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NON-ACADEMIC INFLUENCE ON EDUCATIONAL OUTCOMES IN THE EUROPEAN UNION:

An integrated approach

Introduction

In the complex educational landscape of the European Union, excellence and efficiency in student achievement emerge as issues of utmost relevance. This amalgam of nations, characterized by rich cultural diversity and shared goals, is constantly questing to refine and adapt its educational systems to meet the multifaceted challenges of the 21st century. These challenges have evolved beyond the boundaries of a conventional curriculum. A plurality of non-academic factors -- psychosocial, demographic, and lifestyle-related – also play a determining role in educational outcomes.

In our literature review, we meticulously evaluate such factors' influence on European students' academic performance. We emphasize stress, attention deficit, and mental resilience, trying to decipher their possible ramifications in the educational context. Likewise, we analyze how healthy habits and practices, such as balanced nutrition, regular exercise, and quality sleep, can optimize academic results.

The methodology adopted for this study integrates a qualitative vision and a rigorous bibliographic analysis. Through this prism, we mean to deepen our understanding of how these often-interconnected factors can influence overall academic success. We hope this review will establish itself as a valuable resource for formulating educational policies and strategies at the local, subnational and, pre-eminently, European Union level.

1. School dropout in Europe

In the intricate panorama of the European educational fabric, a profound heterogeneity is evident due to the singularity with which each member nation articulates and oversees its educational system. By way of illustration, the variability in educational regulations is evident even at the most superficial level. Some countries, such as Slovenia, the Czech Republic, Austria, Switzerland and Cyprus, set the end of compulsory education at 15 years of age, while Croatia places it at 14 years of age. Others, such as Bulgaria, Denmark, Estonia and many other European nations, set this limit at 16. Romania stands out by extending this period to age 17, and, in contrast, countries such as Poland and the Flemish region of Belgium allow dropout at age 15. On the other hand, the Netherlands and Portugal raised this threshold, making school compulsory to 18 years of age.

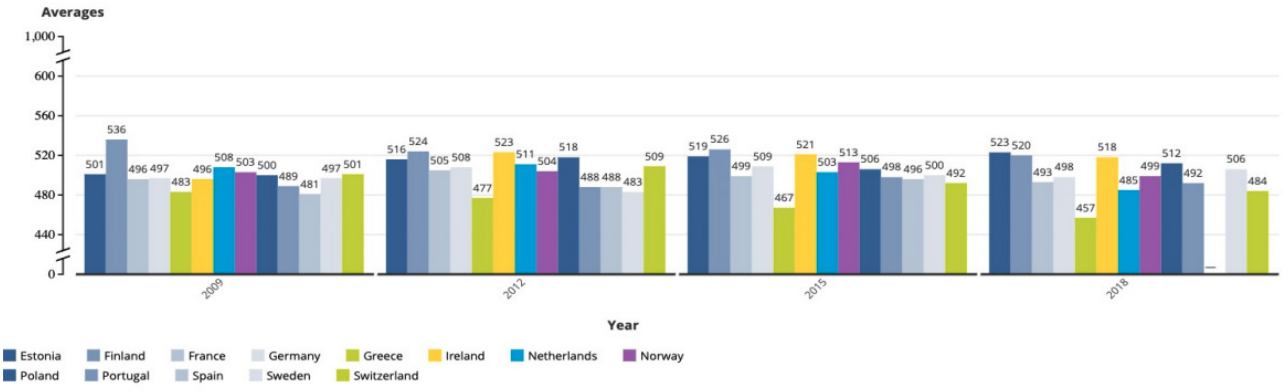
This diversity leads to an amalgam of educational systems, from those favouring highly adaptive curricula to those that subscribe to more orthodox and rigid models, with varying degrees of integration into the work environment and co-learning paradigms (Mingo, 2010).

However, the variability in the cut-off ages for the completion of compulsory education in different countries is merely the tip of the iceberg. García-Fernández (2015) vehemently warns of the need to address the disparity of European education systems, postulating the imperative of a standardized methodology. Data collection is presented as a methodological labyrinth, with nations opting for labour force surveys while others use national or local censuses (Eurostat, 2020).

Emerging from this educational kaleidoscope, the pressing challenge of "early school leaving" shines through. The underlying causes of this phenomenon are multifaceted: from the arduous economic situation stifling various European families (OECD, 2018) to academic barriers, to socio-cultural influences and challenges linked to mental health (World Health Organization, 2017; UNESCO, 2019).

The Programme for International Student Assessment (PISA) is crucial in educational assessment. Administered by the OECD, PISA assesses 15-year-old students in core areas such as reading, mathematics, and science (OECD, 2019). Differences in results across European countries reflect disparities in educational quality, pedagogical priorities, and applied methodologies.

Averages for 15 years PISA reading scale: overall reading, by All students [TOTAL] for Estonia, Finland, France, Germany, Greece, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden and Switzerland: 2018, 2015, 2012, and 2009
All students



— Not available.
NOTE: The Reading, Mathematics and Science scale ranges from 0 to 1000. Some apparent differences between estimates may not be statistically significant.
SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2009, 2012, 2015, and 2018 Reading, Mathematics and Science Assessments.

In parallel, the phenomenon of student mobility has experienced a notable escalation across Europe, significantly driven by the establishment of the Erasmus+ Programme. This pivotal initiative has ignited a robust interchange among the academic community, weaving a rich educational and cultural fabric through engagement with a spectrum of pedagogic environments. Annual accounts emphasize that nations such as Germany, France, and Spain not only emerge as preeminent exporters of scholarly pursuits but also as highly sought-after educational sanctuaries, accentuating their exalted educational stature and the magnetism of their cultural legacies.

The conferral of Erasmus+ scholarships is characterized by its stringent and discerning nature, executed by each participating institution in strict conformity with the criteria of academic excellence and equitable distribution stipulated by the European Commission. This scrupulous allocation is indicative of the European Union's unwavering commitment to fostering an all-encompassing, superior educational setting, thus fortifying its vow to the advancement of an intercultural educational ethos and the exaltation of the continent's extensive cultural tapestry (European Commission, 2020).

Europe, in its ambition to improve education, has promoted several initiatives. The European Strategic Reference Framework (ET, 2020) aims to promote collaboration among member countries to address common challenges and share best practices.

Europe has demonstrated resilience and adaptability by implementing multifaceted strategies at such a crossroads. Strategies such as mentoring programs and adapted vocational training are evidence of the proactive efforts of nations such as Spain (Ministry of Education and Vocational Training, 2020). However, although inclusive education resonates vehemently in educational rhetoric, it must transcend mere words and crystallize into palpable policies that ensure actual diversity (UNESCO, 2017).

The study concludes that Europe is at a decisive pedagogical and methodological turning point, facing the inherent complexity of its educational diversity. The lack of homogeneity in the European Union's education systems, with their varied approaches and practices, suggests a pressing need for a more holistic perspective and a cohesive approach. This holistic view does not advocate rigid standardization that strips nations of their pedagogical singularities but rather a harmonized educational framework that guarantees quality standards and facilitates transnational cooperation. The aim is to foster an educational space in which diversity is perceived as an asset rather than an obstacle, thus promoting an academic fabric that not only recognizes the richness of different educational traditions but also ensures that all European students enjoy equitable and high-quality learning opportunities. This approach is an optimal solution to strengthen the continent's educational scaffolding, allowing each country to bring the best educational system to the European consortium, thus enriching the educational process.

2. Performance, Dropout, and School Failure Indicators in the European Union

The heterogeneity of the European Union's education systems reflects its member states' rich cultural and linguistic diversity. However, this educational mosaic reveals glaring disparities in academic performance, repetition rates, and other indicators of school failure. While some countries have shown significant progress, others still face persistent challenges.

Since the turn of the millennium, the European Union has shown renewed determination to combat early school leaving and improve academic performance. From 2002 to 2018, the school dropout rate in the EU experienced a remarkable reduction from 18% to 12%. However, despite this achievement, the rate still needs to reach the EU target of less than 10%. Countries like Portugal, Spain, Greece, Ireland, and Malta have pioneered this transformation, implementing strategies and educational reforms that have borne fruit. However, there are still 13 members with rates above the 10% threshold, a sign that there is still work to be done.

The Council of Europe's Education Policy Implementation Report sheds light on these challenges, underlining the need to adapt educational strategies to each population's linguistic and cultural specificities. This perspective emphasizes the importance of implementing early intervention programs for the most vulnerable populations, both from a material and cognitive point of view.

A critical aspect in this context is bullying, which has psychological consequences for the victims and can be an underlying factor in academic failure. Educational institutions must promote an inclusive environment where cultural, ethnic, and linguistic diversity is valued and respected. Likewise, teacher training in multilingual competencies and intercultural sensitivity is crucial, particularly in critical subjects such as language and mathematics.

On the other hand, the impact of academic failure transcends the classroom, leading to limited employment opportunities and undermining economic autonomy. This phenomenon, analyzed in studies such as that of Feito (2015), is a complex fabric woven with threads of intrinsic causes, such as family and socioeconomic factors, and extrinsic causes, which highlight the inadequacy of education systems to adapt to the diversity of student needs. Often, the root of this school failure lies in a set of interrelated factors: teaching methods that do not evolve at the same pace as the learning needs of young people, scarce resources that prevent quality education for all, and an approach to assessments that does not reflect the true potential of students. In addition, integration and socialization present challenges, as highlighted by the research of Martín-Sánchez, Fernández-Galvez, and De Dios (2017). The ability of schools to foster an inclusive environment is critical, especially in serving neurodivergent students. In this sense, it is imperative to equip educators with the necessary tools and training to address these complexities, thus ensuring a learning process that is inclusive but also effective and resonant with the demands of the modern world.

3. Neurodivergence and Education in Europe

Neurodivergence, which includes conditions such as autism spectrum disorder, attention deficit hyperactivity disorder (ADHD), and dyslexia, represents a distinctive set of challenges and possibilities within the educational setting. The traditional structure of education, often linear and rigorous, is only sometimes suited to the needs of neurodivergent individuals, which can limit their optimal development and learning (Armstrong, 2012).

The issue of neurodivergence has gained prominence in educational debates. However, there still needs to be a significant gap in data collection and analysis by the European Commission regarding these students' educational experiences. While some member countries have been proactive in collecting information on inclusive and special education, the overall picture shows a need for uniformity and rigour in managing and evaluating this information (Ebersold et al., 2011).

Practically, many European educational systems still refer neurodivergent students to specialized institutions. Although these centres may offer more individualized treatment, they often need more resources and training to fully address the facets of neurodivergence. This practice of segregation can hinder the creation of genuinely inclusive environments and simultaneously perpetuate prejudices and stigmas associated with these conditions.

Another relevant challenge is the late or inaccurate diagnosis of neurodivergent conditions. The absence of specific training and awareness among educational personnel may result in delayed or inappropriate interventions, depriving students of the early and adequate support they require (Norwich & Kelly, 2004).

Against this backdrop, Europe urgently needs to design and implement an educational strategy that recognizes neurodivergence and celebrates and supports it. It is crucial to establish clear parameters for teacher training, boost research in the field, and promote collaboration and the exchange of best practices among Member States. This will lay the foundation for an education that provides equitable opportunities for all students, respecting and enhancing their unique neurocognitive abilities.

4. School Inclusion and Catch-Up Strategies in Europe

Europe has experienced an unprecedented transformation in its educational demographics, marked by increased diversity and heterogeneity in its school communities. This change has been influenced by internal migratory movements, such as the movement from rural to urban areas, and external, with the arrival of immigrants of different origins. These challenges are not confined to the linguistic domain and encompass cultural and social dimensions (OECD, 2018).

Although European educational rhetoric consistently emphasizes the need for inclusion, research by Martín-Sánchez, Fernández-Galvez, and De Dios (2017) highlights that classroom reality often does not reflect these ambitions. Faced with this disparity, it is imperative to establish pragmatic strategies that ensure proper integration at both the disciplinary and curricular levels.

Truancy emerges as one of the leading indicators of inclusion failure. To address it, a rigorous monitoring system was implemented that is not only limited to recording attendance but also promotes active and constant communication with the student's tutors or guardians. This system builds bridges of understanding between the school and the family, consolidating the relationship and commitment between both parties.

Co-learning is presented as an innovative pedagogical solution in this context. This strategy, which involves high-achieving students tutoring their peers with academic difficulties, goes beyond simple academic support. It facilitates the social and linguistic integration of the immigrant population, providing a favourable environment for developing communication skills and strengthening interpersonal ties.

However, it is crucial to understand that co-learning is not merely an intervention to level performance. It is consolidated as a pedagogical approach that values interaction, solidarity and empathy, transforming the traditional dynamics by allowing students to play simultaneous roles of teachers and learners. This reciprocity in learning and favouring community cohesion can catalyze discovering and nurturing future teachers with a deep inclusive vocation, positioning students as recipients and active and committed actors in their education (Sharma et al., 2016).

5. Healthy Habits and Use of Palliative Care in Educational Outcomes

- ***Influence of nutrition on cognitive and academic performance***

Proper nutrition has a direct and crucial effect on the efficiency with which our minds operate. What we choose to ingest has the potential not only to affect our physical health but also to shape our cognitive capacity, concentration and mental agility.

Eating a diet that prioritizes balance and the inclusion of omega-3 fatty acids is vital to maximize brain capacity. These fatty acids, found in seafood such as salmon and sardines, not only strengthen the structure of neuronal cells but also enhance processes such as memory and logical thinking. Several studies support the idea that a constant intake of omega-3 can lead to significant improvements in memory and analytical skills (Gómez-Pinilla, 2008).

Micronutrients also play a preponderant role in this context. Iron, found in foods such as red meat, legumes, and green leafy vegetables such as spinach, is vital for brain oxygenation, as it facilitates oxygen transport in the blood. Iron deficiencies can result in cognitive complications, such as memory difficulties or concentration problems. In parallel, zinc, present in sources such as nuts, seeds and different meats, is essential for synaptic transmission, directly influencing skills such as learning and information retention

(Bryan et al., 2004).

The act of nourishing ourselves goes beyond selecting individual foods; it is essential to maintain a proper ratio of carbohydrates, proteins and fats to ensure optimal brain function. Imbalances in our diet can generate ups and downs in energy, hindering concentration and structured thinking.

Nutrition is central to our bodily health and cognitive and academic performance. Advocating a balanced and mindful diet is an investment in our mental capacity and, by extension, our academic and professional success.

- ***Oral health, a multifaceted tool for cognitive enhancement***

Meticulous oral health care is essential not only for physical well-being but also has a significant influence on vital areas such as cognition and academic performance. A healthy oral environment, free of inflammatory diseases or infections, is associated with generalized well-being and can be crucial for maintaining an optimal concentration level, particularly in educational settings. This interconnection underscores a broader perspective of preventive medicine and health promotion in the community. The oral cavity should not be viewed simply as an isolated anatomical structure but as an integral part of human well-being, with influences extending to various vital functions, from metabolic processes to social communication.

Moreover, the oral cavity assumes multidimensional roles that underlie our daily interactions. Saliva secretion, for example, is a vital function for oral homeostasis. It not only lubricates but, thanks to its complex chemical composition with enzymes, immunological agents and other solutes, acts as a reliable indicator of systemic disorders and a clinical biomarker of great value. In this multifunctional context, the smile emerges as an indispensable social component, playing a leading role in interpersonal communication. A healthy and attractive smile not only reflects good oral health but can also positively influence social perception, self-esteem and personal interactions, reinforcing the importance of optimal oral hygiene in the overall health and social sphere of the individual.

Among the strategies that can contribute to optimal oral health care and boost cognitive capacity, we find sugar-free chewing gum. Gum stimulates saliva, the body's first line of defense, while offering the added benefit of promoting calm and focus. Kubo (2015) found that stress levels and stress-specific emotions, such as feeling anxiety or tension, decrease after chewing gum, indicating that gum chewing actually reduces levels of anxiety and stress.

Scientific research has elucidated that chewing gum may be conducive to salivation. A meticulous analysis by Polland, F Higgins, and Orchardson (2003) exposed that chewing sugarless gum for prolonged periods markedly amplifies salivary volume and pH. Additional research, such as that undertaken by Yankell & Emling (1989), supports these postulates, reinforcing the leading role of sugar-free gum in oral health protection.

Saliva, according to Tenovuo (1998), has multiple active roles in oral safeguarding, including its cleansing capacity, which favours the establishment of a balanced oral environment; the presence of immunoprotective factors that antagonize pathogens; and the building of a holistic barrier against external aggressions. Additionally, salivary pH, which tends to fluctuate between 6.2 and 7.6 under homeostatic conditions, can modulate the predisposition to oral pathologies. Research, such as that of Baliga, Muglikar, and Kale (2013), has established correlations between salivary pH and specific gingival conditions.

In conclusion, it is indisputable that safeguarding and prevention in oral health are essential for social and physical well-being and can benefit academic performance and cognitive acuity. In the context of the European Union, where education and the holistic well-being of students are essential, various tools and methodologies that can contribute to improving oral health and coping with academic performance anxiety must be recognized and promoted by educators and guardians alike. This series of simple and easily accessible tools and strategies, of which sugar-free gum chewing is just among many, can significantly enhance citizens' quality of life and education.

- ***The role of regular exercise in brain function***

Physical exercise is essential to optimal wellness regarding physical health, mental health, and cognitive agility. As we delve deeper into scientific studies and findings, we realize the profound connection between physical activity and brain optimization.

Our body responds with a cascade of biological and chemical reactions when we exercise regularly. Among the most notable is its potential to enhance brain plasticity, that is, our brain's extraordinary ability to adapt, evolve and establish new neural connections throughout our existence. This characteristic is fundamental for essential functions such as learning and information retention. In parallel, exercise induces neurogenesis, a process that drives the generation of new neuronal cells, particularly in the hippocampus, a brain region vitally linked to memory and information processing (Hillman et al., 2008).

Beyond these structural and functional advantages for the brain, exercise is a powerful shield against stress and emotional tension. During physical activity, endorphins are released, which act as natural painkillers, enhancing emotional well-being and reducing pain. Physical activity promotes a more transparent, agile, and focused mind by decreasing stress-related hormones like cortisol. This amalgam of emotional well-being and cognitive enhancement directly influences academic efficiency and knowledge assimilation (Ratey & Hagerman, 2008).

Finally, it is crucial to understand that the relationship between cognition and exercise is one of interdependence. While exercise enhances mental function, a stimulated and active mind can increase the inclination toward movement and physical activity. If properly channelled, this synergy can enrich the quality of life and academic and professional productivity.

- ***The importance of a good night's rest for academic***

excellence

Sleep represents a time of rest and rejuvenation for the body and is fundamental for brain performance and cognitive optimization. In the context of education, particularly in the European Union, where diversity and academic competition are booming, the role of sleep in information consolidation and processing is crucial.

During sleep, our brain works in various phases, orchestrating an intricate process of reviewing and categorizing information acquired during the day. This process is essential for solidifying memories, integrating new knowledge and purging data that does not require long-term storage.

However, today's demands and pace of life, accentuated by the educational dynamics in the European Union, often result in sleep deprivation or irregular sleep patterns among students. A deficiency in sleep quality or quantity translates into noticeable cognitive decrements, such as lapses in attention, reduced ability to concentrate, failures in decision making and difficulties in problem-solving. This direct relationship between sleep and cognitive function underscores the need to promote healthy sleep habits to ensure academic excellence.

The impact of sleep goes beyond cognition; it extends to the emotional realm. Insufficient sleep can catalyze negative emotional states, increasing susceptibility to disorders such as anxiety and depression. These conditions, in turn, can exacerbate sleep challenges and impair academic performance, creating a vicious cycle (Walker, 2008; Stickgold, 2005).

Given the multifaceted nature of sleep and its direct impact on education, educational institutions in the European Union must integrate sleep awareness into their curricula and pedagogical strategies. Implementing educational programs emphasizing the importance of rest, providing resources to manage stress, and promoting flexible academic schedules can ensure students maximize their academic potential and overall well-being.

- ***Palliative care and cognitive performance***

Cognition and well-being are fundamental pillars in any educational process and are crucial to academic performance. Over the years, various tools and practices have been researched and adopted, all designed to enhance cognition and improve overall well-being. These palliatives, each with unique merits and advantages, have established themselves as valuable resources in contemporary education.

A simple yet underappreciated act of chewing sugar-free gum is more than a mere habit and may play a crucial role in modulating our cognition and general well-being. Beyond its physiological function in the digestive process, chewing has been shown to enhance cerebral oxygenation due to increased blood flow. This enhanced flow could catalyze improvements in vital areas such as attention, concentration and working memory, fundamental pillars for effective learning and information retention (Tucha et al., 2004). In line with this, research such as Hirano & Onozuka (2015) and Kubo, Linuma, and Chen (2015) have supported the intrinsic relationship between chewing and brain health, especially in regulating hormones such as cortisol. Therefore, in addition to enhancing cognitive abilities, chewing acts as a balm, decreasing stress and promoting a state of serenity, which is essential in highly demanding contexts such as exams or pressure situations (Smith, 2010).

Aromatherapy, a practice that uses essential oils extracted from plants, is another valuable palliative. Oils such as lavender or rosemary not only offer a pleasant aroma but have also been shown to have the potential to improve memory and mood. These oils can help create a relaxing environment conducive to learning and concentration, facilitating the educational process (Moss et al., 2003).

Drawing or doodling, often seen as a distraction, can have cognitive benefits. During active listening, doodling can function as a channel for processing and retaining information, allowing students to interpret it visually and tactilely, which is especially useful for visual learners (Andrade, 2010).

The influence of music on cognition has been the subject of study for decades. In particular, genres such as classical music have been shown to enhance aspects such as concentration, relaxation and creativity. These elements are essential for creating an optimal learning environment where students can absorb and retain information efficiently (Rauscher et al.; K. N., 1993).

Meditation and Mindfulness practices have gained popularity in contemporary society for their multiple benefits. These techniques reduce stress and anxiety, improve concentration, and provide mental clarity. These practices can significantly enhance students' learning ability and well-being (Jha et al.; M. J., 2007).

Finally, in education, it is essential to recognize the importance of regular breaks, especially during prolonged periods of study or work. These breaks reboot the mind, boosting productivity, revitalizing concentration and improving information retention. Adopting strategic breaks can be the key to effective learning (Ariga et al., A., 2011).

Conclusions

Within the vast and multifaceted educational landscape of the European Union, the challenge of cultivating academic excellence and addressing inequalities in educational achievement demands a comprehensive and enriched analysis that goes beyond the academic quality of classroom instruction. By delving into the intricate web of non-academic factors that influence educational outcomes, this review has identified opportunities for improvement and profound truths that transcend the boundaries of the traditional curriculum.

The worrying prevalence of dropout, repetition and other indicators of school failure not only highlight the gaps in existing pedagogical structures but also underscores the urgent need for a deeper understanding of the cognitive and emotional uniqueness of the learner. In this context, neurodivergence, with its challenges and opportunities, and the adoption of inclusive leveling-up strategies take on unprecedented relevance.

This review has identified the essential correlation between healthy habits and cognitive performance. Balanced nutritional intake, meticulous preservation of oral health, incorporation of regular exercise and valuing nightly rest are not mere complements on the road to academic excellence; they are potential pillars that, when properly integrated, can trigger a palpable transformation in students' cognitive capacity and mental resilience. Additionally, consideration of the judicious use of palliatives sheds light on the potential of often simple and unappreciated external tools to optimize brain function.

In conclusion, our educational vision requires a redesign that goes beyond conventional methodologies. We need a pedagogy that recognizes diversity, honours singularities, and simultaneously incorporates findings from intertwined and interrelated areas, such as health and psychology, into its core. While more work is needed, this literature review suggests that the road to exceptional education in the European Union involves a confluence of knowledge, a holistic view and constant adaptability, including considering simple but innovative non-academic tools that have the potential to improve educational outcomes. We fervently hope this enriched understanding will contribute to rethinking educational interventions and policies on the European continent.

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