameworks for the 21st century, the curriculum has emerged as a living construct, continually evolving to foster meaningful, future-ready learning [1][9].

At the University of Moratuwa, the Department of Languages exemplifies how such theoretical legacies can be operationalized within Sri Lankan higher education. The ESAP for Engineering and Academic Literacy for STEM Studies programmes serve not merely as language courses but as curricular responses grounded in scholarly insight and local necessity.

By framing curriculum as both concept and compass, this article encourages educators and policymakers to move beyond prescriptive models and embrace reflective, integrative curriculum practices. Such practices, grounded in historical theory and contextual relevance, hold the potential to transform STEM education and elevate the communicative agency of future professionals. The future of curriculum, then, lies in its capacity to evolve without losing sight of its purpose—to serve as the foundational medium through which knowledge is shaped, shared, and sustained.

Curriculum Through the Ages: A 100-Year Evolution

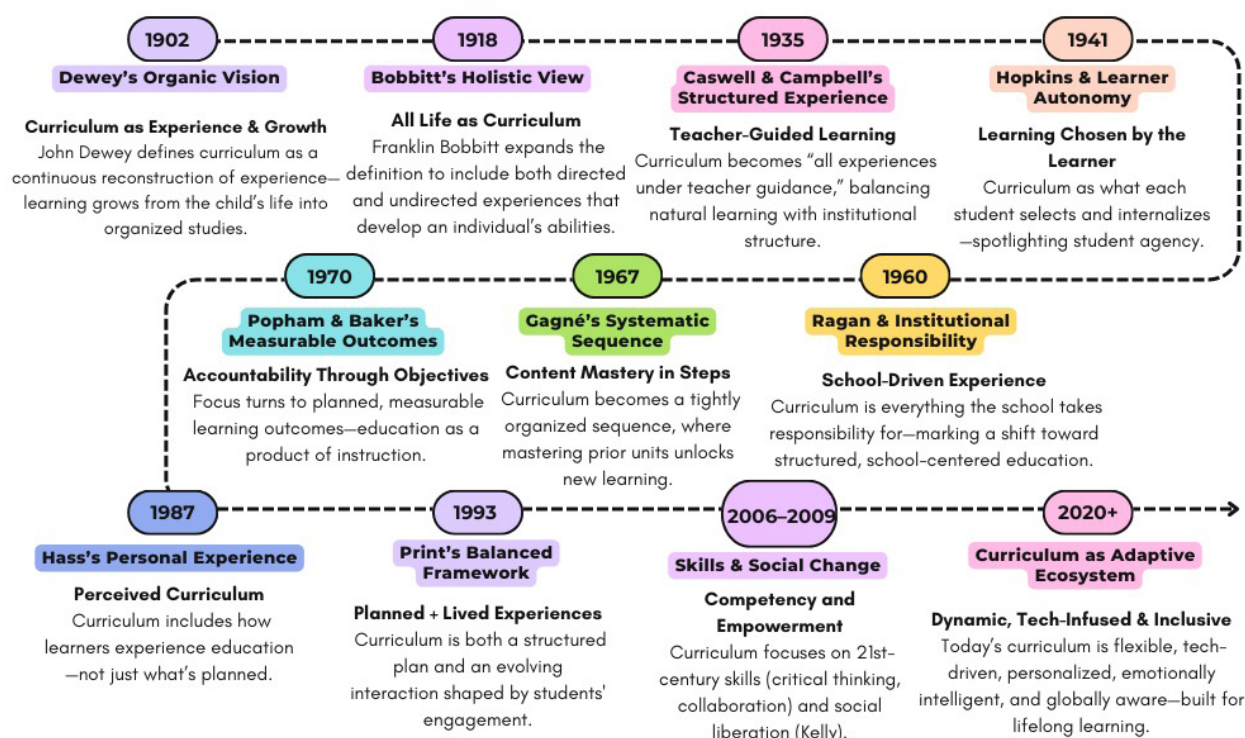


Figure 1: Curriculum Through the Ages: A 100-Year Evolution (1902–2020+)

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