Metacognition and wellbeing in education. A literature review

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Abstract
Despite the very large number of publications dedicated to metacognition and well-being, there are very few studies directly aimed to explore the connection between these variables and the possible mediating factors. In this context, the present bibliographic study has the following objectives: a) Identifying the main definitions and conceptual models of metacognition and well-being; b) Highlighting the particular aspects of the educational environment, important from the perspective of the research on metacognition and well-being; c) Identifying the factors that connect metacognition and well-being; d) Identifying the tools available for measuring metacognition and well-being; e) Identifying the methods and directions of action in interventions aimed at developing metacognitive skills and well-being. Based on the existing data in the literature, we conclude that there is sufficient empirical evidence to support the idea that metacognitive skills have a significant positive effect on professional performance both for students and teachers, and indirectly on their well-being. Therefore, additional research is required to elucidate the connections between metacognition and well-being, as well as to develop specific intervention programs for the development of metacognitive skills in school and for raising awareness of the factors contributing to the well-being of students and teachers.

Keywords: *Metacognition; well-being; education; factors of well-being; interventions;*

1. Introduction. Context and objectives of this study

In Western culture, rooted in humanistic ideas, the pursuit of happiness (as stated in the Declaration of Independence of the United States) is widely accepted as an inalienable right and a natural objective of human existence. Within this context, the assertion that wellbeing (WB) is "the ultimate dependent variable in social sciences" seems natural. Moreover, substantial evidence that wellbeing can be improved through education (Hobbs et al., 2022), along with observations showing that teachers' wellbeing significantly impacts students' wellbeing (Cherkowski & Walker, 2018) justifies the interest in studying wellbeing in education.

From a practical perspective, individuals who report high levels of subjective wellbeing are healthier, live longer (Diener & Chan, 2011), and are more likely to

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succeed (Lyubomirsky et al., 2005). Additionally, they achieve better professional and academic results (Maffoni et al., 2022; Turban & Yan, 2016; Smith & Firman, 2019).

However, the concept of wellbeing is highly multifaceted. A multitude of terms (such as life satisfaction, quality of life, happiness, flourishing, and thriving), with overlapping meanings are often used interchangeably in similar contexts (Dodge et al., 2012).

On the other hand, metacognition (MC), understood as the set of skills for awareness and control over one's cognitive processes, appears to correlate with most of the so-called 21st-century skills, such as creativity (Preiss et al., 2016), critical thinking (Valeyeva et al., 2020), communication abilities (Santoso & Istiqomah, 2021), and problem-solving (Liu, 2020). It is also deeply involved in learning processes (Hamzah et al., 2022).

Nevertheless, very few studies explicitly address the connections between metacognition and wellbeing in educational environments, as well as the factors linking these two constructs (Varshney & Barbey, 2021; Kiaei, 2014).

In this context, the objectives of the present bibliographic study are as follows:

- O1: To identify the main definitions and conceptual models of metacognition and wellbeing.
- O2: To highlight specific characteristics of the educational environment that are significant for studying metacognition and wellbeing.
- O3: To identify the linking factors between metacognition and wellbeing.
- O4: To identify the tools available for measuring metacognition and wellbeing.
- O5: To identify methods and actionable strategies in interventions aimed at developing metacognitive skills and wellbeing.

2. Methodological aspects

The vast amount of literature on metacognition and wellbeing excludes the possibility of conducting a systematic review. Additionally, the five objectives outlined for this study require different filtering criteria for content. For example, in identifying definitions and conceptual models of metacognition and wellbeing, it was not feasible to limit the search to the educational field, as these definitions are generally universal.

Similarly, tools for measuring MC and WB in educational contexts are usually adapted versions of general-use instruments. The same applies to studies exploring the connections between MC and WB.

Given the need to identify and cite original definitions of various concepts, as well as some seminal studies on wellbeing dating back to the early stages of research in this area, it was also not possible to filter by publication date, as many of these foundational studies precede the year 2000. In these conditions, the search strategy was as follows:

- For each of the formulated objectives, separate search and selection procedures for publications were conducted.

- Web of Science and Scopus databases were used as starting points because they are comprehensive and allow for complex searches.
- The content was filtered by publication type, including only articles, reviews, and book chapters. Relevance was assessed based on the citation count reported by Google Scholar, and significantly cited articles were selected for analysis.
- Publications related to the medical field were excluded based on title and abstract, retaining only studies focused on healthy participants, both physically and mentally.
- When searches in the Web of Science and Scopus yielded unsatisfactory results, additional searches were conducted using Google Scholar and ERIC.
- Selected articles were downloaded (using web-wide searches), and in some cases, other references were manually added to the selection.

The Zotero tool was used for managing references.

3. Definitions and conceptual models of metacognition and wellbeing

3.1. Definitions and conceptualizations of metacognition

The term *metacognition* was introduced by Flavell (1976) and defined as *knowledge about one's own cognitive processes or anything related to them.*

Flavell's definition was later simplified to the notion that *metacognition is thinking about thinking*, omitting the detail that it refers to one's own thinking, which led to some confusion.

More recently, Papleontiou-Louca defined metacognition as encompassing *all processes related to thinking, such as what you feel about your thinking, what you think about your thinking process, and regulating your thinking through self-observation and monitoring* (Papleontiou-Louca, 2003, p. 12). In summary, metacognition entails self-awareness and self-regulation of cognitive processes, as well as personal emotions and motivations. It is deliberate reflection on cognitive functioning.

Other studies (Flavell, 1979; Brown et al., 1984) have emphasized that metacognition also involves execution strategies necessary for controlling cognitive processes, such as planning, monitoring, revising, and correcting comprehension.

Metacognition plays a crucial role in communication, reading comprehension, language acquisition, social cognition, attention, self-regulation, memory, writing, problem-solving, and personality development (Flavell, 1979). Black and William (2009) consider metacognition a higher-level psychological process within the framework of formative assessment theory.

As a theoretical construct, metacognition does not equate to learning or development but rather to the conscious and deliberate regulation of learning and development (Papleontiou-Louca, 2003, p. 13).

Currently, there is consensus on two defining components of metacognition: awareness of aspects related to cognition and application of control procedures over cognitive processes.

Kuhn & Dean (2004) define metacognition as *awareness and management of one's thoughts*. Martinez (2006) views it as the process of *monitoring and controlling*

thought. Schraw (1998) argues that *metacognition consists of the knowledge and regulation skills necessary to control one's thinking*.

Schraw & Moshman (1995) distinguish between *metacognitive knowledge* and *metacognitive skills*, corresponding to distinct elements of the metacognitive process:

- Knowledge of cognition (KC): monitoring one's cognition.
- Regulation of cognition (RC): controlling cognitive processes.

Metacognitive knowledge has the following dimensions (Saks et al., 2021):

- Declarative knowledge: what individuals know about themselves, their strengths and weaknesses, abilities, etc.
- Procedural knowledge: how tasks can be performed.
- Strategic knowledge: applying declarative and procedural knowledge to accomplish tasks.

Jacobs & Paris (1987) identify specific processes of metacognitive control (RC):

- Planning: selecting strategies based on cognitive objectives.
- Metacognitive evaluation: assessing the gap between cognitive goals and achieved outcomes.
- Regulation: adjusting plans and strategies based on evaluation results.

Efklides (2001) enumerates additional skills involved in metacognitive regulation:

- Interpreting situations.
- Guiding, coordinating, and supervising thoughts, emotions, and actions.
- Defining problems and identifying cognitive limits.
- Setting goals and strategies.
- Monitoring progress and evaluating solutions.

Building on these, Mevarech & Kramarski (2014) define metacognition as *a higher-order thinking process involving active control over cognitive processes*.

A graphic illustration of the connections between cognition and metacognition is shown in figure 1.

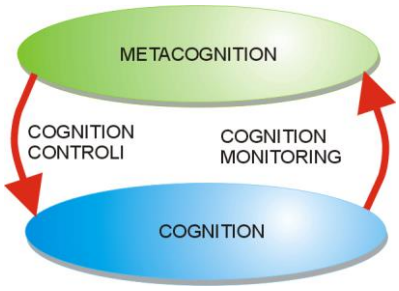

Figure 1. A graphic illustration of the relationship between cognition and metacognition

Although only implicitly acknowledged, the idea of the existence of a cognitive goal is essential for understanding the metacognitive process, as it allows for a clear distinction between cognition and metacognition: knowledge is metacognitive if it is actively used to achieve a cognitive goal.

The concept of metacognitive skills is specific to cognitive control processes and refers to the acquired ability to monitor, guide, direct, and control learning and problem-solving processes (Veenman, 2012).

Regarding the relationship between metacognition and intelligence, most researchers seem to agree that there is only a weak correlation between the two, particularly concerning the declarative components of metacognitive knowledge. Moreover, there is virtually no correlation between IQ and the strategic components of metacognition (Alexander et al., 1995; Schraw, 1998).

Finally, for a better understanding of metacognition, it is necessary to note the existence of related concepts such as "metamemory" and "metacognitive experiences".

The term *metamemory* was introduced by Flavell (1971), who used it to refer to intelligent mechanisms for structuring, storing, searching, and retrieving information, as well as monitoring one's knowledge about these processes.

Later, Weed et al. (1990) expanded on Flavell's definition, arguing that metamemory comprises two components:

- Stable knowledge of variables that affect one's knowledge about people, tasks, and strategies.
- Monitoring one's own memory operations, which includes the ability to judge one's performance in using memory and employing strategies to improve these performances.

As for *metacognitive experiences*, Efklides (2009) defines them as a third dimension of metacognition, alongside metacognitive knowledge (MK) and metacognitive regulation (MR). Efklides' definition reads: Metacognitive experiences are manifestations of continuous monitoring of cognition as a person performs a task and processes information related to it.

However, the usefulness of this concept is limited and remains debatable.

3.2. Definitions and Conceptualizations of Wellbeing

The earliest attempt to define wellbeing appears in Aristotle's *Ethics*, introducing the term "eudaimonia", referring to the optimal realization of individual potential through a life guided by reason and moral values.

Eudaimonic wellbeing, thus defined, is a process rather than a transient state, contrasting with hedonic wellbeing, characterized by emotional balance, predominance of positive emotions, and life satisfaction (Vasquez et al., 2009).

Over the past decades, wellbeing has been studied across diverse disciplines (philosophy, psychology, economics, medicine, social policy, pedagogy, etc.), cultures, and demographic groups, resulting in vast literature. Jackson et al. (2022) describe this as a *pandemic of wellbeing*, while others lament the lack of a unified definition and the challenge of identifying truly relevant studies (Dodge et al., 2009; Pollard & Lee, 2003).

The difficulty in defining wellbeing arises from the multiplicity of related but not entirely synonymous terms—happiness, quality of life, life satisfaction, flourishing, thriving, and wellness—often inconsistently used. For instance, the American Psychological Association defines wellbeing as *a state of happiness,*

contentment, low levels of distress, overall good physical and mental health, and good quality of life (VandenBos, 2007).

We did not find any study in the literature that attempts to systematize the definitions of all these concepts, although there are studies that comparatively address the content of specific pairs of terms, such as subjective wellbeing (SWB) and quality of life (Camfield & Skevington, 2008), wellbeing and life satisfaction (Charlemagne-Badal et al., 2015), wellbeing and happiness (Khalil, 2019; Alexandrova, 2005), wellbeing and flourishing (Chaves, 2021), or wellbeing and thriving (Corneliusson et al., 2020).

Table 1 summarizes several definitions of terms that are semantically related to wellbeing as found in the literature.

Table 1 – Definitions of concepts related to wellbeing

Concept	Definition	Reference
Happiness	Happiness is a subjective state that can be described by frequent positive affects, rare negative affects, and high satisfaction with one's own life	Diener et al, 2003
Quality of life	A person's perception of their position in life, within the context of the culture and value system in which they live, and in connection with their goals, expectations, standards, and concerns. It is a broad concept, influenced in a complex manner by a person's health, psychological state, level of independence, social relationships, and their connections to prominent aspects of the environment in which they live.	WHOQOL Group (1995)
Life satisfaction	The extent to which a person positively evaluates the quality of their life as a whole. In other words, how much they like or dislike the life they are living.	Veenthoven, 1996
Flourishing	Flourishing is the exercise of intellectual, emotional, or other capacities to a high degree within a supportive social context. Ideally, flourishing represents the most complete expression of human development under favorable conditions.	Ward, 2011
Thriving	A dynamic and intentional process of interaction between individuals and the social context through which, over time, both people and the environment undergo improvements.	Bundick et al., 2010

From the analysis of the definitions above, the main perspectives from which the study of wellbeing has been approached emerge:

- The hedonic perspective, focusing on predominantly positive subjective experiences.
- The eudaimonic perspective, emphasizing the realization of individual potential through personal growth within the context of a value system.
- The social/objective perspective, oriented towards interaction with the environment, material living conditions, and the quality of social relationships

From the hedonic perspective, Ed Diener (1984) proposed that subjective wellbeing (SWB) comprises two components: a positive evaluation of overall life satisfaction and a balance between positive and negative affects. This conceptualization was later formalized: *Subjective wellbeing is an umbrella term for the various evaluations people make regarding their lives, the events they experience, their physical and mental states, and their circumstances* (Diener, 2006).

Although extremely broad, Diener's definition of subjective wellbeing (SWB) has been officially adopted and reformulated by the OECD (2013) as follows: *SWB consists of good mental states, including all positive and negative evaluations people make about their lives and their affective reactions to the experiences they have lived.*

Defined this way, SWB encompasses the concept of life satisfaction and is practically synonymous with Quality of Life (QoL) (Camfield & Skevington, 2008).

From a eudaimonic perspective, Ryff (1989) theoretically grounded the concept of Psychological Wellbeing (PWB) by proposing a multidimensional model that considers the following components:

- Self-acceptance
- Positive relationships with others
- Autonomy
- Environmental mastery, defined as the ability to choose or create a suitable environment aligned with one's psychological profile
- Purpose in life
- Personal growth.

Later, Ryff (2014) highlighted additional factors, such as personality traits (optimism, self-esteem, empathy, emotional intelligence), family life, professional environment, and especially biological health, which can significantly influence psychological wellbeing. Regarding the relationship between PWB and health, it is worth emphasizing its bidirectional nature: healthy individuals tend to have higher levels of wellbeing, and higher levels of wellbeing increase the likelihood of maintaining biological health into old age.

From a social perspective, Keyes (1998) proposed a multidimensional model of social wellbeing that includes the following components:

- Social integration, defined as the evaluation of the quality of a person's relationships with the society they live in and the extent to which they feel part of a community.
- Social acceptance, reflecting trust in others and the belief that they are capable of kindness and competence.
- Social contribution, which evaluates a person's social value, based on the belief that they have something valuable to offer society.

• Social actualization, the belief that society evolves toward fulfilling its potential through a path that can be observed and understood.

• Social coherence, the perception of society's quality and organization and the concern for understanding these aspects.

Focusing solely on the social perspective of wellbeing, as proposed by Keyes' model, is clearly limiting. However, the social dimension of wellbeing is also considered in Ryff's model of psychological wellbeing (positive relationships with others) and in the PERMA model proposed by Seligman (2012) within the framework of positive psychology.

According to the PERMA model, wellbeing is based on the following pillars:

• Positive emotions
• Engagement
• Relationships
• Meaning
• Accomplishments.

It is easy to observe that the PERMA model shares positive emotions with SWB, and positive relationships and purpose in life/meaning with PWB.

An important attempt to unify the concepts of subjective and psychological wellbeing is the ESS (European Social Survey) model proposed by Huppert et al. (2009). In this model, wellbeing is defined as an area delineated within a reference system with two axes: the personal/interpersonal axis and the feeling–functioning axis, as illustrated in Figure 2.

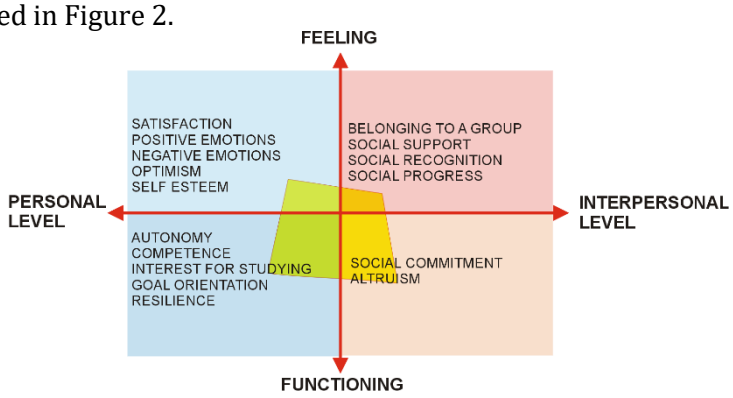

Figure 2. The ESS model of wellbeing

Regarding the correlations between wellbeing and other psychological factors, numerous studies have demonstrated the connection between subjective wellbeing and physical health (Kyriopoulos et al., 2018), work productivity (Hafner et al., 2015), success (Erdogan et al., 2012), job satisfaction (Song et al., 2020), professional performance, and workplace absenteeism (Man, & Ticu, 2015).

Studies indicate that subjective wellbeing is inversely correlated with anxiety about the future (Paredes, Apaloaza et al., 2021).

Overall, high levels of wellbeing are important for both health and workplace performance, regardless of the nature of the work.

4. Specific features of the educational environment in the study of metacognition and wellbeing

4.1. Metacognition in the Educational Context

From the perspective of students, metacognition has been recognized as a critical strategy for enhancing learning in school settings (Hattie, 2012). Kuhn (2000), studying the development of metacognition in children, found that between the ages of 4 and 6, children begin to differentiate between beliefs and information.

Metacognition develops. It does not suddenly appear as a phenomenon related to thinking. In fact, it emerges early in life in forms that hint at its future development, following a process during which it becomes more explicit, stronger, and consequently more effective as it comes under conscious control of the individual (Kuhn, 2000, p. 178).

Metacognition increases students' motivation because they feel they have control over their own learning process (Weight, 2018). Students who learn metacognitive strategies become more aware of their own thinking and are more likely to become proactive and effective learners.

In a study by Callan al. (2016), researchers examined the relationship between metacognitive strategies and learning strategies in relation to reading, math, and science performance. They identified metacognitive strategies as the strongest predictors of performance, even when accounting for socioeconomic status and gender.

Another study by Young & Fry (2008) found significant positive correlations between scores on the Metacognitive Awareness Inventory and students' GPA (a standardized measure of academic performance in the U.S.) as well as their final course grades.

From a teaching perspective, Shulman (1998) argued that effective teachers monitor students' understanding and adjust the processes students use to learn and solve problems.

In a review of literature on the use of metacognition in teaching, Duffy, Miller, and colleagues (2009) noted that although there is extensive literature promoting the idea of teachers as metacognitive professionals, there is insufficient empirical research to validate this notion. They advocate for direct empirical research on how metacognition can influence student learning in desirable ways and, if proven effective, investigating how teacher training programs can develop metacognitive skills in educators.

4.2. Specific Features of the Educational Environment in the Study of Wellbeing

Regarding students' wellbeing, several comprehensive reviews of the literature are available. For example, Cho & Yu (2020) analyzed 193 articles published between 2000 and 2019, classifying them based on their focus on objective or subjective wellbeing.

Objective wellbeing refers to external living conditions and includes dimensions such as material welfare, health, environmental safety, quality of

education, living/sanitation conditions, quality of social relationships, behavioral risks (e.g., drug use), physical activity, and civic engagement (inspired by UNICEF recommendations, 2010).

Teachers' wellbeing (Teachers' Wellbeing, TWB) has been predominantly explored from a deficit perspective, focusing on high stress levels and burnout phenomena (Spilt, Koomen, & Thijs, 2011). For example, Pakarinen et al. (2010) found that high teacher stress levels negatively affect students' motivation. A smaller proportion of studies have focused on general wellbeing, such as life satisfaction (Duckworth et al., 2009). Research on teachers' wellbeing often relies on general wellbeing concepts, rarely addressing the unique challenges, demands, and tasks specific to teaching as a profession. Only a minority of researchers have grounded their studies in the teaching profession or defined TWB as a specific manifestation of wellbeing. Future studies will aim to approach teacher wellbeing from a perspective unique to this profession (Hascher & Waber, 2021).

The main theoretical models of wellbeing specific to the teaching profession include those by Van Horn (2004), Collie (2010), and, more recently, Viac & Fraser (2020).

Van Horn and colleagues identified five analytical dimensions of teacher wellbeing:

- Affective wellbeing.
- Social wellbeing.
- Professional wellbeing.
- Cognitive wellbeing.
- Psychosomatic wellbeing.

According to Collie and colleagues (2010), three dimensions/factors influence teacher wellbeing within schools:

- Workload and associated pressures.
- Teachers' perceptions of the school as an organization, including its leadership and culture regarding educators and teaching.
- Teacher-student interactions, including perceptions of student behavior and motivation.

More recently, Viac & Fraser (2020) proposed a theoretical model tailored to the specific demands and tasks of the teaching profession. Their model, which underpins PISA 2021 self-report questionnaires, identifies the following dimensions of teacher wellbeing: cognitive, subjective, physical and mental, and social wellbeing.

Specific professional factors influencing teacher wellbeing include social climate, defined by the school's ethos shaped and conveyed by the management team (Gray et al., 2017), and a sense of control, which, when low, can negatively affect teachers' wellbeing and classroom performance (Beck et al., 2011).

Positive relationships between teachers and students support children's mental health (Kidger et al., 2012). Such relationships help students feel connected to their schools (Harding et al., 2019) and improve student wellbeing (Aldridge & McChesney, 2018) by fostering a sense of belonging to a community.

5. The relationship between metacognition and wellbeing

Somewhat surprisingly, given the extensive literature on wellbeing and metacognition, the number of studies exploring the connection between these concepts is very limited.

Only one study (Perry et al., 2019) explicitly posed the question, *"What does the literature say about the relationship between metacognition and pupils' wellbeing?"* The study concluded that, in an educational context, metacognition indirectly affects wellbeing by first influencing academic outcomes, with positive results being socially valued and contributing to increased wellbeing. In this regard, the study cites Veenman & Beishuizen (2004), who found that approximately 17% of students' academic success is attributable to metacognitive skills, compared to only 10% attributed to intelligence.

Another study (Sariçam, 2015) investigated the connection between metacognition and happiness, exploring the mediating role of perceived stress.

The widespread notion that positive results or success (academic, professional, or otherwise) lead to wellbeing and happiness is challenged by arguments suggesting the inverse: that wellbeing provides the motivational resources necessary to mobilize effort and achieve success (Lyubomirsky et al., 2005). This perspective proposes that *happiness leads to success rather than success leading to happiness* (see Figure 3).

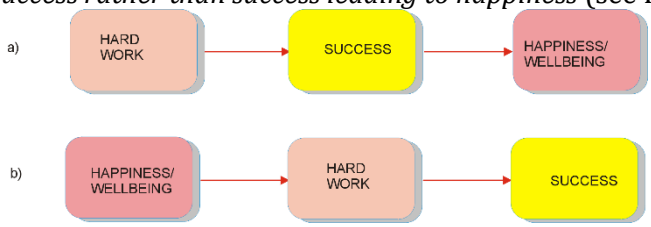

Figure 3. The connection between happiness and success: a – in the common perception, b – according to Lyubomirsky et al. (2005)

It is likely that, in reality, the relationship between positive outcomes (success) and subjective wellbeing (happiness) is more complex than the simple linear dependence usually assumed. It is not excluded that metacognitive evaluation may play a role in this process, but in the absence of evidence, this remains a hypothesis.

However, in the educational context, for practical reasons (ease of measurement), the factor "academic outcomes" can be considered as a mediator between metacognition and wellbeing.

Figure 4 summarizes a series of other factors, identified in an initial review of the literature, that mediate the connection between metacognition and wellbeing, without claiming that the list is exhaustive.

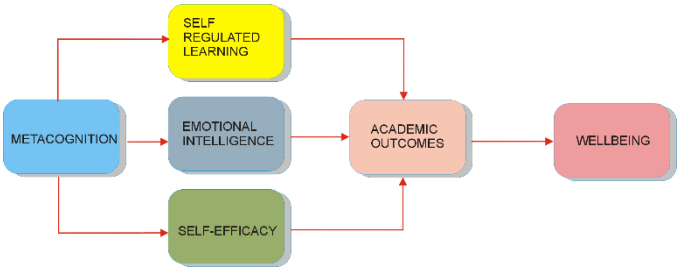

Figure 4. Possible mediating factors of the connection between metacognition and wellbeing in the educational context

Self Regulated Learning (SRL) is defined as "students' active metacognitive, motivational, and behavioral engagement in their learning process" (Jossberger et al., 2010). Some authors argue for a direct link between SRL and psychological wellbeing (PWB). For instance, Balashov (2022) states that "autonomous/internal SRL fosters the development of students' cognitive and metacognitive skills, creativity, self-organization, and active attitude towards learning, leading to increased levels of PWB".

Other significant mediating factors include:

Emotional Intelligence: Described by Salovey et al. (2002) as comprising four branches:

• Emotional perception: the ability to identify and become aware of one's own and others' emotions.

• Emotional facilitation of thought: the ability to use emotions in cognitive processes, such as creativity.

• Emotional understanding: the capacity to analyze and process emotions cognitively.

• Emotional management: the ability to regulate one's own and others' emotions.

Studies suggest that emotional intelligence improves academic performance (Zins, 2004) and positively influences student wellbeing (Weissberg, 2000).

Self-Efficacy (SE): Defined by Bandura (1994) as an individual's belief in their ability to successfully complete a task. Self-efficacy is intrinsically linked to metacognition, as it involves self-assessment processes, and it is also a strong predictor of academic performance (Coutinho, 2008; Moores et al., 2006). Furthermore, studies suggest a direct link between self-efficacy and wellbeing (Cikrikci & Odaci, 2016).

When comparing the traits of emotional intelligence with the definitions of metacognition, it could be argued that *emotional intelligence is metacognition.*

Most conceptual models of wellbeing identified in this review are static, assuming linear dependence on psychological or environmental factors. However, evidence suggests that these dependencies are nonlinear. For instance, the seminal study by Brickman et al. (1978) analyzed variations in subjective wellbeing (SWB) among lottery winners and accident victims with permanent disabilities. The study found that neither the happiness brought by an unexpected windfall nor the unhappiness caused by a tragic accident was proportional to the magnitude of the

event. Over time, individuals' happiness levels tended to return to a pre-existing baseline. Cummins (2014) argues that the self-regulation process of SWB is similar to homeostasis, and the set-point of this model is genetically determined.

6. Methods and instruments for measuring metacognition and wellbeing

6.1. Methods and Instruments for Measuring Metacognition

There is a wide variety of methods and instruments for measuring metacognition. In a simple taxonomy, these can be categorized based on the timing of their application as: Online Evaluation Methods – where data is collected during the execution of specific tasks, and offline Evaluation Methods – where data is collected before or after task execution or independently of tasks (for general metacognitive skills evaluation).

A summary of key instruments identified in the literature is presented in Table 2:

Table 2. Instruments for measuring metacognition

Method	Instrument	Description
Online Evaluation	Think-Aloud Protocols	Participants verbalize their thoughts while completing a task (Veenman & Beishuizen, 2004).
	Accuracy Ratings	Participants evaluate their performance immediately after completing a task (Schraw, 2009).
	Systematic Observation	Identifies and records specific behaviors associated with metacognition during task execution.
Offline Evaluation	Self-Report Questionnaires	Includes instruments such as:
	Metacognitive Awareness Inventory (MAI)	Contains 52 items grouped into two subscales: knowledge of cognition and regulation of cognition (Schraw & Dennison, 1994).
	Junior Metacognitive Awareness Inventory (JMAI)	A child-friendly adaptation of MAI, containing 18 items (Sperling et al., 2002).
	Metacognitive Awareness Inventory for Teachers (MAIT)	An adaptation of MAI for teachers, with 24 items (Balcikanli, 2011).
	COMEGAM (Connaissances Métacognitives et de la Gestion de l'Activité Mentale)	A 36-item questionnaire, translated and validated in Romanian as COMEGAM-RO (Porumb & Manasia, 2015).
	Interview Protocols	Engages participants in discussions about the

Method	Instrument	Description
		metacognitive behavior required for tasks (Fortus et al., 2016).

None of these methods is perfect or universally applicable. In large studies, self-report questionnaires are preferred for practicality. However, their use is limited or impossible with children (Haberkorn et al., 2014).

Veenman (2005) observed discrepancies between online test scores and offline self-report scores for the same participants. Saraç & Karakelle (2012) recommend the complementary use of online and offline instruments for greater accuracy in measuring metacognition.

6.2. Methods and Instruments for Measuring Wellbeing

The diversity of definitions and models of wellbeing has naturally led to an even greater diversity of measurement tools. Linton et al. (2016) reviewed 99 measures of wellbeing in adults and identified 196 dimensions, grouped into six thematic domains: mental, social, physical, spiritual wellbeing, activities, and personal circumstances. Most instruments identified in this review (67 out of 99) are based on multidimensional models of wellbeing.

Among the most popular instruments for measuring SWB are the WHO-5 Wellbeing Index (Topp et al., 2015) and the scale proposed by Diener et al. (1985) for measuring SWL (Satisfaction With Life). A scale specifically designed to measure SWB in teachers, called the Teacher Subjective Wellbeing Questionnaire, was proposed by Renshaw et al. (2015).

For measuring psychological wellbeing (PWB), the Ryff scale (Ryff, 1989) is frequently used, and the PERMA model of PWB was employed in designing the PERMA Profiler (Butler et al., 2016).

In numerous studies (Vazi et al., 2013; Heyder, 2019), teachers' wellbeing (TWB) is investigated and measured from the perspective of occupational stress.

Among the scales listed above, translated and validated versions for the Romanian population are available for WHO-5 (Cosma et al., 2022) and Ryff (Costea-Bărluțiu et al., 2018).

In a comprehensive review of the literature on teachers' wellbeing, based on the evaluation of 98 studies conducted between 2000 and 2019, Hascher & Waber (2021) highlight the heterogeneity of the content associated with the term TWB (Teachers' Wellbeing) and recommend using this term with greater caution. Regarding measurement instruments for TWB, they advocate for the use of tools based on a multidimensional and specific model of TWB, such as the one described by Viac & Fraser (2020).

The model proposed by Viac and Fraser includes four dimensions: physical and mental wellbeing, subjective wellbeing, cognitive wellbeing, and social wellbeing. This model underpins part of the PISA 2021 questionnaires, which will likely contribute over time to a more unified and coherent approach to this concept. The questionnaire proposed by Viac & Fraser (2020) is probably the most complex and comprehensive among the existing ones, but it is challenging to apply and interpret.

Huppert et al. (2009) proposed a questionnaire based on the ESS model of wellbeing, applicable to the general population.

Table 3 summarizes, based on data reported in Cho & Yu (2020) and Gilman & Huebner (2000), a list of the most commonly used instruments for measuring SWB in children and adolescents, without adhering to a specific hierarchy. It should be noted that not all these instruments are designed for use in educational contexts.

Table 3. Instruments for measuring SWB of children and adolescents

Instrument	Description	Reference	Notes
KIDSCREEN-52	Quality-of-life measure for children and adolescents	Ravens-Sieberer et al. (2005)	Available in versions with 10 and 27 items (Ravens-Sieberer et al., 2005).
BMSLSS	Brief Multidimensional Students' Life Satisfaction Scale	Seligson et al., (2003)	
PWI-8	Personal Wellbeing Index	Żemojtel-Piotrowska et al., (2017)	
PWI-SC	Personal subjective wellbeing of high-school students	Tomyn & Cummins, (2011)	A version of the Personal Wellbeing Index adapted for school-aged children
KINDL-R	Health-Related Quality of Life in children and adolescents	Bullinger at al., (2008)	
MLSS	Multidimensional life satisfaction scale for children	Huebner (1994)	
SLSS	Students' Life Satisfaction Scale	Huebner (1991)	
PLSS	Percieved Life Satisfaction Scale	Adelman et al. (1989)	

7. Interventions for enhancing metacognition and wellbeing

7.1. Interventions to stimulate metacognition

In a review of the literature on metacognition from the perspective of neuroscience and educational sciences, Fleur et al. (2021) observed that the most

commonly used methods for stimulating metacognitive processes in education (meta-knowledge and meta-control) are:

- Metacognitive prompts: Offline elements that draw attention to metacognition, presented as questions (e.g., "Are there patterns in the way I approached solving the task?", "What progress have I made compared to previous tasks?", "What do I need to improve for better performance next time?") or suggestions (hints) such as "In what other situations could the strategy used for this task be useful?".
- Learning journals (reflective writing): A method where students are encouraged to record reflections in a journal about how they approached certain tasks and their learning progress. This type of metacognitive analysis of task-solving methods can also take place during group discussions initiated and facilitated by either teachers or peers.
- Direct and explicit instruction: Teaching aimed at understanding processes associated with metacognition or acquiring specific metacognitive strategies.

Regarding the effect of interventions on learning, Fleur et al. (2021) cite meta-analyses (Digntath et al., 2008; Hattie et al., 1996) and note that the effect size of interventions is more significant when they target the development of both components of metacognition (meta-knowledge and meta-control). Moreover, the persistence of the effect over time increases proportionally with the duration of the training.

Another review of the literature (Zohar & Barzilai, 2013) confirms the findings of Fleur et al. (2021) and adds the observation that 20% of the analyzed interventions used information and communication technology (ICT) methods. These included dedicated software applications for generating metacognitive prompts, web-based reflective writing, or creating and editing conceptual maps.

7.2. Interventions to enhance wellbeing

In a study on student wellbeing in the UK, involving over 10,000 participants (Neves & Hewitt, 2021) cited by Hobbs et al. (2022), it was reported that only 11% of students experienced high levels of happiness, and just 6% were very satisfied with their lives. Regarding teachers' wellbeing, it is well-known that teaching is among the most stressful professions, with a worrying number of burnout cases and professional attrition.

On the other hand, there is evidence that teachers' wellbeing directly influences students' wellbeing and the quality of the educational process (McCallum & Price, 2016; Cherkowski & Walker, 2018, cited by Dreer & Gouasé, 2022).

Under these circumstances, the literature referring to programs or specific interventions for improving teachers' wellbeing is diverse and heterogeneous. In a recent review of these studies, Dreer & Gouasé (2022) noted: *We found almost as many types of interventions and measurement perspectives as there were articles in the sample.*

Out of the 29 studies analyzed by Dreer & Gouasé (2022), the best results were reported for Positive Psychology Interventions (PPI) (see Sin & Lyubomirsky, 2009).

Also noteworthy is the frequency of interventions based on mindfulness, given its connection to metacognition (Jankowski & Holas, 2014).

Another review, focused on interventions for improving student wellbeing (Hobbs et al., 2022), confirms the prevalence of interventions within the PPI framework and details the identified action directions (see Table 4).

Table 4. Action directions to improve students' wellbeing, according to Hobbs et al., (2022)

Exercises for:	Number of studies (K) from the total N=27
Identifying and using character strengths	K=21
Cultivating gratitude	K=21
Practicing mindfulness	K=18
Promoting acts of kindness	K=16
Developing emotional intelligence	K=12
Encouraging social relationships	K=9
Fostering forgiveness	K=8
Stress management	K=6

Hobbs et al. (2022) also observed that the most commonly used psychometric tool in these studies was the Satisfaction with Life Scale (SWLS; Diener et al., 1985).

Regarding the persistence in time of intervention effects, four studies analyzed by Hobbs et al. (2022) reported measurable positive effects up to four months post-intervention. However, longitudinal studies examining longer-term effects are lacking.

8. Discussions. The state of research on metacognition and wellbeing in Romania

A key conclusion from this review is that, despite the large number of publications dedicated to metacognition and wellbeing, very few studies directly address the connection between these variables and the potential mediating factors. While interventions aimed at developing metacognition have an undeniably positive effect on learning, and there are numerous localized initiatives to apply these interventions in education, the interest of policymakers in generalizing metacognitive training remains low.

A major challenge in developing coherent strategies for promoting wellbeing in the educational environment stems from the multitude of conceptual models of wellbeing and the lack of a unified vision regarding the specific features of wellbeing for teachers and students.

In Romania, interest in studying metacognition and wellbeing in the educational context has been relatively limited. The few studies focusing on teacher

wellbeing have primarily examined stress and burnout phenomena, without addressing teacher wellbeing from the perspective of the profession's specificities.

Studies by Vlăduţ and Kállay (2011) on a sample of 177 primary, secondary, and high school teachers from Cluj County, Romania, and by Bentea (2017) on a sample of 217 teachers (45 preschool teachers, 86 primary school teachers, and 86 secondary school teachers) highlight a high proportion of Romanian teachers affected by burnout syndrome or exhibiting symptoms of anxiety and depression. In Vlăduţ and Kállay's study, 49.6% of teachers scored above average or high on emotional exhaustion, 28.7% on depersonalization, and 54.1% on inefficacy. Both studies found that teachers reporting higher levels of burnout also reported significantly lower self-efficacy in teaching. Teachers with lower scores across all dimensions of psychological wellbeing exhibited higher levels of exhaustion and depersonalization, tended to reduce personal accomplishments, and showed increased demotivation when faced with difficulties (Bentea, 2017).

Another study conducted by Transylvania College and the Happy Teachers for Romania Association in 2021 assessed the current level of wellbeing among 5,527 pre-university teachers using the *Teacher Flourishing Evaluation* tool developed by Harvard University. According to the study, only 32.5% of participants were flourishing, 5.6% were stagnating, and the majority (61.9%) reported moderate levels of mental health. Furthermore, while most participants expressed satisfaction with their work, 36% felt lonely (Transylvania College Foundation, 2021).

Rusu and Colomeischi (2020), in a study of 1,335 teachers in Romania, found that teachers with a higher ratio of positive to negative emotions reported greater engagement (dedication, absorption, and vigor) in their teaching activities, which, in turn, led to higher levels of subjective wellbeing.

Regarding predictors and mediators of wellbeing, Stănculescu (2014), in a study of 174 middle and high school teachers from urban areas, found that teachers experience subjective wellbeing when they perceive a high level of social support and demonstrate high self-efficacy in their profession.

Ignat and Clipa (2012), in a study of 196 teachers from various educational levels (73% urban, 27% rural), observed that teachers with high emotional intelligence exhibited greater life satisfaction, a positive attitude toward work, and higher satisfaction with their professional roles.

Studies on metacognition in Romania align with international research. For instance, a study by Kállay (2012) on 202 psychology and veterinary medicine students concluded that metacognition significantly correlates with learning outcomes and professional performance.

As Bücker (2018) stated regarding the relationship between academic success and wellbeing, summarizing the results of 47 studies with a total of 38,946 participants, there is a significant but weak to moderate positive correlation between academic performance and subjective wellbeing.

We have not identified any studies linking metacognition to wellbeing in education for either teachers or the school population in Romania.

Regarding interventions aimed at developing metacognitive skills to improve academic outcomes, in Romania, we identified only one study (Bran & Balaş, 2011)

dedicated to this subject. The study coordinated by Bran and Balaş involved a formative experiment designed to stimulate deep learning in students through constant training of metacognitive regulation processes. The experiment resulted in a significant increase in the number of students in the experimental group who adopted deep learning approaches and a decrease in those who approached learning in a superficial manner.

Based on the data available in the literature, we conclude that there is sufficient empirical evidence supporting the idea that metacognitive skills have a significant positive effect on the professional performance of both students and teachers and, indirectly, on their wellbeing.

Therefore, further research is welcome to clarify the connections between metacognition and wellbeing, as well as to develop specific intervention programs aimed at enhancing metacognitive skills in schools and raising awareness of the factors that contribute to the wellbeing of students and teachers.

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