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ABSTRACT

This article explores how Self-Efficacy can be effectively used as a teaching tool within a Cognitive Embodiment framework to enhance sports coaching and learning. It will delve into the ways in which coaches can utilize SE-enhancing strategies to foster a more embodied and effective learning experience for athletes, ultimately leading to improved performance and a deeper understanding of their sport.

Questo articolo esplora come l'autoefficacia (ES) possa essere efficacemente utilizzata come strumento didattico all'interno di un framework di Incarnazione Cognitiva (CE) per migliorare l'allenamento e l'apprendimento sportivo. Approfondirà le modalità con cui gli allenatori possono utilizzare strategie di potenziamento dell'ES per promuovere un'esperienza di apprendimento più incarnata ed efficace per gli atleti, con conseguente miglioramento delle prestazioni e una comprensione più profonda del loro sport.

KEYWORDS

Self-Efficacy; Cognitive Embodiment; Sports Coaching; Learning Environment; Athletic Performance
Autoefficacia; Cognitive Embodiment; Allenamento sportivo; Ambiente di apprendimento; Prestazione atletica

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Introduction

The connection between mind and body is highly relevant in sports, where athletes utilize cognitive processes to enhance performance across various competitive scenarios. The dynamic interplay between an athlete's body, environment, and cognitive functions is crucial for developing a comprehensive understanding of their sport.

Cognitive Embodiment (CE) offers a theoretical framework that emphasizes this relationship, highlighting the significant role of the body in shaping cognitive processes, and vice versa. CE moves beyond the traditional separation of mind and body, asserting that cognition is deeply rooted in bodily experiences, sensory perceptions, and motor actions. Even abstract concepts are grounded in our physical experiences. In the context of learning, CE suggests that knowledge is actively constructed through embodied experiences, a perspective particularly relevant to sports, where physical movement and sensory feedback are central to skill acquisition and performance.

In sports, Self-Efficacy (SE) can be used as a tool to increase embodiment. SE, indeed, plays a critical role in how people feel, think, motivate themselves, and behave, and is a crucial factor influencing performance in the sport realm. SE can be understood as an example of CE in the context of sports. Athlete's belief in their abilities is reflected in their physical movements and overall performance. Conversely, weak self-efficacy can lead to ineffective movement, highlighting the close link between cognitive belief and physical action.

While previous research has explored various aspects of SE, a gap exists in understanding its application as a CE tool to modify and enhance sports learning environments. This article aims to address this gap by exploring how SE can be effectively used as a teaching tool within a CE framework to enhance sports coaching and learning. It will delve into the ways in which coaches can utilize SE-enhancing strategies to foster a more embodied and effective learning experience for athletes, ultimately leading to improved performance and a deeper understanding of their sport.

1. The movement through the cognitive embodiment

CE is a theoretical framework that emphasizes the crucial role of the body in shaping cognitive processes and vice versa. It moves beyond the traditional view of

the mind as a separate entity from the body, instead positing that cognition is deeply rooted in bodily experiences, sensory perceptions, and motor actions. In the last 30 years several authors investigate the relationship between body and mind and Key figures in the development of CE include Francisco Varela, and colleagues who, in the 1991, introduced the concept of "embodied cognition" in their work "The Embodied Mind" (Varela et al., 1991). George Lakoff and Mark Johnson further expanded on these ideas in their book "Philosophy in the Flesh" (Lakoff & Johnson, 1999), arguing that even abstract concepts are grounded in our physical experiences. According to this perspective, our understanding of the world, including abstract concepts like time, space, and causality, is shaped by our interactions with the environment through our bodies. For example, our understanding of grasping a concept is rooted in the physical act of grasping an object. In the sport context there are several examples of athletes who use the mind to live a competition, a task or a race trying to improve the performance. This kind of practice represents the basis on which a specific training methodology is built, called ideomotor training. It refers to the athlete's capability of motor imagery, defined as the representation of an action, very similar to what happens in reality, but without its actual execution (Mandolesi, 2017).

In the context of learning, CE suggests that knowledge is not simply acquired through passive reception of information but is actively constructed through embodied experiences. This has significant implications for how we understand learning in various domains, including sports, where physical movement and sensory feedback are central to skill acquisition and performance. Filippo Gomez Paloma's work also contributes to this understanding, particularly in the realm of didactics and physical education (Gomez Paloma, 2013). Then, in his research "Embodied Cognition. Body, movement and sport for didactics" (Gomez Paloma & Tafuri, 2017), delves into how sport, from a psycho-pedagogical view, is deeply educational, conjugating physical dexterity and ability with competitiveness within a framework of respect for the opponent, and how motor activity develops both the body and social and ethical personality based on values like respect, humility, and team spirit. In this work, the authors underlined the strong relation between mind and body even in learning environment.

CE plays a crucial role in learning processes. For instance, consider how a child learns the concept of "balance." They do not learn it through a verbal definition alone. Instead, they learn it by physically experiencing balance – by trying to stand

on one leg, by feeling themselves wobble, and by adjusting their posture to stay upright (Merleau-Ponty, 2013). It is an exploration of the world through the perception where the lived body is the center of the perspective and understanding. These bodily experiences form the basis of their understanding of balance.

Similarly, learning to ride a bicycle involves a complex interplay of sensory, motor, and cognitive processes. The learner feels the handlebars, the seat, and the pedals; they experience the sensation of movement and the pull of gravity; and they learn to coordinate their movements to maintain balance and direction. These embodied experiences are crucial for developing the skill of cycling. The embodied view of learning has implications for educational practices across various domains. It suggests that effective learning should provide learners with opportunities for active engagement, hands-on experience, and interaction with the environment. This approach can be seen in pedagogical methods like experiential learning (Kolb, 2014), project-based learning (Thomas, 2000), and kinesthetic learning (Wilson, 2002), which emphasize the role of bodily action and sensory experience in the learning process.

This kind of educational setting could be applied in sport environment. Indeed, CE is particularly relevant to sports learning. CE principles can be observed in different sports also offering a valuable lens through which to understand how athletes learn and develop expertise. In the realm of sports, physical movement is not merely a means of executing a skill; it is also a fundamental way of knowing and understanding the sport itself. Athletes develop a deep understanding of their sport through the continuous interplay between their bodies, the environment, and their cognitive processes. For example, consider a basketball player learning to shoot a free throw. Initially, the player may focus on explicit instructions about stance, arm position, and release point. However, with practice, the player begins to develop a more nuanced, embodied understanding of the skill (Davids et al., 2008). They internalize the feel of the ball in their hand, the subtle adjustments in their balance, and the proprioceptive feedback from their muscles and joints (Clark & Metcalfe, 2002). This embodied knowledge allows them to make split-second adjustments and to adapt their technique to different situations. Similarly, a gymnast learning a complex tumbling routine relies heavily on embodied cognition. The gymnast does not just memorize a sequence of movements; they develop a kinesthetic awareness of their body in space, a sense of timing and rhythm, and an understanding of how

their movements interact with the forces of gravity and momentum (Casolo, 2002; Dreyfus, 2014). This embodied understanding is crucial for executing the routine with precision, fluidity, and control. The principles of CE can be observed across a wide range of sports. In swimming, for instance, swimmers develop an embodied understanding of how their body moves through the water, how to generate propulsion, and how to minimize drag. In rock climbing, climbers learn to "read" the rock face, using their bodies to sense subtle shifts in texture and angle, and to anticipate the movements required to maintain their grip and balance. In team sports, athletes develop a shared embodied understanding of the flow of the game, anticipating their teammates' movements and reacting instinctively to the unfolding action. This embodied perspective has significant implications for coaching and training. It suggests that effective coaching should not only focus on providing explicit instructions and technical feedback, but also on creating learning environments that allow athletes to explore, experiment, and develop their own embodied understanding of the sport.

2. Self efficacy and sport

In order to increase the embodiment in sport, Self-efficacy (SE) could be used as a tool. SE, a cornerstone of Social Cognitive Theory (Bandura, 1977, 1982, 1986, 1997), refers to an individual's belief in their capacity to execute behaviors necessary to produce specific performance attainments. It is a belief about what one is capable of doing, not a belief about what one will do (Bandura, 1986). This belief plays a critical role in how people feel, think, motivate themselves, and behave.

SE is often confused with other constructs, such as self-confidence and self-esteem, but it is important to distinguish between them. Self-confidence is a general belief in one's ability, whereas SE is specific to a particular task or situation (Bandura, 1997); for example, an athlete may have high self-confidence but low SE for a specific skill, like shooting free throws in basketball. Self-esteem relates to one's sense of self-worth and overall evaluation of oneself, while SE is a judgment of one's capability to accomplish a specific task. A person may have high self-esteem but low SE for learning a new sport. Bandura identified four primary sources of SE, mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states (Feltz et al., 2008).

Mastery experiences are the most influential source of SE. Successes raise SE, while failures lower it. However, it's not simply a matter of counting successes and failures; the impact of an experience depends on factors like the perceived difficulty of the task, the amount of effort expended, whether the success was achieved independently or with assistance, and the individual's attributional style (i.e., how they explain their successes and failures) (Bandura, 1994).

SE can be influenced by observing others (models), and this process is known as vicarious experience. Seeing someone similar to oneself succeed can raise SE ("If they can do it, I can do it"), while seeing them fail can lower it. The impact of vicarious experiences is influenced by the similarity between the observer and the model, the clarity of the modeled behavior, and the observer's motivation (Schunk & Pajares, 2009). Another modality to use vicarious experiences is reviewing video recordings of their own performance. This allows individuals to relive the experience, enabling them to identify areas for improvement and to reconcile their perception of the movement with the actual performance.

Verbal persuasion such as encouragement and feedback from others can influence SE, as well. However, persuasion is most effective when it is realistic and combined with experiences that confirm the individual's capabilities. Empty praise is often ineffective and can even be detrimental if it is followed by failure.

Then, an individual's emotional, physiological, and psychological state can influence their judgment of SE. Positive mood can enhance SE, while negative mood can diminish it. Stress, anxiety, fatigue, and pain can also lower SE. It is not the intensity of these reactions but rather how they are perceived and interpreted that is important. For example, if an athlete interprets pre-competition anxiety as a sign that they are not prepared, their SE will be decreased, but if they interpret it as a sign that they are ready and focused, it may have little impact or even enhance their SE (He & Wong, 2022).

SE in Physical Activity

SE as tool of CE could be used in promoting and maintaining physical activity. Individuals with high SE for physical activity are more likely to engage in regular exercise, even in the face of barriers. SE plays a significant role in an individual's decision to initiate and adhere to a physical activity program. People with high SE for physical activity believe that they can successfully engage in exercise, even

when faced with challenges such as lack of time, bad weather, or feelings of fatigue (Bandura, 1997). This belief is a strong predictor of whether someone will adopt and maintain a physically active lifestyle (McAuley, 1992, 1993). Individuals with high SE for physical activity are more likely to choose to be active, they are more inclined to select activities that involve physical exertion; they tend to put more effort into their workouts and are less likely to be discouraged by initial difficulties or setbacks; they are more resilient in the face of obstacles and are more likely to find solutions to overcome challenges, such as finding alternative times or locations for exercise, or modifying their activity level as needed; and high SE individuals are more likely to adhere to their exercise routines over the long term, leading to greater health benefits. Conversely, those with low SE for physical activity may avoid exercise, give up easily when faced with challenges, and are less likely to maintain an active lifestyle. Therefore, interventions aimed at increasing SE can be effective in promoting and sustaining physical activity across various populations and age groups.

SE in Sports Performance

In the sport realm, SE is a crucial factor influencing performance (Moritz et al., 2000). Athletes with high SE have a strong belief in their ability to succeed, which translates into several advantages on and off the field. Feltz and Moritz have conducted extensive research on the relationship between self-efficacy and sports performance, highlighting its impact on various psychological and behavioral aspects of athletic endeavor (Feltz et al., 2008). Athletes with high SE are more likely to set challenging goals, persist through difficulties, exhibit greater effort and experience less anxiety.

High SE athletes tend to set more challenging and ambitious goals (Locke & Latham, 1990; Tosi et al., 1991). They are not afraid to push their limits and strive for excellence, which can lead to greater improvement and achievement over time. This skill provides significant benefits in competition and is an essential characteristic for continuous improvement during practice. Athletes with heightened SE have higher self-awareness can understand their capabilities, recognize their limits, and develop strategies to surpass them. When faced with obstacles and setbacks, athletes with high SE demonstrate greater effort and persistence (Bandura, 1997). They are more likely to stay focused, maintain their motivation, and work through challenges, rather than giving up or becoming

discouraged. SE can also influence an athlete's emotional state. High SE athletes tend to experience less anxiety and stress in competitive situations (Feltz et al., 2008). They are more likely to view pressure as a challenge rather than a threat, which allows them to perform more calmly and effectively. This allows athletes to address stressful situations with greater speed, facilitating faster task mastery and contributing to higher overall performance levels. The combination of these factors—challenging goals, persistent effort, and reduced anxiety—leads to enhanced performance. Numerous studies have shown a positive relationship between SE and various aspects of sports performance, including skill acquisition, strength, speed, endurance, and overall athletic achievement (Stajkovic & Luthans, 1998).

Self-Efficacy Assessment

SE assessment is a crucial process in sports settings, providing valuable insights into an athlete's beliefs about their capabilities to succeed in specific tasks. These assessments can be used for various purposes, including identifying athletes who may need specific support in performance improving, tailoring training programs to enhance athletes' SE, and monitoring the effectiveness of interventions.

The most common method for assessing SE in athletes involves the use of questionnaires. These questionnaires are typically task-specific, meaning they assess an athlete's confidence in performing particular skills or behaviours within their sport. When designing SE questionnaires, several guidelines should be followed (Bandura, 2005). Questions should be tailored to very specific tasks. For instance, instead of asking "How confident are you in your basketball skills?", a questionnaire should ask "How confident are you in making 7 out of 10 free throws?". The questionnaire should include items that vary in difficulty, from very easy to very challenging. This allows for a more nuanced assessment of SE across different levels of performance. Responses are typically measured on a scale, often ranging from 0 (not confident at all) to 10 (completely confident). This provides a quantitative measure of the strength of an individual's SE beliefs. Questions should focus on the athlete's current perceived capabilities, rather than their past performance or future expectations.

In addition to questionnaires, other methods can be used to assess SE, such as interviews and behavioural observations. Interviews allow for a more in-depth exploration of an athlete's beliefs and the factors that influence their SE.

Behavioural observations can provide valuable information about how SE manifests in an athlete's behaviour, such as their effort, persistence, and emotional responses to challenges. For instance, (Cudicio & Agosti, 2023, 2024) provide a practical example of SE evaluation in a sports context. Their research on the link between physical performance and self-efficacy (specifically, jumping ability) demonstrates how SE assessments can be used to quantify the relationship between an athlete's beliefs and their actual performance. By measuring both SE and jumping performance, the authors were able to show how an athlete's belief in their jumping ability influences their physical performance. This type of research provides valuable insights into the role of SE in sports and can inform the development of interventions to enhance athlete performance. Furthermore, these studies provide intriguing clues regarding the differences between SE, self-perception, and actual performance, which can guide coaches in recognizing the significance of personalizing training activities by leveraging SE as a mechanism for embodiment

Interventions to Enhance SE

Building upon the foundational understanding of SE, coaches possess a powerful capacity to significantly elevate their athletes' belief in their own capabilities through the deliberate and consistent implementation of several evidence-based strategies. At the core of this endeavour lies the strategic cultivation of a mastery-oriented learning environment. This involves a meticulous approach to designing practice drills and structuring training progressions that are not only challenging but also provide athletes with frequent opportunities to experience tangible success and incrementally build competence. Following Bandura's seminal work (Bandura, 1997), the principle of mastery experience underscores the importance of starting with simpler tasks that athletes can confidently accomplish and then gradually introducing increasing levels of difficulty as their skills and confidence mature. This systematic progression ensures a continuous cycle of accomplishment, reinforcing the belief that they can overcome obstacles and master new challenges. Through successful physical execution, athletes solidify neural pathways and intricate physical memory related to motor patterns. This iterative cycle of accomplishment, where cognitive appraisal of success influences sensorimotor experiences, exemplifies CE in action, leading to a more integrated understanding of the skill. The enhanced SE gained from successful execution

translates into more fluid, coordinated, and confident physical actions, demonstrating how belief shapes embodied performance.

Complementing this, the effective utilization of modelling and vicarious experiences serves as another cornerstone in bolstering SE. Coaches should strive to be exemplary models, consistently demonstrating correct techniques with precision and clarity. Furthermore, strategically showcasing successful performances of other athletes, particularly those whom the learners perceive as similar in ability, can create powerful vicarious experiences (Schunk & Pajares, 2009). These relatable examples provide tangible evidence that success is achievable. Practical applications of this strategy include incorporating video analysis of elite athletes executing specific skills flawlessly, inviting more experienced team members to demonstrate their expertise to less experienced ones, or even highlighting the significant progress made by peers within the team. These visual and observational cues can significantly impact an athlete's belief in their own potential. When athletes observe and imitate skilled performers, they blend visual perception with kinaesthetic emulation. In line with the mirror neurons theory (Iacoboni et al., 2005), this process actively translates visual information into motor commands, enriching the athlete's embodied understanding of movement dynamics. The integration of visual and kinaesthetic input during observational learning highlights the interconnectedness of sensory input and motor output, a central tenet of CE.

The provision of specific and positive verbal feedback is equally crucial in nurturing self-efficacy. Rather than resorting to generic praise, coaches should focus on highlighting athletes' strengths and acknowledging concrete progress made in specific aspects of their performance. This targeted feedback reinforces what athletes are doing well and provides clear indicators of improvement, fostering a sense of accomplishment and encouraging continued effort. While encouraging athletes to believe in their abilities is important, the feedback must remain realistic and directly tied to their actual performance, ensuring a genuine sense of earned success. Effective verbal persuasion, when specific and constructive, directly influences athletes' cognitive understanding of their movements. This cognitive input helps refine physical actions, making embodied experiences more purposeful (Allen et al., 2024). Connecting verbal instructions to physical sensations enhances kinaesthetic awareness, leading to integrated and skillful execution.

Finally, coaches play a pivotal role in empowering athletes to effectively manage their physiological and emotional responses to demanding situations. This involves actively teaching and encouraging the use of cognitive and somatic techniques such as relaxation exercises to mitigate performance anxiety, mental visualization of successful outcomes to build confidence and focus, and positive self-talk to challenge negative thoughts and foster a resilient mindset (Feltz et al., 2008). By helping athletes reinterpret the physiological symptoms of anxiety as a source of facilitative energy rather than a debilitating threat, coaches can significantly enhance their ability to perform under pressure.

By consistently and thoughtfully integrating these evidence-based strategies into their coaching practices, mentors can cultivate a robust sense of SE within their athletes. This, in turn, transcends mere performance enhancement, fostering sustained motivation, promoting greater resilience in the face of setbacks, and ultimately contributing to the athletes' overall well-being and enjoyment of their sport. The coach, therefore, acts not only as a technical instructor but also as a crucial architect of their athletes' self-belief and potential.

Within the lens of CE, SE emerges not merely as a psychological construct, but as a potent pedagogical tool that underscores the inseparable link between mind and body in the acquisition and refinement of athletic skills. The deliberate application of SE-enhancing strategies by coaches can be viewed as a tangible and highly effective implementation of CE principles in the dynamic realm of sports coaching. These strategies inherently acknowledge that athletic learning is not solely a cognitive endeavour confined to mental blueprints, nor is it purely a physical process devoid of mental interpretation. Instead, they recognize the profound and continuous interplay between an athlete's thoughts, feelings, and physical experiences (Martín-Rodríguez et al., 2024).

Consider, for instance, the CE perspective on mastery experiences. When coaches meticulously design practice drills and progressive training regimens that afford athletes repeated opportunities to master new skills, they are not simply building confidence; they are actively fostering a deeper, embodied understanding of those movements. The iterative cycle of physical execution, coupled with the positive cognitive reinforcement derived from achieving mastery, serves to solidify the neural pathways and the intricate physical memory directly associated with the specific motor patterns. This is a quintessential example of CE in action: the cognitive appraisal of success directly influences and is, in turn, influenced by the

sensorimotor experiences, creating a more robust and integrated understanding of the skill.

Similarly, the strategic use of modelling and vicarious experiences aligns seamlessly with CE principles. When athletes learn by attentively observing and subsequently imitating skilled performers, they are engaging in a process that intricately blends visual perception with kinesthetic emulation (Ridderinkhof & Brass, 2015). This goes beyond mere mimicry; it involves the brain actively processing visual information and translating it into motor commands, thereby enriching the athlete's embodied understanding of the movement's dynamics and nuances. The integration of visual and kinesthetic information during observational learning further underscores the interconnectedness of sensory input and motor output, a central tenet of CE.

Furthermore, the provision of effective verbal persuasion and the coaching of physiological and emotional state management contribute significantly to a learning environment that is inherently aligned with CE. By offering specific, positive feedback and equipping athletes with techniques to regulate their anxiety and enhance focus, coaches are directly influencing the athletes' cognitive and emotional states, which in turn profoundly impact their physical execution and learning capacity. This holistic approach recognizes that an athlete's mental and emotional well-being is inextricably linked to their physical performance (Smith et al., 2007). By addressing these psychological factors, coaches facilitate a more receptive and effective embodied learning process.

Crucially, the application of these SE-enhancing strategies inherently promotes flexible teaching. By focusing on individual progress, providing varied learning experiences (mastery, observation, feedback), and acknowledging the unique psychological and physiological responses of each athlete, coaches move away from a rigid, one-size-fits-all approach. Instead, they cultivate a personalized learning journey that respects the diverse ways in which athletes embody and internalize skills. This adaptability, driven by an understanding of the mind-body connection inherent in CE, allows coaches to tailor their instruction to meet the specific needs and learning styles of their athletes, ultimately fostering more profound and lasting embodied understanding and skill acquisition. In essence, leveraging SE as a guiding framework provides coaches with practical, CE-informed tools to cultivate not just skilled athletes, but individuals with a deep, integrated, and confident understanding of their own physical capabilities.

Conclusions

The findings of this exploration into the intricate relationship between CE and SE carry profound implications for coaching practice across all levels such as athletic competition or physical education. By embracing a framework that acknowledges the deep interconnectedness of mind and body, coaches can move beyond traditional training paradigms and adopt a more holistic approach to athlete development, fostering not only superior performance but also enhanced well-being. This necessitates a shift towards creating learning environments that are inherently supportive, empowering, and adaptable to the diverse needs of each athlete.

This exploration, grounded in a comprehensive theoretical analysis rather than empirical data, aims to bridge the gap between established concepts of Self-Efficacy and Cognitive Embodiment by proposing concrete didactic strategies for sports coaching. Our "methodology" lies in synthesizing existing literature to demonstrate how SE, when strategically fostered, acts as a practical tool within the CE framework, offering actionable insights for coaches to enhance athletic learning and performance. This conceptual review seeks to guide future pedagogical interventions and research in the field.

Grounded in the principles of CE, training should move beyond rote repetition and instead engage the athlete's whole being. This involves crafting activities that provide rich and varied sensory feedback, allowing athletes to develop a deeper, more intuitive, and embodied understanding of the sport. For instance, rather than simply running drills, coaches can incorporate scenario-based training that simulates the complex sensory and decision-making demands of competition. This could include incorporating variability in practice conditions to enhance adaptability and designing drills that require athletes to actively problem-solve and make choices based on their perception of their body in relation to the environment. Furthermore, drawing upon SE theory (Bandura, 1997), coaches should structure these programs to provide a sense of mastery through progressively challenging tasks. This involves starting with simpler, more achievable goals and gradually increasing the complexity as athletes gain competence, ensuring a continuous cycle of accomplishment that reinforces their belief in their capabilities.

Acknowledging the crucial role of SE, coaches must cultivate an environment where athletes feel confident in their abilities and are motivated to strive for

improvement. This can be achieved through several key strategies. Firstly, coaches should utilize effective modeling techniques, demonstrating skills with precision and clarity, and strategically showcasing successful performances of other athletes, particularly those with similar perceived abilities to the learners (Schunk & Pajares, 2009). This provides powerful vicarious experiences that enhance SE. For example, coaches can use video analysis of exemplary performances, invite experienced athletes to share their insights and demonstrate skills, or highlight instances of significant progress within the team. Secondly, the provision of specific, positive, and constructive feedback is paramount. Coaches should move beyond generic praise and instead focus on providing targeted feedback that highlights athletes' strengths, identifies areas for improvement, and acknowledges concrete progress. This type of feedback reinforces positive actions, promotes a growth mindset, and fosters a sense of earned accomplishment. Thirdly, coaches should equip athletes with strategies to manage their physiological and emotional states. Techniques such as relaxation exercises, visualization of successful outcomes, and positive self-talk can empower athletes to interpret the demands of training and competition as challenges to be overcome rather than insurmountable obstacles (Feltz et al., 2008).

By integrating CE and SE principles, coaches can foster a more holistic approach that enhances both performance and well-being. When athletes possess a strong sense of SE, they are more likely to persist in the face of adversity, embrace challenges, and maintain motivation, even when confronted with setbacks. This not only leads to improved performance outcomes but also contributes to greater psychological resilience, reduced anxiety, and a more positive overall experience in sport. The embodied learning fostered by CE-informed coaching further enhances skill acquisition by promoting a deeper, more intuitive understanding of movement and strategy.

Recognizing the diverse needs and learning styles of athletes is crucial for effective coaching. This aligns strongly with the principles of Universal Design for Learning, which advocates for creating learning environments that are accessible and engaging for all individuals. By understanding CE and SE, coaches can embrace Universal Design for Learning to personalize their coaching approach. This involves providing athletes with multiple means of: representation (e.g., using visual, auditory, and kinesthetic modalities to present information); action and expression (e.g., offering athletes choices in how they demonstrate their knowledge and skills); engagement (e.g., fostering intrinsic motivation by making training relevant,

challenging, and enjoyable). This personalized approach, informed by CE's emphasis on individual embodiment and SE's focus on individual belief, allows coaches to tailor their instruction to meet the unique needs, preferences, and learning styles of each athlete, ultimately leading to more effective and lasting learning.

In conclusion, the integration of CE and SE principles, guided by a Universal Design for Learning framework, empowers coaches to create a transformative learning environment that fosters not only athletic excellence but also personal growth and well-being. By acknowledging the interconnectedness of mind and body, promoting self-efficacy, and embracing personalized learning, coaches can cultivate athletes who are skilled, confident, resilient, and deeply connected to their embodied potential.

Author contributions

A.C., conceptualization; writing original draft preparation (chapters: introduction, 2 and conclusion), revision and editing, study supervision; *corresponding author.

G.S., conceptualization; writing original draft preparation (chapters: introduction, 1 and conclusion), revision and editing.

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