

A THEORETICAL ANALYSIS OF THE RELATIONSHIP BETWEEN THE INTEGRATION OF META-LEARNING STRATEGIES INTO THE UNIVERSITY CURRICULUM AND ITS FLEXIBILIZATION WITHIN AN EDUCATIONAL CONTEXT

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ABSTRACT

The concept we wish to examine in this academic study is that of a fluid curriculum. We are not considering the idea of a curriculum reform in the true sense of the word, but rather as an approach that takes into account a valid paradigm shift at the level of the learning process. Education is evolving into an AI-driven learning ecosystem that continuously adapts, develops, and transforms. In other words, given that today's educational society is deeply permeated by aspects relating to AI, our analysis focuses on the relationship between the manner in which a university curriculum is structured and the academic context in which it can be undertaken and put to good use. This explanatory approach also stems from the fact that the new information society is changing our perspective on how the learning process takes place.

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From a centralised curriculum to a flexible curriculum

What is interesting about the vast majority of education systems is the very fact that, in a traditional approach, the curriculum content is designed in a structured manner, over a clearly defined period of time. These cycles are usually planned in 10- to 15-year intervals, with textbooks and certain educational resources being approved centrally. Furthermore, the predictability of the content becomes evident precisely through the types of activities outlined within them (Bone et al., 2024),

In the context of new educational paradigms, education is approached and rethought in a structural manner. In other words, we can no longer speak of stability in terms of the personal and professional competences acquired in relation to a specific labour market (Yang and Harbor, 2023). The teacher is no longer simply the person who provides explanations, but rather becomes a facilitator of knowledge and even of educational resources relating to topics that are, in most cases, interdisciplinary in nature.

The narrow gap between skills training and development in the labour market is becoming evident. Education is becoming a learning hub that operates and develops through artificial intelligence. Today's educational society is one that develops within the framework of a decentralised organisation (though not in the sense of chaos) combined with artificial intelligence platforms. Consequently, we can no longer speak of a centralised education system centred on the teacher's role at the heart of the teaching process.

In the light of these circumstances, we can also speak of a different approach to the concept of curriculum content, one that adapts to a new educational context and a social reality, distinct from the traditional one. This new type of education develops at a network level, with its nodes connected to open disciplinary frameworks, thereby encouraging inter- and transdisciplinary research. This is a metamorphosis that reflects a shift from the question of 'how one learns' to the question of 'how a person can adapt in order to learn'.

In this endeavour to explain how a flexible curriculum is possible, the issue of the ethical use of artificial intelligence arises. How ethical and deontological is it for such a

curriculum to be constructed using artificial intelligence? Or, insofar as it enables the utilisation of (meta)learning strategies, must such a curriculum necessarily be accepted within the academic environment? Certainly, such an approach raises various methodological questions in an educational context. Digital tools themselves were developed precisely to facilitate and simplify access to information and to make practical use of it as quickly as possible.

This reinterpretation of the concept of self-directed learning brings about systemic changes in terms of establishing criteria against which the quality of an academic curriculum can be assessed. However, improving such an approach does not merely involve a specific way of maximising the concept of quality or performance. In other words, the university curriculum itself can shape specific student behaviour. Furthermore, it can influence their learning experience, starting with their commitment and desire for self-efficacy. Additionally, university support can help to strengthen a sense of belonging, self-efficacy, commitment, and well-being, confirming the relational and contextual nature of the academic experience.

The concrete expression of such academic experiences gains validity because applying key knowledge related to new paradigms of knowledge involves extrapolating and using it in the digital environment. The learning process differs from the previous one in that, in the digital realm, knowledge is accessed more fluidly. From a digital perspective, it is no longer a matter of memorising information, but rather of utilising it through specific interconnected networks. The dynamism of such an approach lies in the fact that the learning process takes shape through connections of both a human and technological nature. Therefore, a key aspect of such an approach is the capacity or ability of the individual to convey, facilitate, and utilise knowledge through human and technological networks.

The consistency of such explanatory dimensions reveals a series of references to the idea of rapid social metamorphoses, linked to the transformations of an information-related nature. The correspondence between transformation and the capacity to (re)update information constitutes a relevant approach to connectivism, in relation to the dynamics of contemporary society. Thus, 'liquid modernity' becomes compatible with 'fluid forms of knowledge', highlighting concepts such as flexibility, transformation, continuity and connection.

A reinterpretation of the nature of the educational process reveals an epistemological shift from learning towards meta-learning. It becomes evident that there exists a hermeneutic pluralism regarding the willingness of educational actors (students and teachers) to adopt their own learning strategies. Such an approach also entails a recalibration of the key parameters that enable the curriculum to be put to good use.

In this regard, the ongoing discussion about a re-evaluation of the concept of knowledge can be realised in particular by reference to the subjectivity of the student engaged in the learning process. Within the context of postmodern education, the student relates to their own learning experiences, guided by the needs and demands of contemporary society. In this way, they become an active participant in the process of (de)constructing their own learning journey.

As the decision-maker regarding the implementation of a personal learning strategy, the student is taught how to structure their learning plan. This is made possible by a comprehensive process of monitoring and assessing knowledge and outcomes, followed by a process of self-reflection. The emphasis on the cognitive dimension leads, at an academic level, to an adjustment and readjustment of instructional activities. This ability becomes even more important in the university environment, where there is a high degree of autonomy, curricular flexibility and individual responsibility. The transition to higher education places a significant part of the responsibility for organising one's own learning on the student, which requires skills in planning, monitoring, self-assessment and strategic adaptation.

Translating this idea from the realm of learning to that of meta-learning involves self-regulation of one's own behaviour in relation to the strategic monitoring and management of one's own learning process. From a functional perspective, a student's academic experience can be shaped by the way in which the university curriculum is structured. The prioritisation of the curriculum and the selection of appropriate (meta)learning strategies become interdependent with regard to the student's academic experience. (Panadero, 2017; Raković et al., 2022).

In this regard, the specialist literature refers to a spiral curriculum, which involves initiating a learning activity by reconstructing prior knowledge. Thus, linking one's own learning autonomy to the chosen strategy – as well as to the concept of a spiral curriculum

– can lead to the optimisation and improvement of the learning process (Wood et al., 1976).

The integration of metalearning into the university curriculum can be achieved by developing and incorporating specific modules designed to help students understand the concept of ‘metalearning’ and apply it within their own studies. Through the university curriculum, students can learn how to learn and are able to take ownership of applying a particular metalearning strategy. Therefore, a starting point in such a context must be the recalibration of the idea of learning in relation to the process of re-examining the concept of epistemic knowledge.

The development of academic skills specific to the meta-learning dimension is based on an academic design approach. Examples of good practice in the academic environment (Dennis and Somerville, 2023) show that the implementation and utilisation of meta-learning strategies can take place in stages (Fouché, 2025). In this context, it becomes imperative to relate the analysis of academic learning experiences to different educational conditions and contexts (Wilson et al., 2024). Therefore, the need for a rigorous and structured curriculum (Cherbow, 2023) presents a picture in which students have the opportunity to engage in flexible learning that highlights their reflective and critical thinking. Recalibrating strategies within new educational and social paradigms (Ratnayake, 2024) involves rethinking the way in which a university curriculum is constructed.

In the context of student-centred education, meta-learning practices must take particular account of those components that relate to the manifestation of students’ cognitive structures. This can be seen in the context of their learning needs, in the sense that they are actively involved in a whole process of analysing and synthesising the activities and tasks within their learning. On the other hand, when considering the idea of putting a teaching activity carried out by students into practice, it can be observed that the transition from reflection to self-reflection becomes apparent when they manage to analyse the lesson delivered in class in a critical and constructive manner. In this way, students can identify a number of aspects or moments within the lesson that can be improved in terms of teaching strategies. At this stage, we are referring to an internal experience of (self-)learning.

At the same time, it has been demonstrated that analytical thinking can be developed through a comprehensive process of evaluating the activities carried out and the results achieved. In other words, the way in which these are approached determines the higher-order cognitive processes, the manifestation and development of which can have tangible implications for the university curriculum. Therefore, meta-learning strategies implemented in lectures and seminars can constitute fundamental components in the development of analytical thinking and, by extension, in the way one perceives a particular reality with regard to knowledge (Anthonysamy et al., 2025).

The flexibilisation of the university curriculum in the context of harnessing meta-learning strategies

The current educational context is characterised by several features that highlight the need for individuals to adapt quickly to society's new demands. The process of education and development can only be realised to the extent that the real needs of both those actively involved in this endeavour and society as a whole are understood and recognised. It is therefore essential that, during the learning process, students become aware of such needs, as well as of the necessity to exploit the meta-learning strategies they have adopted.

We need to make a clear conceptual distinction regarding the correlation between a flexible academic curriculum and a fluid academic curriculum. Thus, in the case of a flexible curriculum, the teacher actively shapes it and devises meta-learning strategies that can be utilised within teaching activities. In other words, based on pre-established objectives, whilst also taking into account the context in which the activity takes place, the teacher decides when to introduce changes to the educational process and how these can be implemented. On the other hand, within a fluid curriculum, objectives can be adjusted and aligned as teaching activities unfold, in line with the curricular content. Changes are not planned at a strategic level before the activities, but rather take shape as the teaching activities unfold.

This transformation places the student in a new context with reference to the curriculum content. One aspect of this is the emphasis on reflecting on one's own learning experiences. Furthermore, this reflective process fosters autonomy in learning, as well as the ability to assess the new learning context. Adapting learning using reflective practice encourages critical thinking. It is the teacher who can facilitate such methodological

approaches precisely by promoting collaborative learning, problem-based learning, reciprocity, and also by reinforcing the concept of knowledge.

The very idea of responsibility becomes increasingly relevant in an epistemological sense, given that the new paradigm of learning is generating not only a pluralism of values but also interpretive diversity regarding knowledge and its associated explanatory and argumentative dimensions. In other words, the process of academic knowledge becomes contextualised and self-constructing. Therefore, knowledge is not a final product, but rather the mediator and the result of a continuous process of development and transformation based on the research undertaken and the results obtained.

In these circumstances, the stage of methodological planning becomes significant for both the lecturer and the student. This should not be focused, through the proposed activities, solely on the memorisation and reproduction of knowledge, but should rather reflect an approach that enables the student's genuine learning needs to be met. This can be achieved by developing a curriculum and planning activities centred on problem-solving, analysis and synthesis, which are made possible through the reflective process.

The pragmatism of meta-learning strategies in the university environment stems from the way in which cognisable structures are perceived within the university curriculum and subsequently utilised in educational, social and economic contexts. In this way, the curriculum represents a fundamental component that plays a catalytic role in supporting and realising the meta-learning process, which is based on valid cognitive structures. Therefore, beliefs regarding the accumulation of knowledge must be distinguished from knowledge itself.

The pragmatism of meta-learning strategies in the academic environment is determined by the way in which curricular content is integrated and utilised within the university curriculum. It can therefore be argued that learning experiences can be combined with such strategies to achieve academic performance. This involves a whole process of self-regulation of learning, which essentially highlights aspects relating to the student's behavioural dimension (Tang and Biggs, 2011).

Among these strategies, consideration could be given to integrating meta-learning into the curriculum at university level. These modules could cover topics such as personal reflection, time management and the development of individually tailored learning

strategies. Furthermore, such an approach highlights the concept of decision-making autonomy at an academic level, in terms of the strategies adopted by the student.

Viewed through this lens, the curriculum takes on a role that goes beyond the mere organisation of subject content. It can become a formative framework for autonomy and reflexivity, insofar as the design of activities involves decision-making, the use of feedback, reflection on one's own actions and strategic transfer. In the same vein, lecture and seminar activities can be adapted to explicitly include opportunities for explaining strategies, self-assessment, justifying choices, comparing alternatives and reformulating future behaviour.

In these circumstances, a student's decision-making autonomy can be validated if they identify the conditions underpinning the use of meta-learning strategies. Thus, cognitive awareness is complemented by the process of monitoring learning experiences within a 'structured learning diary', which is not the same as a reflective journal (Kivimäki, 2023).

Students can monitor their learning process based on the subjects included in the university programme they are following. Their learning experiences can be analysed using standardised information that provides a summary of their learning. Whilst recording their experiences in this diary, students must answer questions that highlight the distinction between the complexity of the task and the success achieved as a result of identifying solutions to it.

On the other hand, adopting a particular strategy also involves adapting it to the type of task the student is required to complete. That is why the very concept of self-regulated learning becomes significant in this educational context. Supporting such a process of self-regulation in higher education is possible through methodological planning that must take into account new educational paradigms.

Furthermore, it is important to support the development of technologies related to state-of-the-art digital environments (Alhazbi, 2024). This involves highlighting opportunities arising in the field of artificial intelligence that facilitate a comprehensive analysis of alternative conceptual and theoretical dimensions of learning. The development of meta-learning is possible to the extent that artificial intelligence is

integrated and, from a pedagogical methodology perspective, corresponds to students' real learning needs.

Recent studies have also highlighted limitations regarding the relationship between cognitive flexibility and awareness of the need to utilise meta-learning strategies (Musullulu et al., 2025). This research has shown that it is not sufficient to explain performance solely through meta-learning strategies without also taking into account related aspects that may be correlated with the mechanisms underlying other cognitive processes. Consequently, such a situation highlights a limitation arising from a reductionist approach in attempts to explain performance solely by reference to the implementation of meta-learning strategies.

Juhanák et al. (2025) discuss the role played by metacognitive prompts in optimising learning experiences. Although such prompts are designed to enhance the efficiency of learning, the results of these studies have indicated that effective behaviour linked to the concepts of optimisation and performance cannot be directly determined by strategies implemented through cognitive prompts. Consequently, self-regulation of learning cannot be facilitated by such prompts.

The formative aspects of such an educational approach gain academic validity to the extent that self-regulation strategies can explain the relationships between students' academic goals, engagement and performance. Furthermore, given that metacognitive strategies are directly linked to strategies specific to academic engagement, certain behavioural manifestations within a university learning environment can be justified.

Consequently, in such an educational context, one may acknowledge the existence of epistemic conditions in the optimisation of academic experiences, as well as in the development and achievement of academic performance. From this perspective, academic performance becomes the result of a complex process in which the encoding, semantic elaboration, updating, consolidation, monitoring, and recalibration of information are linked into a functional and coherent system. Efficiency can no longer be associated with a simple cumulative logic of repeated exposure to the material, but rather with a strategic accumulation of cognitive operations, meant to optimize the accessibility, flexibility, and durability of the mental representations.

Conclusions

Consequently, the key criterion is not the intrinsic superiority of a particular strategy, but its functional compatibility with the specific educational context. Effectiveness, in this sense, becomes relational; it depends on the context and is conditioned by it. This perspective replaces the prescriptive logic of the ‘best method’ with the principle of strategic adaptability, according to which effective practice involves selection, monitoring, evaluation and adjustment in response to feedback derived from one’s own experience.

Within the conceptual framework of this thesis, meta-learning can be understood as a self-regulating meta-architecture, within which learning becomes simultaneously both an activity and the object of its own analysis. The individual does not merely apply cognitive procedures, but also develops the ability to assess their effectiveness, to observe inconsistencies, to compare options and to make deliberate changes to their own behaviour. This perspective allows for a functional distinction between meta-learning and metacognition.

Disclosure statement

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