

Leisure, nature activities, tourism and recreation

How do undergraduate first-year sports management students learn? CBL impacts styles and competencies

¿Cómo aprenden los estudiantes de primer curso de la carrera de gestión deportiva? El impacto del aprendizaje basado en casos (CBL) en los estilos y las competencias

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ABSTRACT

This study evaluates the effects of Challenge-Based-Learning (CBL) on learning styles and professional competencies among first-year sports management students. A total of 52 students participated in a pre- and post-test intervention, using the CHAEA-36 to assess learning styles and the Competency Dimensions Questionnaire for Sports Management to measure professional skills. The results revealed a statistically significant reduction in the reflective learning style ($t_7=3.67$; $p=.008$; $d=1.30$). Declines were observed in organizational skills ($t_{18}=3.44$; $p=.003$; $d=.79$) and adaptability ($t_{44}=2.19$; $p=.034$; $d=.33$). However, significant improvements were noted in key sports management competencies such as business experience ($t_{46}=4.37$; $p<.001$; $d=.64$), economic expertise ($t_{53}=3.08$; $p=.003$; $d=.42$), and legal knowledge ($t_{54}=8.46$; $p<.001$; $d=1.14$). These findings suggest that while CBL may enhance certain competencies, its impact on learning styles and other skills may require adjustments, particularly for novice learners. Structured reflection periods and additional guidance could be necessary to maximise the benefits of CBL for first-year students.

Keywords: Challenge-Based Learning, employability, learning styles, professional competencies, sport management education.

RESUMEN

Este estudio evalúa los efectos del aprendizaje basado en retos (CBL) sobre los estilos de aprendizaje y las competencias profesionales entre los estudiantes de primer año de gestión deportiva. Un total de 52 estudiantes participaron en una intervención con pruebas previas y posteriores, utilizando el CHAEA-36 para evaluar los estilos de aprendizaje y el Cuestionario de Dimensiones de Competencia para la Gestión Deportiva para medir las habilidades profesionales. Los resultados revelaron una reducción estadísticamente significativa en el estilo de aprendizaje reflexivo ($t_7 = 3,67$; $p = 0,008$; $d = 1,30$). Se observaron descensos en las habilidades organizativas ($t_{18} = 3,44$; $p = 0,003$; $d = 0,79$) y en la adaptabilidad ($t_{44} = 2,19$; $p = 0,034$; $d = 0,33$). Sin embargo, se observaron mejoras significativas en competencias clave de gestión deportiva, tales como la experiencia empresarial ($t_{46} = 4,37$; $p < 0,001$; $d = 0,64$), los conocimientos económicos ($t_{53} = 3,08$; $p = 0,003$; $d = 0,42$) y los conocimientos legales ($t_{54} = 8,46$; $p < 0,001$; $d = 1,14$). Estos resultados sugieren que, si bien el CBL puede mejorar ciertas competencias, su impacto en los estilos de aprendizaje y otras habilidades puede requerir ajustes, especialmente para los estudiantes noveles. Podrían ser necesarios periodos de reflexión estructurados y orientación adicional para maximizar los beneficios del CBL para los estudiantes de primer año.

Palabras clave: aprendizaje basado en retos, empleabilidad, estilos de aprendizaje, competencias profesionales, formación en gestión deportiva.

INTRODUCCIÓN

Sports management, as a multifaceted discipline, requires an educational approach that goes beyond the simple transmission of theoretical knowledge. It comprehensively encompasses the teaching, learning styles, and competencies necessary for professional success in the sports industry (Ilundáin-Agurruza, 2017). This involves not only the acquisition of knowledge but also the development of critical thinking, problem-solving, leadership, and communication skills, which are essential for navigating the complex and dynamic landscape of modern sports organizations. As such, the educational programs must be designed to foster these competencies through diverse and interactive learning experiences. In the Spanish context, understanding the learning styles and predominant competencies among sports management students is essential for training adaptive leaders capable of responding to the demands of a constantly evolving economic and sports environment (Light & Dixon, 2007). The rapid changes in sports management, driven by technological advancements, globalization, and shifting societal values, necessitate a workforce that is not only knowledgeable but also flexible and innovative. Therefore, educational institutions must prioritise the identification and development of these key competencies and learning styles to ensure that graduates are well-equipped to meet these challenges.

The global sports industry has undergone significant growth, leading to a corresponding increase in the need for specialised sports management education. Sports management degree courses are now offered worldwide, reflecting the industry's complexity and the necessity for skilled professionals. According to Pedersen (2011), the expansion of sports as a commercial enterprise has driven the need for managers who can handle the business aspects of sports, from marketing and event management to facility management and sports law. The international diffusion of sports management programs is evident in their presence across continents, tailored to meet regional demands while maintaining core academic and practical components. For instance, degree programs in the United States often

emphasise sports marketing and media relations, reflecting the commercial nature of American sports (Pedersen, 2011). These programs are designed to prepare students for the high-stakes, competitive nature of the North American sports market, where media and sponsorship play critical roles. In contrast, European programs may focus more on governance and policy, aligning with the continent's regulatory environment and the structure of sports organizations (Ferkins et al., 2005; King, 2009). This approach reflects the importance of understanding the intricate web of regulations and policies that govern sports in Europe, where compliance and ethical governance are paramount. European sports management education also tends to emphasise the social and cultural aspects of sports, preparing students to work in diverse and multicultural environments.

This globalization of sports management education underscores the importance of developing a curriculum that addresses both local and international contexts, ensuring that graduates are well-prepared for the global sports market (Choi et al., 2013; Giel et al., 2022; Miragaia & Soares, 2017; Wohlfart et al., 2020). The integration of global perspectives into the curriculum helps students understand and appreciate the different approaches to sports management around the world. It also encourages the development of a more flexible and adaptable skill set, which is crucial for operating in an increasingly interconnected and interdependent global sports industry. Furthermore, the growth and international diffusion of sports management programs reflect the increasing complexity and professionalization of the sports industry. By understanding and addressing the unique educational needs of sports management students, these programs can better prepare graduates for successful careers in a dynamic and evolving field.

Learning Styles Tools from Sports Science to Sports Management

Understanding how students learn is crucial for effective education (Hmelo-Silver, 2004), particularly in fields as dynamic as sports management (Barnhill et al., 2018; Eagleman & McNary, 2010; Skinner & Gilbert, 2007). One of the most widely used instruments is CHAEA-36 tool, employed to assess learning styles, categorizing students into active, reflective, theoretical, and pragmatic learners (Alonso et al., 1997). This categorization helps educators tailor their teaching strategies to accommodate different learning preferences, enhancing the educational experience and outcomes (Honey & Mumford, 1992). The CHAEA-36 is instrumental in identifying the dominant learning styles of students, which is critical in sports management education where the integration of practical experiences with theoretical knowledge is essential for developing well-rounded professionals (Ilundáin-Agurruza, 2017). Research by Kolb and collaborators (Kolb et al., 2014) introduced the Experiential Learning Theory, which has significantly influenced how learning styles are understood and applied in education and also sports science. Kolb's theory posits that learning is a process whereby knowledge is created through the transformation of experience. This theory, along with instruments like CHAEA-36, provides a framework for identifying and addressing the diverse learning needs of students. Kolb's model, which includes the four stages of concrete experience, reflective observation, abstract conceptualization, and active experimentation, emphasises the importance of experiential learning in developing critical thinking and problem-solving skills (Kolb & Kolb, 2005). This approach is particularly relevant in sports management, where practical application and theoretical knowledge must be balanced to prepare students for the multifaceted challenges of the industry (Brown, 2013; Peters et al., 2008; Shreffler et al., 2019).

Coming from sports science and aiming the management side, understanding learning styles can inform the development of curricula that engage students effectively and foster critical competencies. The need for such tailored educational strategies is underscored by the diverse nature of sports management, which encompasses areas such as event management, marketing, facility operations, and governance. Effective education in this field requires not only imparting knowledge but also developing the ability to apply these competencies in real-world settings. This holistic approach ensures that students are not only academically prepared but also professionally competent (Barnhill et al., 2018; Light & Dixon, 2007). Studies have shown that adapting teaching methods to match students' learning styles can improve engagement and retention. For example, Colella and D'Arando (2021) found that sports science students who were taught using methods aligned with their learning styles demonstrated higher levels of understanding and application of the material. Similarly, Siedentop et al. (2011) reported that personalised teaching strategies led to enhanced academic performance and student satisfaction. These findings highlight the importance of personalised education, particularly in the context of sports management, where diverse learning needs must be met to develop a versatile and skilled workforce.

This personalised approach to education is particularly relevant in the post-pandemic era, where digital natives require a blend of traditional and innovative teaching methods to thrive in both virtual and physical learning environments (Prensky, 2001). The COVID-19 pandemic has accelerated the integration of digital tools and online learning platforms in education, necessitating a reevaluation of teaching strategies to ensure they meet the evolving needs of students. The use of blended learning models, which combine online and face-to-face instruction, can provide the flexibility and engagement required by contemporary learners (Garrison & Kanuka, 2004). This approach not only addresses the immediate challenges posed by the pandemic but also aligns with the long-term trends in educational technology and student preferences. Understanding and addressing the learning styles of sports management students through tools like CHAEA-36 and frameworks like Kolb's Experiential Learning Theory are essential for developing effective educational schemes. These strategies must be adaptive, integrating both traditional and innovative methods to meet the diverse needs of students in a rapidly evolving educational landscape. By doing so, educators can enhance student engagement, retention, and overall academic and professional success, ultimately contributing to the development of competent and adaptable sports management professionals.

The Competency Dimensions Questionnaire for Sports Management

The Competency Dimensions Questionnaire (CDQ) for Sports Management (Fahrner & Schüttoff, 2020) is a validated tool designed to assess the essential competencies required for success in the sports management field. This tool evaluates a range of skills, including leadership, strategic decision-making, and team management, which are critical for navigating the complex and varied environments within the sports industry. These competencies are essential for professionals who must adapt to the diverse challenges and opportunities presented by different types of sports organizations, from community sports programs to elite sports franchises (Addolorato et al., 2022). Fahrner and Schüttoff's (2020) study provides a comprehensive analysis of how these competencies are perceived by graduates and professionals in different sports management contexts. Their findings indicate that while core competencies such as leadership and strategic planning are universally important, the emphasis on specific skills can vary depending on the job setting. For instance, in grassroots sports organizations,

the ability to engage with the community and promote participation is highly valued. This is because these organizations often rely on strong community ties and volunteer support to operate effectively (Lowther et al., 2016). In this context, sports managers must be adept at fostering relationships, organizing community events, and encouraging widespread participation to achieve their goals.

Conversely, elite sports organizations prioritise performance management and innovation. These settings demand a focus on optimizing athlete performance, implementing advanced training techniques, and staying ahead of industry trends (Swanson et al., 2020). Sports managers in these environments must possess a deep understanding of sports science, technology, and analytics to support their teams' competitive edge. They are also expected to exhibit strong strategic decision-making abilities to navigate the high-stakes, fast-paced nature of elite sports (Tortora, 2017). This dichotomy between grassroots and elite sports management highlights the need for a flexible and context-sensitive approach to competency development. Moreover, the CDQ for Sports Management also emphasises the importance of interpersonal and communication skills. Effective communication is crucial across all levels of sports management, whether it's motivating athletes, negotiating with stakeholders, or engaging with the media (Abeza et al., 2020). In grassroots settings, clear communication helps in mobilizing community support and ensuring that all participants and volunteers are aligned with the organization's objectives. In elite sports, it ensures that complex strategies are understood and executed by athletes and support staff, and helps maintain a positive public image of the organization.

Additionally, the tool assesses competencies related to ethical decision-making and governance. With increasing scrutiny on the ethical standards within sports organizations, sports managers must navigate ethical dilemmas and uphold integrity and transparency in their operations (Hums et al., 1999). This is particularly important in elite sports, where the pressure to win can sometimes lead to ethical compromises. Ensuring that sports managers are equipped with the skills to handle such challenges is vital for the credibility and sustainability of sports organizations. Similar academic means and frameworks have been developed to assess competencies in sports management and related fields. The Sport Management Competency Framework (SMCF) developed by DeSensi et al. (1990) identifies key areas such as ethics, finance, marketing, and law, providing a comprehensive view of the skills needed in the industry (Barcelona & Ross, 2004; Kelley et al., 1994; Teodora, 2020). These instruments not only aid in curriculum development but also help students and professionals identify their strengths and areas for improvement, facilitating targeted career development.

In conclusion, the CDQ for Sports Management provides valuable insights into the essential skills required for various roles within the sports management field. Fahrner and Schüttoff's (2020) study underscores the importance of adapting educational and training programs to develop these competencies in context-specific ways. By doing so, sports management programs can better prepare graduates to meet the diverse demands of their profession, whether they are working in mass sports, elite sports, or any other sector within the industry. This comprehensive approach to competency development ensures that sports managers are well-equipped to lead effectively, make strategic decisions, and contribute to the success and integrity of their organizations.

This study seeks to contribute to the understanding of how educational interventions, such as Challenge-Based Learning (CBL), as one of the leading approaches in higher education, can impact

both learning styles and the development of professional competencies in sports management students. CBL is recognised for its ability to enhance student competencies through real-world challenges, fostering collaboration and transversal skills (Gallagher & Savage, 2023). By focusing on changes in these areas through a pre- and post-assessment, this research aims to provide insights that can help educators design more effective teaching strategies. For this reason, this study aims to: a) evaluate the predominant learning styles and analyze the main competency dimensions among sports management education for undergraduate students, and b) determine the effect of a Challenge-Based Learning (CBL) intervention on learning styles and students' competencies on sports management. This contribution uses the CHAEA-36 (Alonso et al., 1997) and the Competency Dimensions Questionnaire (Fahrner & Schüttoff, 2020) on undergraduate students enrolled in the curricular course 'Analysis of the Sports Economic Environment' while engaged in activities directly related to professional practice, conducted both prior (pre-) to and following (post- self-assessment analysis) this practical experience. These interventions aim to enhance student engagement and facilitate the acquisition of necessary competencies, ultimately preparing students for professional success in the dynamic field of sports management.

METHOD

Design

A pre-experimental one-group pre-test/post-test design was used. This design was selected because the CBL activity was implemented as part of a regular university course and all enrolled students were exposed to the same teaching innovation. Therefore, random allocation was not feasible in this academic context. Consequently, the study analyses pre-post changes associated with the intervention.

Participants

A total of 52 first-year students from the Bachelor's Degree in Sports Management at *University affiliation name (Country)*, all enrolled in the "Analysis of the Sports Economic Environment" course, participated in this study. Although the sample comes from a single institution, it represents an authentic cohort of first-year students in a degree that remains relatively uncommon in the Spanish university context.

The inclusion criteria were: (a) being enrolled in the "Analysis of the Sports Economic Environment" course, (b) participating in the CBL activity, and (c) providing informed consent. Students who did not provide consent or did not complete the required questionnaires were excluded from the corresponding paired analyses.

To reduce contextual variability, all participants belonged to the same academic year and course, completed the same CBL activity, and answered the same instruments before and after the intervention under equivalent classroom conditions.

Intervention

A Challenge-Based Learning (CBL) was designed. The title was "Innovation in Sports Management in Rivas-Vaciamadrid: A Data-Driven Approach". In an 8-week collaborative project between students of the Analysis of the Sports Economic Environment course, a key challenge for the Rivas-

Vaciamadrid Sports Department was addressed. The goal was to transform sports service management through data analysis and innovation. The project began with the creation of an interactive pedestrian map based on the MetroMinuto design. Using tools like Google My Maps, the team identified and mapped key points of interest in Rivas-Vaciamadrid, highlighting walking routes between sports facilities, green spaces, cultural centers, and educational entities. This map provided citizens with detailed information about available services at each point, enhancing the visibility and accessibility of community resources.

Afterwards, the students were asked to develop two innovative projects based on the interactive map. One project had to focus on linking sports facilities with rural areas, promoting outdoor activities, while the other had to concentrate on connecting sports facilities with educational entities, creating sports programs for students. Both projects were presented in a semifinal phase and, later, in a final competition in front of a panel of experts, aiming to select the most viable proposals to enhance the city's physical activity and sport offerings.

Before implementing any type of educational intervention, two questionnaires were administered to all participants to obtain an initial profile of their learning styles and competencies of sports management students. The questionnaires used were: CHAEA-36, on learning styles (Alonso et al., 1997) and the competency dimensions questionnaire for sports management (Fahrner & Schüttoff, 2020). The data obtained from both questionnaires were collected with the students in person in the classroom and securely stored through the Google Forms platform. The confidentiality of the participants was ensured by assigning numerical codes instead of using names to identify the completed questionnaires. The students used their own devices to complete both questionnaires.

The study was conducted as part of an institutionally approved teaching innovation project (InnD 2023/03). Participation was voluntary, informed consent was obtained from all participants, and responses were anonymised through numerical codes. All procedures followed the principles of the Declaration of Helsinki and applicable data protection regulations.

Instruments

To carry out this research, two evaluation instruments were used: CHAEA-36, on learning styles (Alonso et al., 1997) and the competency dimensions questionnaire for sports management (Fahrner & Schüttoff, 2020). These instruments were selected for their relevance and validity in the educational context, as well as for allowing a comprehensive assessment of both learning styles and specific competencies necessary for professional success. Internal consistency was examined for the Competency Dimensions Questionnaire for Sports Management in the present sample, showing acceptable overall reliability (Cronbach's $\alpha = .79$). For the CHAEA-36 coefficients in the pre-test sample were low across learning styles ($\alpha = .36$); therefore, learning-style results were interpreted cautiously as descriptive learning-style profiles rather than as highly homogeneous psychological scales.

The combination of both questionnaires provides a holistic view of the educational and competency profile of the students, facilitating the design of more effective educational interventions tailored to their needs. CHAEA-36 Instrument on Learning Styles was used to measure learning styles. The CHAEA-36 is a questionnaire designed to assess learning styles according to the Alonso et al. (1997) model. This instrument consists of 36 items that identify four predominant learning styles: active,

reflective, theoretical, and pragmatic. Each item was scored with a dichotomous 'yes' or 'no' response. The results provide a detailed profile of the students' learning preferences, facilitating the adaptation of pedagogical strategies to their individual needs. The predominant learning style was selected based on the style that achieved the highest score. Competency Dimensions Questionnaire for Sports Management Based on the work of Fahrner and Schüttoff (2020), was used to measure the different competencies of interest. This questionnaire was designed to analyze the relevance of various specific competencies in the context of sports management. The questionnaire was divided into two main sections:

Personal, Social, and Methodological Competencies: Participants evaluated the relevance of different competencies on a Likert scale ranging from 1 (not at all) to 5 (very high degree). Among others, the evaluated competencies include:

- Organizational skills
- Independent work
- Time management
- Adaptability
- Teamwork skills
- Conflict resolution skills
- Leadership skills

Competency in Sports Management: This specific section measures the relevance of sports management competencies for the participants' current work, also using a Likert scale (1=not at all; 5=very high degree). The included items allow a detailed assessment of key competencies necessary for effective management in the sports field, including:

- Organizational skills
- Time management
- Business expertise
- Competence in speaking a foreign language
- Economic expertise
- Legal expertise
- Didactic skills
- Experience related to the sociological and psychological aspects of sports
- Experience related to biomechanics and sports training
- Practical sports skills

Data Analysis

The analyses were performed using the IBM SPSS 27.0 statistical package (IBM Corp., Armonk, NY, USA). Initially, goodness-of-fit tests were conducted following the Kolmogorov-Smirnov technique ($N > 30$). A paired samples t-test was conducted to compare the pre-test and post-test effects within the group. Cohen's d (Cohen, 1988) was calculated as a measure of effect size. Effect sizes were reported only for significant comparisons to avoid overinterpretation of small, non-conclusive variations. Values of .20, .60, and .80 were used to interpret the effect size as small, medium, and large, respectively. The level of significance was set at $p < 0.05$ for all cases.

RESULTS

According to the sample description, 34.5% of the students were Spanish nationals, 9.1% were Colombian, and 7.3% were Mexican and Italian. The average age of the participants was 19.65 ± 1.76 . The predominant learning style was reflective, followed by active, theoretical, and pragmatic. Table 1 shows the means and standard deviations of the predominant learning styles and competency dimensions.

Table 1.

Analysis of Learning Styles and competency scores of first-year students' sample

Learning Style (CHAEA-36)	M$\pm$SD
Active	6.57 $\pm$ 1.26
Reflective	6.75 $\pm$ 1.53
Theoretical	5.96 $\pm$ 1.32
Pragmatic	5.14 $\pm$ 1.60
Competency dimensions for sports management	
Self-competition	
Organizational skills	3.67 $\pm$ 0.92
Independent work	3.98 $\pm$ 0.67
Time management	3.61 $\pm$ 0.67
Self-discipline	3.92 $\pm$ 0.69
Adaptability	3.92 $\pm$ 0.70
Load capacity	3.70 $\pm$ 0.58
Social competence	
Communication skills	3.96 $\pm$ 0.84
Skills to assume responsibility	4.11 $\pm$ 0.67
Ability to work in a team	4.03 $\pm$ 0.94
Negotiation skills	3.88 $\pm$ 0.75
Conflict resolution	3.94 $\pm$ 0.74
Assertiveness	3.62 $\pm$ 0.68
Leadership skills	4.01 $\pm$ 0.85
Methodological competence	
Problem-solving skills	4.04 $\pm$ 0.66
Presentation skills	3.76 $\pm$ 0.74
Transfer Skills	3.51 $\pm$ 0.61
Information management	3.66 $\pm$ 0.55
Analytical skills	3.81 $\pm$ 0.72
Use of the scientific method	3.02 $\pm$ 0.98
Scientific writing	2.85 $\pm$ 1.15
Sports Management Competence	
Digital skills	3.44 $\pm$ 1.00
Entrepreneurial thinking	3.65 $\pm$ 0.86
Business Experience	3.23 $\pm$ 0.85
Proficiency in the foreign language	3.90 $\pm$ 1.00
Expert in economics	2.81 $\pm$ 0.79
Legal Expert	2.45 $\pm$ 0.93
Teaching skills	3.14 $\pm$ 0.93
Experience related to the sociological and psychological aspects of sport	3.50 $\pm$ 1.12

Experience related to biomechanics and training in sport	3.16±1.25
Practical sports skills	4.34±0.90

Note. *M = Mean; SD = Standard Deviation

Table 2 shows the effect of the CBL intervention on learning styles. A statistically significant reduction was observed in the change in values from pre-test to post-test for the reflective style ($t_7=3.67$; $p=.008$; $d=1.30$). No significant differences were observed in the change in values from pre-test to post-test in any other learning style ($p>.05$).

Table 2.

Effect of the CBL intervention on learning styles

	Pre		Post		p	d
	M	SD	M	SD		
Learning style						
Active	6.62	1.40	6.75	1.16	.685	
Reflective	7.00	1.60	5.60	1.30	.008**	1.30
Theoretical	5.75	1.83	5.63	1.30	.857	
Pragmatic	5.00	2.07	5.75	1.98	.468	

Note. M = Mean; SD = Standard Deviation; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; d = Cohen's d. Values of 0.20, 0.60, and 0.80 were used to interpret effect size as small, medium, and large, respectively (Cohen, 1988).

Table 3 shows the pre-post changes in competency dimensions for sports management. A statistically significant decrease was observed in scores from pre-test to post-test for the following competencies: organizational skills ($t_{18}=3.44$; $p=.003$; $d=.79$), adaptability ($t_{44}=2.19$; $p=.034$; $d=.33$), problem-solving skills ($t_{48}=1.46$; $p=.001$; $d=.49$), entrepreneurial thinking ($t_{31}=2.20$; $p=.035$; $d=.39$), teaching skills ($t_{54}=2.49$; $p=.016$; $d=.34$), experience related to the sociological and psychological aspects of sport ($t_{35}=5.617$; $p<.001$; $d=.94$), and practical sports skills ($t_{50}=5.34$; $p<.001$; $d=.74$).

However, there was an increase in scores for methodological competencies. Specifically, improvements were seen in presentation skills ($t_{47}=2.40$; $p=.022$; $d=.34$), transfer skills ($t_{45}=5.55$; $p<.001$; $d=.82$), use of the scientific method ($t_{38}=4.30$; $p<.001$; $d=.69$), and scientific writing ($t_{34}=4.63$; $p<.001$; $d=.78$).

Statistically significant increases were also observed in the change in scores for specific competencies in sports management. Specifically, improvements were noted for business experience ($t_{46}=4.37$; $p<.001$; $d=.64$), expert in economics ($t_{53}=3.08$; $p=.003$; $d=.42$), and legal expert ($t_{54}=8.46$; $p<.001$; $d=1.14$).

Table 3.

Effect of the CBL intervention on sports management competencies

	Pre		Post		p	d
	M	SD	M	SD		
Competency dimensions for sports management						
Self-competition						
Organizational skills	3.73	.93	3.00	.00	.003**	.79
Independent work	4.57	.53	3.71	.95	.078	
Time management	3.66	.68	3.88	.63	.130	
Self-discipline	3.93	.69	4.04	.62	.417	

Adaptability	3.98	.69	3.64	.67	.034**	.33
Load capacity	3.71	.58	3.89	.70	.209	
Social competence						
Communication skills	3.94	.84	4.02	.65	.455	
Skills to assume responsibility	4.19	.60	4.09	.31	.414	
Ability to work in a team	4.06	.95	4.02	.74	.806	
Negotiation skills	3.90	.75	4.11	.69	.086	
Conflict resolution	4.00	.74	4.20	.71	.151	
Assertiveness	3.62	.69	3.85	.78	.090	
Leadership skills	4.06	.84	3.99	.10	.455	
Methodological competence						
Problem-solving skills	4.06	.65	3.65	.69	<.001***	.49
Presentation skills	3.79	.74	4.13	.70	.022*	.34
Transfer Skills	3.52	.62	4.11	.64	<.001***	.82
Information management	3.70	.55	3.77	.74	.511	
Analytical skills	3.86	.72	3.47	.59	.003**	.46
Use of the scientific method	3.08	.95	3.72	.56	<.001***	.69
Scientific writing	2.89	1.08	3.74	.66	<.001***	.78
Sports Management Competence						
Digital skills	3.52	.97	3.39	.55	.431	
Entrepreneurial thinking	3.75	.80	3.34	.65	.035*	.39
Business Experience	3.17	.84	3.79	.66	<.001***	.64
Proficiency in the foreign language	3.86	.14	3.67	.82	.302	
Expert in economics	2.83	.80	3.27	.83	.003**	.42
Legal Expert	2.45	.94	3.89	1.01	<.001***	1.14
Teaching skills	3.14	.94	2.83	.79	.016*	.34
Experience related to the sociological and psychological aspects of sport	3.58	1.02	2.69	1.12	<.001***	.94
Experience related to biomechanics and training in sport	3.16	1.26	3.16	.92	1.00	
Practical sports skills	4.39	.85	3.69	.93	<.001***	.74

Note. M = Mean; SD = Standard Deviation; *p < 0.05; **p < 0.01; ***p < 0.001; d = Cohen's d. Values of 0.20, 0.60, and 0.80 were used to interpret effect size as small, medium, and large, respectively (Cohen, 1988).

DISCUSSION

This study examines pre-post changes associated with a Challenge-Based Learning (CBL) on both learning styles and the development of professional competencies in sports management students. The pre- and post-test results reveal significant changes in both areas, offering useful knowledge into how CBL interventions are associated with students' learning processes and skills development.

The analysis of the predominant learning styles among first-year sports management students, as measured by the CHAEA-36, reveals a strong inclination toward the reflective learning style. The mean score (M=6.75) suggests that students tend to favor introspective approaches to learning, preferring to gather information and reflect on it before acting. This finding is consistent with previous

research in educational contexts, where reflective learners often excel in environments that require deep analysis and careful consideration (Tang et al., 2023). The lower scores for the pragmatic style (M=5.14) suggest that students might be less inclined toward immediate application of knowledge in real-world scenarios, indicating potential areas for development in more practical and hands-on learning approaches.

Regarding the analysis of competency dimensions, students demonstrate moderate abilities in organizational skills (M=3.67), time management (M=3.61), and adaptability (M=3.92), which aligns with findings that time management and organizational skills are often developed to a moderate level among university students (Covic et al., 2003; Khan et al., 2020). Studies suggest that these competencies can positively impact academic performance but still leave room for improvement, particularly in fostering a more systematic approach to these skills (Khan et al., 2020). The stronger results in teamwork (M=4.03) and leadership (M=4.01) are supported by research on employability skills, which shows that graduates with strong teamwork and leadership competencies tend to perform better in professional settings (Abas & Imam, 2016). However, areas such as business expertise (M=3.23), legal expertise (M=2.45), and scientific writing (M=2.85) scored lower, which is consistent with broader concerns about the need to enhance professional competencies in these fields, particularly in vocational and professional education (Stryukov & Hromtseva, 2019). Lastly, high scores in practical sports skills (M=4.34) reflect students' confidence in operational aspects, indicating that hands-on, practical experiences may foster stronger competencies in this area.

The significant reduction in reflective learning style observed among first-year students following the CBL intervention raises concerns about the impact of this approach on novice learners. First-year students are still in the early stages of developing critical thinking and self-regulation skills, and reflective learning is key to promoting deeper understanding and long-term retention, particularly in complex academic contexts (Moon, 2013). The drop in reflective thinking suggests that the fast-paced, active nature of CBL may have overcome these students, prioritizing immediate engagement and problem-solving over the more deliberate, introspective processes that reflective learners typically rely on. This suggests that CBL may require additional structure when implemented in early stages of learning.

This highlights the need to incorporate timely feedback and structured reflection periods to better support first-year students, as emphasised by previous research. For instance, Lee et al. (2014) found that first-year students' intercultural development is often facilitated through intentional pedagogical strategies, such as knowledge sharing and awareness-building activities within the classroom, which are then extended beyond it. Their study suggests that structured reflection opportunities enable students to internalise critical learning moments. Similarly, Shields (2015) highlights the importance of timely feedback, particularly in helping reduce anxiety and build confidence. Furthermore, Haenen et al. (2024) emphasise the importance of increasing the cognitive challenge of tasks to better engage students, which aligns with this study's findings that the fast-paced nature of CBL may overwhelm first-year students. They also highlight the role of strong group dynamics in adjusting challenge levels, which resonates with the collaborative aspect of CBL. Monitoring both students' and teachers' perceptions, as suggested by Haenen et al., (2024) can help tailor programs to better support novice learners, underscoring the need for structured reflection periods identified in this study.

Given that CBL is designed to promote active, real-world problem-solving, the intervention may need to be adapted for first-year learners by incorporating structured reflection periods. These could include guided debriefing sessions or reflective journaling, allowing students time to process their experiences, evaluate their decision-making, and develop critical insights. Kahn (2013) argues that the deliberate use of reflexive practices by tutors, particularly in small group settings, enhances students' capacity for professional growth. In line with this, our results suggest that the CBL approach would benefit from structured reflection opportunities to allow first-year students to process their learning more thoroughly and foster the development of essential professional competencies.

The results about the effect of the CBL intervention on sports management competencies reveal a mixed effect of the CBL intervention on competencies in sports management. Notably, there was a statistically significant decrease in several key competencies, such as organizational skills, adaptability, problem-solving skills, analytical skills, entrepreneurial thinking, teaching skills, and practical sports skills. These declines, particularly in areas like organizational skills ($d=.79$) and adaptability ($d=.33$), raise concerns about the efficacy of CBL in fostering these critical competencies. This decrease may reflect the challenges first-year students face when adapting to the demands of CBL, which emphasises real-time problem-solving and decision-making under pressure. Without adequate foundational skills, students might struggle to keep up with these demands, resulting in diminished performance in competencies that require deliberate practice and structured learning environments (Thistlethwaite et al., 2012).

These decreases should be interpreted cautiously and should not be understood as a direct loss of competence. Given the pre-experimental design and the use of self-reported measures, they may reflect a recalibration of students' self-perceptions after facing authentic professional tasks. For first-year students, CBL may increase cognitive load and make the gap between perceived and required professional competence more visible. Limited prior experience with autonomous learning, project management, and decision-making in real contexts may also have reduced perceived self-efficacy in broad competencies such as organization, adaptability, problem-solving, entrepreneurial thinking, teaching skills, or practical sport skills. In this sense, the intervention may have made students more critical about their abilities while simultaneously strengthening competencies directly practiced during the challenge.

The statistically significant increase in methodological competencies, such as presentation skills ($d=.34$), transfer skills ($d=.82$), and scientific writing ($d=.78$), suggests that CBL has a positive impact on areas related to academic and research-oriented skills. These improvements indicate that the CBL approach effectively encourages students to engage with research processes and improve their communication of complex ideas, which are critical skills for sports management professionals. This aligns with previous studies that highlight how CBL fosters deeper engagement with subject matter and enhances students' ability to synthesise and present information in real-world scenarios (Gurpinar et al., 2013).

Interestingly, the increase in competencies related to business experience, expertise in economics, and legal expertise demonstrates that the CBL intervention was particularly effective in areas directly linked to the practical management of sports organizations. These improvements reflect the real-world

applications of CBL, where students are tasked with solving business and legal challenges, thereby enhancing their ability to navigate complex, industry-specific issues. This aligns with research on how knowledge management and psychological empowerment can improve organizational business performance, as seen in the study by Ekosaputro and Sadikin (2024), which highlights that empowering learners with responsibility and innovation fosters growth in business-related competencies.

CONCLUSIONS

This study examined pre-post changes associated with a Challenge-Based Learning (CBL) on learning styles and professional competencies among first-year sports management students. The findings revealed a significant reduction in the reflective learning style post-intervention, suggesting that the active and intensive nature of CBL may challenge students who rely on introspective learning approaches. While certain competencies such as organizational skills, adaptability, and problem-solving skills decreased, there was a notable improvement in methodological competencies including presentation skills, transfer skills, use of the scientific method, and scientific writing. Additionally, competencies directly related to sports management, such as business experience, economic expertise, and legal knowledge, showed significant enhancement following the CBL intervention.

The results suggest that while CBL may contribute to enhancing certain methodological and industry-specific competencies, educators should be cautious when implementing it with first-year students. To maximise the benefits of CBL, it may be necessary to incorporate structured reflection periods and provide additional support to help novice learners adapt to its demands. Educators should consider blending CBL with traditional teaching methods to balance the development of both practical skills and foundational competencies such as reflective thinking and organizational abilities.

From a practical perspective, these findings suggest that CBL should be introduced progressively in first-year sports management courses. Teachers may consider starting with smaller guided challenges, providing milestone checklists, incorporating structured reflection sessions, and offering formative feedback throughout the process. In addition, assessment rubrics should explicitly connect CBL tasks with the professional competencies expected in sports management. Combining CBL with brief theoretical scaffolding may help novice learners benefit from real-world challenges without experiencing excessive cognitive overload.

It is worth mentioning that the study has some limitations. First, although the one-group pre-test/post-test design is appropriate for examining changes in a real educational context, the absence of a control group limits the possibility of establishing definitive causal conclusions. Therefore, the observed changes should be interpreted as changes associated with the CBL intervention, rather than as effects attributable exclusively to it. Second, the sample size was confined to 52 students from a single institution, which may affect the generalizability of the findings to a broader population. Additionally, the short duration of the intervention and the reliance on self-reported measures could introduce bias and affect the accuracy of the results. The lack of long-term follow-up prevents assessment of the sustained impact of CBL on learning styles and competencies over time.

Future research should explore the long-term effects of CBL on learning styles and competencies across different year levels and institutions. Studies employing a randomised controlled trial design with larger and more diverse samples would strengthen the validity of the findings. Additionally, qualitative research could provide deeper insights into students' experiences with CBL, identifying specific factors that contribute to both the enhancement and decline of certain competencies. Investigating the integration of supportive measures, such as guided reflection, could inform strategies to optimise CBL for learners at various stages of their educational journey.

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The authors report there are no competing interests to declare.

REFERENCES

- Abas, M. C., & Imam, O. A. (2016). Graduates' Competence on Employability Skills and Job Performance. *International Journal of Evaluation and Research in Education (IJERE)*, 5(2), 119–125. <https://doi.org/10.11591/ijere.v5i2.4530>
- Abeza, G., O'Reilly, N., & Braunstein-Minkove, J. R. (2020). Relationship Marketing: Revisiting the Scholarship in Sport Management and Sport Communication. *International Journal of Sport Communication*, 13(4), 595–620. <https://doi.org/10.1123/IJSC.2020-0052>
- Addolorato, S., García-Unanue, J., Gallardo, L., & García-Fernández, J. (2022). Fitness industry business models: from the traditional franchising chain to the fitness boutique. *Podium Sport Leisure and Tourism Review*, 11(1), 1–25. <https://doi.org/10.5585/podium.v11i1.18287>
- Alonso, C. M., Gallego, D. J., & Honey, P. (1997). *Los estilos de aprendizaje: procedimientos de diagnósticos y mejora*. Ediciones Mensajero.
- Barcelona, B., & Ross, C. M. (2004). An Analysis of the Perceived Competencies of Recreational Sport Administrators. *Journal of Park and Recreation Administration*, 22(4), 25–42.
- Barnhill, C. R., Czekanski, W. A., & Pfleegor, A. G. (2018). Getting to know our students: A snapshot of sport management students' demographics and career expectations in the United States. *Sport Management Education Journal*, 12(1), 1–14. <https://doi.org/10.1123/smej.2015-0030>
- Brown, M. M. (2013). *The relationship between learning style and level of sport performance in division II collegiate athletics* [Doctoral Dissertation]. Auburn University.
- Choi, J. S. A., Kim, M., & Park, S. B. R. (2013). Globalising sport management curriculum: An analysis of benefits of a short-term study abroad programme. *International Journal of Sport Management and Marketing*, 14(1–4), 23–38. <https://doi.org/10.1504/IJSM.2013.060638>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioural Science* (2nd ed.). Lawrence Erlbaum.

- Colella, D., & D'Arando, C. (2021). Teaching styles and outdoor education to promote non-linear learning. *Journal of Physical Education and Sport*, 21(1), 507–513.
- Covic, T., Adamson, B., Lincoln, M., & Kench, P. (2003). Health science students' time organization and management skills: a cross-disciplinary investigation. *Medical Teacher*, 25(1), 47–53. <https://doi.org/10.1080/0142159021000061422>
- DeSensi, J. T., Kelley, D. R., Blanton, M. D., & Beitel, P. A. (1990). Sport Management Curricular Evaluation and Needs Assessment: A Multifaceted Approach. *Journal of Sport Management*, 4(1), 31–58. <https://doi.org/10.1123/jsm.4.1.31>
- Eagleman, A. N., & McNary, E. L. (2010). What are we teaching our students? A descriptive examination of the current status of undergraduate sport management curricula in the United States. *Sport Management Education Journal*, 4(1), 1–17. <https://doi.org/10.1123/smej.4.1.1>
- Ekosaputro, A., & Abdurrahman Sadikin. (2024). The Influence of Psychological Empowerment and Knowledge Management Readiness on Organizational Business Performance Mediated by Micro-Innovation. *Open Access Indonesia Journal of Social Sciences*, 7(5), 1718–1731. <https://doi.org/10.37275/oaijss.v7i5.265>
- Fahrner, M., & Schüttoff, U. (2020). Analysing the context-specific relevance of competencies – sport management alumni perspectives. *European Sport Management Quarterly*, 20(3), 344–363. <https://doi.org/10.1080/16184742.2019.1607522>
- Ferkins, L., Shilbury, D., & McDonald, G. (2005). The Role of the Board in Building Strategic Capability: Towards an Integrated Model of Sport Governance Research. *Sport Management Review*, 8(3), 195–225. [https://doi.org/10.1016/S1441-3523\(05\)70039-5](https://doi.org/10.1016/S1441-3523(05)70039-5)
- Gallagher, S. E., & Savage, T. (2023). Challenge-based learning in higher education: an exploratory literature review. *Teaching in Higher Education*, 28(6), 1135–1157. <https://doi.org/10.1080/13562517.2020.1863354>
- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95–105. <https://doi.org/10.1016/j.iheduc.2004.02.001>
- Giel, T., Yamashita, R., Argomand, D., & Hallmann, K. (2022). International sport management education: Curricula, trends, and challenges. In K. Petry & J. de Jong (Eds.), *Education in Sport and Physical Activity: Future Directions and Global Perspectives* (pp. 24–37). Routledge. <https://doi.org/10.4324/9781003002666-4>
- Gurpinar, E., Kulac, E., Tetik, C., Akdogan, I., & Mamakli, S. (2013). Do learning approaches of medical students affect their satisfaction with problem-based learning? *Advances in Physiology Education*, 37(1), 85–88. <https://doi.org/10.1152/advan.00119.2012>
- Haenen, J., Vink, S., Sjoer, E., & Admiraal, W. (2024). Challenge and learning in honours education: a quantitative and qualitative study on students' and teachers' perceptions. *Teaching in Higher Education*, 29(1), 216–232. <https://doi.org/10.1080/13562517.2021.1973408>
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- Honey, P., & Mumford, a. (1992). The Manual of Learning Styles (Maidenhead, Peter Honey Publications). In *The Manual of Learning Styles*. Peter Honey.
- Hums, M. A., Barr, C. A., & Gullion, L. (1999). The Ethical Issues Confronting Managers in the Sport Industry. *Journal of Business Ethics*, 20(1), 51–66. <https://doi.org/10.1023/A:1005951720456>
- Ilundáin-Agurruza, J. (2017). A different way to play: Holistic sporting experiences. In R. Scott Kretchmar (Ed.), *Philosophy: Sport* (pp. 319–343). Macmillan Interdisciplinary Handbooks.
- Kahn, P. (2013). The informal curriculum: a case study on tutor reflexivity, corporate agency and medical professionalism. *Teaching in Higher Education*, 18(6), 631–642. <https://doi.org/10.1080/13562517.2013.774356>

- Kelley, D. R., Beitel, P. A., DeSensi, J. T., & Blanton, M. D. (1994). Undergraduate and Graduate Sport Management Curricular Models: A Perspective. *Journal of Sport Management*, 8(2), 93–101. <https://doi.org/10.1123/jsm.8.2.93>
- Khan, I. A., Zeb, A., Ahmad, S., & Ullah, R. (2020). Relationship Between University Students Time Management Skills and Their Academic Performance. *Review of Economics and Development Studies*, 5(4), 853–858. <https://doi.org/10.26710/reads.v5i4.900>
- King, R. (2009). Governing universities globally: Organizations, regulation and rankings. In *Governing Universities Globally: Organizations, Regulation and Rankings*. Edward Elgar Publishing. <https://doi.org/10.1080/13603101003780350>
- Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning and Education*, 4(2), 193–212. <https://doi.org/10.5465/AMLE.2005.17268566>
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2014). Experiential learning theory: Previous research and new directions. In D. A. Kolb, R. E. Boyatzis, & C. Mainemelis (Eds.), *Perspectives on Thinking, Learning, and Cognitive Styles* (pp. 227–247). Routledge. <https://doi.org/10.4324/9781410605986-9>
- Lee, A., Williams, R. D., Shaw, M. A., & Jie, Y. (2014). First-year students' perspectives on intercultural learning. *Teaching in Higher Education*, 19(5), 543–554. <https://doi.org/10.1080/13562517.2014.880687>
- Light, R., & Dixon, M. A. (2007). Contemporary Developments in Sport Pedagogy and their Implications for Sport Management Education. *Sport Management Review*, 10(2), 159–175. [https://doi.org/10.1016/S1441-3523\(07\)70009-8](https://doi.org/10.1016/S1441-3523(07)70009-8)
- Lowther, M., Digennaro, S., Borgogni, A., & Parry Lowther, A. (2016). Exploring and Establishing a Framework For Effective Governance in European Grassroots Sports Organisations. *Journal of Applied Sport Management*, 8(1), 80–104. <https://doi.org/10.18666/JASM-2016-V8-I1-6234>
- Miragaia, D. A. M., & Soares, J. A. P. (2017). Higher education in sport management: A systematic review of research topics and trends. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 21, 101–116. <https://doi.org/10.1016/j.jhlste.2017.09.001>
- Moon, J. A. (2013). A handbook of reflective and experiential learning: Theory and practice. In *A Handbook of Reflective and Experiential Learning: Theory and Practice*. Routledge Falmer. <https://doi.org/10.4324/9780203416150>
- Pedersen, P. M. (2011). *Contemporary Sport Management*. Human Kinetics.
- Peters, D., Jones, G., & Peters, J. (2008). Preferred 'learning styles' in students studying sports-related programmes in higher education in the United Kingdom. *Studies in Higher Education*, 33(2), 155–166. <https://doi.org/10.1080/03075070801916005>
- Prensky, M. (2001). Digital Natives, Digital Immigrants Part 2: Do They Really Think Differently? *On the Horizon*, 9(6), 1–6. <https://doi.org/10.1108/10748120110424843>
- Shields, S. (2015). 'My work is bleeding': exploring students' emotional responses to first-year assignment feedback. *Teaching in Higher Education*, 20(6), 614–624. <https://doi.org/10.1080/13562517.2015.1052786>
- Shreffler, M. B., Cocco, A. R., Presley, R. G., & Police, C. C. (2019). Testing the Learning Styles Hypothesis: An Assessment of the Learning Styles, Learning Approaches, and Course Outcomes in the Sport Management Classroom. *Sport Management Education Journal*, 13(2), 83–91. <https://doi.org/10.1123/smej.2019-0028>
- Siedentop, Daryl D., Hastie, P. A., Van der Mars, H., & Mars, ans Van Der. (2011). Complete guide to Sport Education. In *IL Human Kinetics* (Vol. 148). Human Kinetics.
- Skinner, J., & Gilbert, K. (2007). Sport Management Education: Teaching and Learning for the Future. *Sport Management Review*, 10(2), 125–131. [https://doi.org/10.1016/S1441-3523\(07\)70007-4](https://doi.org/10.1016/S1441-3523(07)70007-4)

- Stryukov, V., & Hromtseva, O. (2019). Analysis of key competences in vocational education. *Journal of Scientific Papers "Social Development and Security,"* 9(5), 94–109. <https://doi.org/10.33445/sds.2019.9.5.6>
- Swanson, S., Billsberry, J., Kent, A., Skinner, J., & Mueller, J. (2020). Leader prototypicality in sport: The implicit leadership theories of women and men entering sport management careers. *Sport Management Review,* 23(4), 640–656. <https://doi.org/10.1016/j.smr.2019.08.002>
- Tang, Y., Zhang, S., Sun, M., Wen, Y., An, S., & Liu, Q. (2023). Understanding student teachers' reflective thinking using epistemic network analysis and fine-grained trace data. *Thinking Skills and Creativity,* 48, 101301. <https://doi.org/10.1016/j.tsc.2023.101301>
- Teodora, T. I. (2020). Sports center management: competence structure model for sport managers. *Sport and Society,* 20(2), 2–7. <https://doi.org/10.36836/2020/2/6>
- Thistlethwaite, J. E., Davies, D., Ekeocha, S., Kidd, J. M., MacDougall, C., Matthews, P., Purkis, J., & Clay, D. (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Medical Teacher,* 34(6), e421–e444. <https://doi.org/10.3109/0142159X.2012.680939>
- Tortora, M. (2017). *Grassroots Sustainability Innovations in Sports Management: Emerging Research and Opportunities: Emerging Research and Opportunities.* IGI Global.
- Wohlfart, O., Adam, S., García-Unanue, J., Hovemann, G., Skirstad, B., & Strittmatter, A.-M. (2020). Internationalization of the Sport Management Labor Market and Curriculum Perspectives: Insights From Germany, Norway, and Spain. *Sport Management Education Journal,* 14(2), 129–141. <https://doi.org/10.1123/smej.2019-0046>