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Review Article

The Dunning-Kruger Effect in Dentistry Students

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Abstract

In the field of dental education, we cana find many situations that might be considered outside the norm upon reflection. One such situation is when students employ cognitive biases to train themselves in the clinical treatments they perform or will perform on a patient. This situation is known as the Dunning-Kruger effect and is considered an error in cognitive and subsequently metacognitive processes. In other words, the student takes mental shortcuts to successfully perform a clinical activity. This seemingly correct situation leads them, in one way or another, to put themselves and the patient at risk. If they lack a theoretical foundation for what they are doing and why they are doing it, their professional progress and development will stagnate. And if an error or iatrogenic event occurs, they will not recognize it as their own and, consequently, will never learn from it.

Key Words: dinning-kruger effect, metacognition, lack of awareness

Exordium

Why are some dental students so indifferent and give little importance to certain basic knowledge for good clinical practice?

In the educational field, students can be found in many paradoxical, strange, critical, and even difficult-to-understand and/or explain situations. These situations or phenomena can be exhibited in students of any educational level, but as they occur at higher educational levels, they become riskier and more dangerous, not only for the student but also for the people around them, who may even be at mortal risk by placing themselves in the hands of the graduate for the performance of some activity or professional work.

Among these situations, a very common one involves incompetent students who believe they know more than they actually do and therefore feel no need to seek further information to be better prepared and thus provide a more professional and higher quality service. Paradoxically, on the other hand, there are students who know a lot but consider themselves ignorant in many matters and express a desire to seek that knowledge. This phenomenon has been called the "Dunning-Kruger Effect."

But what is the Dunning-Kruger Effect (DKE)? This phenomenon was studied by David Dunning and Justin Kruger, psychologists at Cornell University in New York, and their results were published in 1999 in The Journal of Personality and Social Psychology . Initially investigated by Dunning in 1959 in Michigan, it was later continued by Kruger in 1968 in California. Both authors, in their respective studies and analyses, proposed that this phenomenon is nothing more than a cognitive bias in which people with low ability or little knowledge in a specific area tend to significantly overestimate their own competence as a consequence of a bias. systematic or mental shortcut they take in processing information that leads them to erroneous interpretations, illogical judgments, wrong predictions and unfortunate decisions, biases that operate as paths that the brain uses to process data efficiently and quickly, although often at the cost of accuracy and logic, influencing their perceptions and behaviors without them realizing it (De la Gandara Martí, J. (2012).

Under this situation, the student always works cognitively under the understanding of simplification; that is, their brain seeks to simplify information to manage data overload, using patterns and previous experiences. Since this strategy is efficient and satisfactory, they continue to use this mechanism as an adaptive procedure to make quick decisions and take advantage in uncertain environments, to the point of doing so automatically and unconsciously, showing behaviors that lead them to use, interpret, and remember superficial and incipient information that confirms their beliefs, while ignoring or discarding what contradicts them or involves too much time, work, and effort.

This situation also leads students to rely heavily on the initial information they receive, which they use mentally and cognitively as an anchor or reference point for making decisions when participating in any type of event or activity. They believe that by not interacting with other classmates or teachers in risky situations, they will avoid arduous or unfamiliar mental and cognitive processing, and therefore have a higher probability of success working individually compared to their peers who do interact. In short, cognitive biases are predictable errors or thought patterns that distort reality, but in some students, they are part of the normal functioning of their brains to process the world more quickly, safely, and efficiently (Barreda Medina, RF, Ubillús Reyes, J., Cevallos López, GE, & Chocobar Reyes, EJ (2025).

The ED-K in Dentistry students

The indifference, listlessness, and apathy displayed by some students pursuing a Bachelor's degree in Dentistry toward certain types of knowledge, especially basic sciences such as Anatomy, Histology, Biochemistry, Embryology, and others, and their lack of motivation and interest in integrating these subjects into the body of knowledge they are mentally and cognitively constructing and which they must later apply comprehensively in their clinical activities and actions, stems from a series and combination of motivational, structural, and emotional factors. Among the most common and significant is their excessive focus on the manual and practical aspects over the theoretical. Many students enter a Bachelor's degree in Dentistry or a related field expecting to perform oral and dental treatments almost immediately upon entering, focusing on quick and practical treatments essentially emphasizing manual dexterity. Consequently, they disregard and dismiss all the theoretical foundation that supports and justifies the activity that could be performed in clinical practice, thus depriving the student of the natural process of analysis, reflection, and prior and subsequent understanding. to the action that allows him to understand why and for what purpose he will perform that clinical action, as well as recognize his mistakes or failures and learn from them by being aware of his misstep.

This situation creates in the student a perception of disconnection between the theoretical-basic-clinical aspects, causing an insurmountable gap that prevents them from immediately connecting the old with the new, or the information they already possess with the new knowledge presented to them. They struggle to understand the information as it is received from the teacher, book, or other source, and subsequently with its practical application to the patient, because they consider this connection (praxis) unnecessary for the success of the clinical activity they are going to perform or have performed.

The school, academic, and administrative environment, in one way or another, generates anxiety and stress at some point for all dentistry students, especially in the first semesters, affecting their mental health in various ways and at various levels. The problem is that many students don't know how to manage these situations, and those who don't know how to control it experience emotional problems. It is well known that anxiety, depression, or constant stress in a student pursuing this degree within the dental discipline tends to reduce their motivation and interest in learning deeply and effectively, leading to indifference, discouragement, apathy, and even disappointment and frustration. This situation, coupled specifically with the personal and administrative pressure to rush treatments and clinical performance due to the sometimes very short timeframes required to achieve points, successes, or a certain grade, leads the student to prioritize speed over quality in patient care, creating indifference and disregard for the precise theoretical-scientific foundation, generally resulting in clinical failure, and therefore the patient pays the consequences.

The ED-K (Early Dental Knowledge) is more common in students who are predisposed to believe that some subjects are difficult, useless, or of little value, whether due to personal experience or references from more advanced classmates. This is especially true for basic subjects that are the foundation for subsequent learning, such as Dental Anatomy or the regulations and legislation specific to the field of dentistry. Students perceive these subjects as difficult, complex, arduous, and above all, unnecessary. This feeling can lead them to lose interest and fail to understand that they are depriving themselves of knowing , understanding, and performing the profession with quality and in a better way. It is a demonstrable truth that not knowing the name of each structural part of any tooth, as well as its function in the complex operation, articulation, and integration of each tooth with its occlusal or interproximal antagonist, will prevent students from performing clinical work based on the logic of the three main functions of oral and dental structures: aesthetics, phonation, and functionality. On the other hand, ignorance of the legislation and regulations governing all dental practice (as a student and as a professional) puts him at risk of committing some type of violation and consequently becoming liable to some sanction and even being provisionally or definitively suspended from carrying out any clinical activity or others within the dental field as a consequence of the complaint or lawsuit filed by the patient who was dissatisfied with the result obtained after undergoing some clinical activity with the student or the professional (Serrano Camargo, LV, (2023).

Cognitive bias in Dentistry students

Therefore, it can be said that ED-K is a cognitive bias in which students of the Bachelor of Dentistry with low skill or little knowledge in a specific area, topic or aspect tend to significantly overestimate their own competence. This overestimation is characterized by an inability to recognize their own incompetence, which leads them to be unable to self-evaluate their own performance and thus recognize the lack of the necessary skills and knowledge to perform a clinical activity correctly and with full knowledge of the facts. Paradoxically, lacking this knowledge, the student cannot notice their errors or recognize their lack of ability.

On the other hand, what is truly baffling about the situation is that many students taking the ED-K exam exhibit overconfidence, a feeling that proves illusory due to a lack of theoretical understanding. This prevents them from explaining why their approach was successful with one patient but not with another, or why they failed in their own work. Because they are unable to identify the root causes of their errors, when they self-assess, they give themselves scores far above average, attempting to project a false and inconsistent sense of security. Conversely, ED-K can also present itself as the opposite effect to the previous one; highly competent students often underestimate their theoretical-clinical capacity, mistakenly assuming that the activities that are easy and quick for them are also easy and quick for others, and often as the most competent students acquire more knowledge and skills they begin to be aware of their ignorance, a situation that can even gradually reduce their confidence before they achieve security in what they do clinically (Torres-Salazar, C.; Moreta-Herrera, R.; Ramos-Ramírez, M. & López-Castro, J. (2020).

Metacognition in dentistry students who present the ED-K

Among the observations made by David Dunning and Justin Kruger in their respective research, they found and concluded that it was very common in school and academic settings for students and/or professionals with little or no experience, knowledge, and/or expertise to express opinions with absolute conviction and certainty on complex topics or situations. They concluded that ED-K (Educational Deviation of Knowledge) is primarily due to a deficit in metacognition, resulting in a total or partial inability to analyze one's own mental processes and evaluate performance objectively and impartially. Consequently, situations where dental students exhibit ED-K demonstrate a deficiency in their metacognitive processes, which prevents them from self-evaluating their actions or understanding their failures and the importance of the information, knowledge, or expertise they overlook because they consider it unimportant or useless.

What is metacognition?

To clarify how we understand the concepts discussed here, we will differentiate between cognition and metacognition. First, it's important to understand the close relationship between these two concepts. Cognition refers to the intellectual functioning of the mind, focused on remembering, understanding, and focusing attention on and processing information (Condemarín, 1995). Metacognition, on the other hand, is an analysis of how acquired or developing knowledge occurs; it involves understanding and regulating one's own cognitive processes while performing an activity.

In other words, metacognition is the ability developed in people to think , analyze, reflect, and conclude about their own mental process (thinking) . It is being aware of and having control over one's own cognitive

processes, such as learning, remembering, and solving problems by understanding them, allowing one to plan, monitor, and evaluate one's own understanding and strategies to improve academic and clinical performance.

This activity is a high-level skill that encompasses knowing what you know, how you learn best, and when to use a specific strategy, functioning as self-reflection that observes and analyzes the mind's processes thanks to self-knowledge and self-regulation. This process allows the person to plan, monitor, and self-evaluate, thereby improving their learning, gaining greater autonomy, a better ability and ease in solving problems, and thus optimizing their performance.

The relevance and importance of the lack of metacognitive processes in dental students stems from the iatrogenic implications this can have on patients. The student's inability to ask themselves, "Do I really know what I think I know?" is the root of the problem, which is rarely addressed. Most dental instructors (and in almost all undergraduate and postgraduate programs) disregard this issue due to ignorance, indifference, or apathy. This situation is essentially because educational administrators and instructors simply assume that students have already developed and possess metacognitive skills.

It is also clear that among students who use metacognitive processes there is a wide variety of procedures and results. This process is highly uneven from one student to another. In most cases, those who monitor their self-regulated learning do so with flawed strategies, and those who lack metacognitive skills rely on weak study strategies such as rereading, repetition, memorization, and underlining in review materials. They use ineffective and passive learning strategies and have a misplaced confidence in their strategies and abilities, which sooner or later leads them to suffer the consequences (Veerstag M, Bressers G, Wijnen - Meijer M, Ommering BWC, Jan de Beaufort A, Steendijk P. Full. (2022)). This latter situation is evident when students depend on exam dates and deadlines to regulate and schedule their study, instead of preparing continuous and detailed plans, strategies, and actions related to achieving their educational goals on time (Dunlosky J, Metcalfe J. (2008)) .

Students with better and broader metacognitive awareness focus on learning with skill and technique, have greater motivation, and have better clinical performance. In contrast, students who lack the ability to perform these processes experience greater difficulties in their clinical activities. This situation of being competent or incompetent in performing a metacognitive process positively or negatively affects critical thinking skills, as well as the accuracy of diagnoses and the planning of clinical work. As students recognize their inability and apply themselves to learning the importance of reflecting on their clinical activities, they will gradually avoid cognitive biases, thereby achieving the potential to reduce errors in their diagnoses and improve their clinical practice and patient safety.

The presence of ED-K or cognitive bias, as already mentioned, is due to a deficit in the metacognitive process and can be explained from the following contexts:

The double burden of incompetence refers to the need to possess the skills to perform clinical tasks and activities correctly while simultaneously lacking the ability to recognize whether the procedure has been performed correctly on the patient. Lacking this dual understanding, the student not only makes mistakes but is also unable to detect and acknowledge their shortcomings, which can even endanger the patient's life. Another context relates to a lack of awareness of one's own ignorance. Students with limited knowledge and experience often lack sufficient understanding of the importance, complexity, and difficulty of a given clinical topic or activity. This ignorance leads them to believe they possess a comprehensive and complete understanding of the patient's condition and the necessary clinical management, based solely on the superficial information they already possess.

These students exhibit a psychological tendency to project a positive self-image while simultaneously protecting their self-esteem. This stems from experiences in school environments where demonstrating confidence is rewarded, encouraging and motivating them to overestimate their abilities to appear more competent to others (students, teachers, patients, family members). Finally, these students live in a world where their brains use shortcuts to process information quickly, leading to a distorted perception of reality. They are constantly seeking information that confirms their beliefs and dismissing information that reveals their shortcomings.

In summary, the presence of this effect (ED-K) occurs because the ignorance of the student, who are generally from the first semesters, generates confidence in him, obstructing his ability to understand and become aware of what he does not know, of the mistakes he makes or even of the risk he has of putting himself, his classmates or the patient himself in a dangerous situation (Massola , AC, Traversi, M. (2023).

Actions to counteract ED-K in dentistry students

Counteracting ED-K is not an easy task, neither for those who experience it nor for those trying to eliminate it. Firstly, it requires that the student recognize this situation within themselves and their educational process. Secondly, it requires that teachers be willing and trained to help the student in this situation. And thirdly, it requires that the administrators of the higher education institution be available to provide conditions for teachers and students to work towards this objective, justified by the need to improve the educational process. Compensating for ED-K requires promoting self-awareness, intellectual humility, and constant feedback among students. To work towards achieving this, the main strategies and actions include continuous education, seeking feedback where information about performance, behavior and/or results is shared with the main objective of improving and fostering development in personal, professional or service contexts. Feedback can be positive (recognition), constructive (suggestions for improvement) or negative (of failures sometimes without solution), so the first step is to ensure that it is specific, timely and respectful to generate self-growth and personal reflection.

Among the main actions to counteract ED-K are those personal to the student (self-awareness), which consists of feeling the need to learn more about the subject. This situation means that the more knowledge one acquires about a subject, the more aware one becomes of the vastness of what one still doesn't know, which reduces false confidence and gradually eliminates it. It is crucial that the student voluntarily seeks feedback from qualified personnel or mentors who are available to evaluate their work, but above all, that they are willing to listen to constructive criticism that helps them reorient their perception of the educational reality in which they live.

Working on their recovery with a sense of intellectual humility involves recognizing that they are not experts in everything and accepting that there is always room for learning and making mistakes. The student should be honest and dare to question their knowledge, asking themselves, "What do I really know about this?" or "I must admit there is much I don't know." These situations should occur within a context where the student avoids comparing themselves to their peers. without assuming attitudes of superiority, that the student focuses on improving based on objective standards, not on their personal perception (Masquijo , J, & Bettendorff, MC. (2024).

Regarding faculty and administrators, they must work alongside their daily tasks on strategies and actions to foster psychological safety and create an environment where students feel secure admitting they don't know something or have made a mistake. Instead of making students feel that clinical work must be carried out in a competitive environment, peer evaluations should be used to obtain a more balanced view of their performance. Administratively, conditions should be created that promote systematic learning by fostering a growth mindset where mistakes are seen as learning opportunities, not failures. Finally, during self-assessments and teacher-designed evaluations, clear and measurable

performance indicators should be established to assess collaborative competence, rather than subjective evaluations. All of this should be addressed with the understanding that the goal is to reverse cognitive bias and develop metacognitive skills, enabling students to recognize themselves as lifelong learners.

Conclusions

The ED-K, or lack of ability and capacity to perform metacognitive processes about what we know and understand, or what we don't know and understand, is a phenomenon that occurs in people with a higher incidence and prevalence than is commonly believed. Based on the following, we could ask the question: who is affected by ED-K? Given this uncertainty, we could say that we are all susceptible to this effect.

In this process, and regardless of our own or shared information or experience, we all have areas of ignorance. Some may be more intelligent and skilled than others in many areas, but no one is an expert in everything, even if they consider themselves to be so, or if others consider them to be so.

We are all susceptible to this phenomenon, and most of us probably experience it with surprising regularity, even without realizing it. Experts in one area may mistakenly believe that their intelligence and knowledge can lead them to other areas with which they are less familiar and lack sufficient expertise, yet still succeed in whatever they undertake. This is actually highly improbable, because a problem, phenomenon, or situation is always permeated and caused by an infinite number of interacting variables. It is impossible for any one person to possess all the knowledge in the world to understand, explain, and resolve every situation they encounter based on a complete understanding of the underlying causes.

The same thing happens in the field of dental education; a clinically brilliant student may be very efficient but theoretically incompetent, or vice versa. The problem itself is not that; the real problem is when the student is unaware of this reality and/or self-transforms it into a fictitious or false truth, a situation that in one way or another will cause them risky and dangerous clinical situations, leading them as a student to academic and school failure and as a professional to social and professional discredit.

Therefore, if the education provided is considered to be of high quality, aspects such as those mentioned throughout this work must be considered and analyzed in their proper dimension by the administrative authorities and teachers of the educational institution, and remedial programs and actions must be proposed to try to counteract or minimize this effect.

References

1. Barreda Medina, RF, Ubillús Reyes, J., Cevallos López, GE, & Chocobar Reyes, EJ (2025). Consequences of the Dunning–Kruger Effect on Students: A Systematic Review (2021–2025). Science and Reflection , 4 (2), 1828–1854.
2. De la Gandara Martí, J. (2012). The Dunning-Kruger effect. Notebooks of Psychosomatic Medicine and Liaison Psychiatry. Notebook No. 102.
3. Dunlosky J, Metcalfe J. (2008). Metacognition, Feb..
4. Masquijo , J., & Bettendorff, M.C. (2024). Between trust and doubt: exploring imposter syndrome and the Dunning-Kruger effect in the medical profession. Acta ortopédica mexicana , 38 (2), 71-72. Epub February 7, 2025.
5. Massola , AC, & Traversi, M. (2023). Cognitive biases: Differences between individual and collective reasoning. XVI International Congress of Research and Professional Practice in Psychology, University of Buenos Aires, Argentina.
6. Serrano Camargo, LV, (2023). Dunning-Kruger effect (self-deception) in dental care. Catholic University of Cuenca
7. Torres-Salazar, C.; Moreta-Herrera, R.; Ramos-Ramírez, M. & López-Castro, J. (2020). Cognitive bias of optimism and perception of well-being in a sample of Ecuadorian university students. Colombian Journal of Psychology.
8. Veerstag M, Bressers G, Wijnen -Meijer M, Ommering BWC, Jan de Beaufort A, Steendijk P. Full. (2022). What Were You Thinking ? Medical Students' Metacognition and Perceptions of Self -Regulated Learning. Teach Learn Med, Mar 15

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