

A pedagogical model for learning to teach wheeled sports: Perspectives from students on the Bachelor's degree in Sport

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ABSTRACT

Introduction: This study integrated methodological theories derived from general and sports pedagogy, focusing on the training process for future physical education teachers. **Objective:** To analyse the perceptions of students in the Bachelor of Sports Science program at the National Pedagogical University (UPN) regarding the implementation of the “*Wheel of knowledge*” teaching model. **Methodology:** This project employed a qualitative approach with a hermeneutic design, allowing for the understanding and interpretation of the categories of the didactic model and the process of learning to teach the sports of roller skating, figure skating, skateboarding, and inline hockey. The study was conducted using convenience sampling, with the participation of 50 third-semester students from the Sports Program at the National Pedagogical University (UPN). **Instrument:** An ad hoc questionnaire was designed and administered, consisting of 20 open-ended questions organized into two categories: a) teaching model and b) “*Learning to teach wheeled sports*.” The instrument was assessed using expert judgment and analysed using Kendall's coefficient ($W = .78, p < .05$), revealing significant consensus and strong expert agreement. **Results:** The analysis revealed that teacher candidates view the “*Wheel of knowledge*” instructional model as a pedagogical alternative for structuring instructional mediation in wheeled sports. The discourse analysis identifies the dimension of teaching action and implementation as the transformative axis of pedagogical practice, where traditional methodologies can be combined through strategies mediated by creativity and the specific reconfiguration of teaching.

Keywords: physical education; teaching methods; pedagogy; student perception; teacher training; wheeled sports.

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INTRODUCTION

When we consider a pedagogical model as a space for ongoing reflection and inquiry into the process of learning to teach sports, this is where the theoretical contribution of the present study becomes significant, drawing on the perspectives of various authors, general pedagogy, and the field of sports. Midoul et al. (2026) and Hernández et al. (2019) emphasize that the process of learning to teach does not focus solely on teacher-directed content but is also nourished by shared experiences, enabling students to discover ways to transform the studied content and apply it to a specific context. Hoyos (2024) proposes transforming knowledge acquisition based on the concept of pedagogy, stating that pedagogy is the tool that addresses not only how to teach but also what to teach.

Martin et al. (2026) and Juvera et al. (2021), based on physical education teachers' perceptions, determined the importance of implementing new teaching methods tailored to the specific needs of sports and physical education. Hoyos (2022) highlights the constant interaction between what teachers think, what students want to learn, and the content deemed necessary. In the specific case of students in sports education, they must be attuned to selecting and implementing decisions in their learning processes that allow them to transform their role as teachers from a perspective of analysis and interaction with the subject matter.

Chang et al. (2026) and Morón et al. (2024) address the need to identify a more effective instructional planning process that enhances students' holistic education. The specific objective was to assess learning preferences according to the four quadrants (assimilative, divergent, convergent, and accumulative) and based on this, to design personalized strategies to optimize teaching. Luna (2019) describes a study on the formative assessment of a university educational model. By combining various methodological techniques, administering large-scale questionnaires, and focusing on identifying critical elements, this makes it an essential tool for managing educational quality and relevance in the university setting.

In their study, Brasó et al. (2023) analyse the impact of a course and propose a training model based on perceptions of competencies and teaching strategies. Medina et al. (2020) propose developing tools to evaluate the teaching process; the purpose of the text revolves around validating a scale that allows for reflection on the peer teaching-learning process in the technical and tactical models of sport. For their part, Cisternas et al. (2023) note that physical education teacher training should focus on the fields of didactics, pedagogy, and the specific practices of various sports disciplines.

From this perspective, López (2025) establishes a teaching system with a greater theoretical and less practical component for the various aspects of sports. Olvera and Fernández-Morales (2021) emphasize that, for teaching sports, traditional teaching models can be used more frequently than approaches based on meaningful learning and shared classrooms. For their part, Pizarro et al. (2024) established a program based on the comprehensive teaching model to improve the motivation of hockey players, while the study by Brasó et al. (2023) focused on developing teaching units for physical education teacher training, based on the experiences of students guided by educational research.

Amorim and Ribeiro-Silva (2022) reflect on teacher training in physical education, defining a desirable teacher profile for their professional work. Similarly, López et al. (2020) designed a new method for evaluating content through an approach that incorporates teamwork and the actual implementation of a teaching practice. Following this approach, Manso et al. (2021) developed a proposal based on Goubak, which refers to the integration of alternative sports. This study invites the identification of new methodologies for integrating the teaching and learning processes specific to physical education and sports.

Findings from studies related to didactic models as a means of learning to teach sports provide a starting point for generating proposals in the field of wheeled sports, specifically in the training of future graduates, equipping them with the skills and abilities to adapt relevant knowledge to different sports contexts. This leads to the central objective of this research: to analyse the perceptions of students in the Bachelor's Degree in Sports regarding the implementation of the teaching model, "*Wheel of knowledge*."

METHODOLOGY

This qualitative study, based on a hermeneutic design, included 50 undergraduate students in the Sports Studies program at the National Pedagogical University: 15 women between the ages of 18 and 19, and 35 men between the ages of 19 and 21. The sampling method was purposive, as the participants were already enrolled in the academic program. The study adheres to the ethical principles set forth in UPN Resolution 1642 of 2018 and the UNESCO Declaration on Bioethics and Human Rights; thus, this research complied with the principles of human dignity and human rights, posed no harm to the participants, who agreed to participate, and signed an informed consent form that informed the participant of all procedures and the use of data solely for academic purposes.

Instrument

An ad hoc questionnaire consisting of 20 open-ended questions was designed and administered. These questions were strategically grouped into two key categories: a) teaching model, which addressed aspects such as pedagogy and the implementation of the model; and b) learning to teach wheeled sports, which focused on the dimensions of creativity, transformation, and support.

Validation was conducted through systematic evaluation by a panel of 15 experts, 8 of whom held a Ph.D. in Education or Physical Activity and Sports Sciences, 6 held a master's degree in Didactics, Pedagogy, or Sports Sciences, and 1 was a national-level skating coach.

The validation criteria used by the experts included: relevance of the categories, conceptual clarity, pedagogical coherence, adequacy of items, and alignment with the research objectives. The Content Validity Index (CVI) analysis was performed using the ja.Moví software, version 2.7, to measure the degree of agreement among the 15 experts regarding the relevance of the items.

The structure of the questionnaire (20 items) was analysed. The I-CVI indicated that 95% of the items obtained a value of 1.0, reflecting unanimous agreement among the 15 experts regarding their clarity and relevance. The remaining items reached an index of .93, and the scale-level content validity index met the .95 criterion, indicating strong content validity for measuring perceptions regarding the implementation of the "*Wheel of knowledge*" model. Kendall's W concordance analysis was used to assess the degree of agreement among experts in their ratings. The resulting W value was .78, indicating strong expert agreement.

To ensure transparency, scientific replicability, and open access, the final version of the questionnaire and its corresponding application guide are available in the institutional repository of Cuauhtémoc University under the title of the doctoral dissertation (Perception of a Didactic Model for Teaching Wheeled Sports) or by sending a request to the authors' email addresses.

Structure of the "Wheel of knowledge" teaching model

The "*Wheel of knowledge*" teaching model is the result of the doctoral dissertation mentioned above. It integrates teaching theories, pedagogical principles of sport, and strategies designed to facilitate the learning

of content specific to wheeled sports, such as roller hockey, skateboarding, and roller skating. This framework is detailed in Table 1.

Table 1. Structure of the instructional model (Wheel of Knowledge).

Component	Characterization (M.D.)	Interaction (M.IN.)	Implementation (M.IP.)	Transformation (M.T.) and Assessment (M.E.)
General Instructional Models	Active, Socratic	Integrative, Collaborative	Mastery Learning, Technological Perspective	Communicative-Interactive
Teaching Models and Principles (Sports)	Personal and Social Responsibility	Collaborative Learning and Adaptation	Skill-Based Instruction, Progression	Comprehensive Education, Conscious Participation
Learning Theories and Teaching Styles	Cognitive; Assignment	Task Constructivist; Guided Discovery	Comprehensive; Problem-Solving	Comprehensive; Metacognition
Phase Explanation	Setup Phase In this phase, the student-teacher becomes familiar with sports that share the use of the wheel. Sessions are structured around guiding questions following the Socratic model and focus on creating initial learning scenarios that foster trust and interaction. Students participate in instructor-guided exercises, identifying key instructional elements such as postural alignment, falling techniques, movement execution without and with equipment, use of the stick, and unstable bases. Video analysis activities are also conducted to promote reflection on movement execution and learning processes.	Introductory Phase Students begin learning how to teach through the exploration of wheeled sports. Research activities and collaborative discussions encourage them to analyse the evolution of these sports and identify appropriate teaching elements. Through integrative and collaborative models, students design artifacts such as functional skateboard prototypes and develop teaching strategies based on collaborative learning, teamwork, and adaptation.	Foundation Phase In this phase, students consolidate teaching processes through comprehensive learning. They study the technical fundamentals of various wheeled sports, including figure skating, skateboarding, and hockey. Theoretical content is examined before practical application, enabling students to identify and understand each technical element through skill-based instruction and progressive learning.	Specialization Phase The student-teacher applies the knowledge acquired throughout the program, focusing on the process of learning to teach. Communication strategies, comprehensive instruction, experiential learning, lesson planning, content organization, and sports festival management are integrated into practice. The emphasis is placed on demonstrating the ability to teach wheeled sports effectively while promoting active student participation and reflective learning.

The “*Wheel of knowledge*” instructional model is designed to structure the process of learning to teach wheeled sports by recognizing teaching as a continuous cycle. Its elements are not treated in isolation; rather, each component contributes to linking experiences that reflect the progression of learning. The conceptual foundation of the model was established based on the methodological work of Olguín et al. (2025) on how to implement teaching strategies in educational settings.

The “*Wheel of knowledge*” model differs from other proposals for sports instruction in that it integrates the teaching of technical elements with the creation of supportive learning environments, achieved by identifying students’ prior knowledge with the aim of consolidating and transforming it (Rodríguez et al., 2023). The

“*Rueda el saber*” model posits that the teaching-and-learning process involves giving pre-service teachers the opportunity to become agents who constantly analyse and reflect on their role as future educators, transforming their motor experiences into a setting for constructing meaningful learning relevant to their role as teachers (Hoyos, 2024).

Table 2. Comparison of the “*Wheel of knowledge*” model vs. instructional models.

Teaching/Instructional model	Main approach	Teacher's role	Future Teacher's role	Similarities and differences with the “ <i>Wheel of knowledge</i> ”
Global / Analytical (Hoyos, 2012)	Repetition of analytical technical movements and automation of sports techniques.	Direct instruction, demonstration of the technique, and correction of errors.	Future teachers practise technical skills and progressively master the sport's techniques.	Difference: The analytical model requires a progression from basic movement patterns to more complex technical execution. “ <i>Wheel of knowledge</i> ” uses the technique as a means of constructing an analysis and teaching the athletic movement.
Comprehensive / Tgfu (Harvey, 2006; Pizarro et al., 2024)	Tactical understanding and decision-making through simplified game situations.	Tactical problem facilitator and Socratic questioner.	An active contributor to solving tactical problems in the game.	Similarity: Both use guided discovery. Difference: TGFU focuses on game tactics. The “ <i>Wheel of knowledge</i> ” model focuses on learning to teach by understanding the physical, technical, and tactical aspects of wheeled sports.
Physical Education (MED) (Siedentop, 1994)	Experiencing different roles in sports (referee, coach, captain) during actual seasons.	Organizer, guide, and environmental manager.	An active role assigned within a sports team.	Similarity: Collaborative work and hands-on experience with the competency-based system through festivals. Difference: MED focuses on general sports culture; “ <i>Rueda el saber</i> ” develops teachers' instructional competencies.
Personal and Social Responsibility. (TPSR) (Hellison, 1983)	Development of social-emotional values, autonomy, and behavioural self-regulation.	An ethical guide who fosters opportunities for reflection and autonomy.	An individual who is self-regulated and shares responsibility for their environment.	Similarity: Training in values and assertive communication. Difference: TPSR prioritizes social behaviour; “ <i>Wheel of knowledge</i> ” balances human values and sports education.
“ <i>Wheel of knowledge</i> ” (Vera-Rivera, 2026)	Learn how to teach wheeled sports by integrating general and sports-specific teaching methods.	Mediator, collaborator, and facilitator of knowledge.	A builder of knowledge, a creator of resources, and a mentor to learners.	Holistic Integration: It synthesizes the best of each approach and introduces the transformation of knowledge through performance.

The “*Wheel of knowledge*” model offers a continuous learning process organized into four stages: Assessment: This stage identifies students' strengths and weaknesses in relation to wheeled sports. It aims to build confidence through activities with a Socratic approach (questions and assessment worksheets) and basic motor exploration (sensory activities). Students' prior knowledge is assessed to help them progress from simple to complex concepts. Next comes the Interaction phase: this promotes collaborative work and

inquiry, based on guided discovery to understand the dynamics of wheeled sports and facilitate motor adaptation to each sport. Implementation: Focused on learning through problem-solving. It uses comprehensive instruction and active feedback to consolidate technique through methodological progressions. Transformation: This represents the culmination of the model's metacognitive process. The teacher-in-training transfers and transforms knowledge into their actual practice as an instructor, consolidating their professional identity; reflection on their role is expected. This approach proposes recognizing errors or doubts as inputs for learning, stimulates the capacity for innovation in the design of teaching environments, and promotes the transfer of teaching competencies to real-world educational settings in the field of teaching wheeled sports.

The “*Wheel of knowledge*” model contributes to the training of future physical education teachers through an ongoing learning environment where the future educator and the model's facilitator continuously analyse interaction and reflection. The model seeks to go beyond the learning of technical elements of roller skating, skateboarding, and inline hockey by fostering critical thinking, self-assessment, and pedagogical application. This dynamic fosters what Sánchez et al. (2022) define as learning experiences generated through emotions and interactions with the environment, allowing the future graduate to question their theoretical preconceptions, identify flaws in verbal and nonverbal communication, and independently restructure their lesson plans. Consequently, the teacher in training develops a professional profile characterized by empathy and methodological flexibility in the face of error or doubt.

Table 3. Transferring the “*Wheel of knowledge*” model to other sports and paralympic contexts.

Context / Sports setting	Purposes of the model	Characteristics of the model
Conventional Sports on Wheels (Skating, Skateboarding, Hockey)	Postural control on unstable surfaces (tubes, bottles, canes, mats, boxes, cushions, balls), techniques for falling while in motion, propulsion and braking using specific equipment, and the use of a stick and a board.	sequential progression, from setting the stage to specialization, self-creation of teaching materials, video analysis of postural movements, and socio-emotional mediation.
Ball Sports	Use of movement analysis for technical correction, based on the Socratic method, and the development of tactics in real game situations.	Structure based on instructional moments (MD, MIN, MIP, MT, ME), use of Comenius's triad (Teacher-Student-Content), and formative and shared assessment.
Paralympic Wheeled Sports (Wheelchair Basketball, Rugby, Tennis, Wheelchair Track and Field, Para cycling).	Controlling the centre of gravity in a sports wheelchair, propulsion techniques, emergency braking, manoeuvrability, and leaning with the wheelchair, understanding each player's role based on the nature of the sport.	Adaptation of the familiarization phase to facilitate interaction with the chair as an extension of the body, balance awareness, and educational principles of responsibility and conscious participation.

RESULTS AND DISCUSSION

The analysis process was guided by a hermeneutic design for interpreting students' perceptions, following a sequence of defined stages outlined by López (2002), which includes the selection of units of analysis, the coding of information, categorization according to dimensions, and finally the interpretation of the results of participants' perceptions in light of the implementation of the “*Wheel of knowledge*” teaching model.

Figure 1 illustrates the transition from the preliminary understanding of perceptions to the explicit articulation of emerging categories, resulting from the analysis and interpretation of participating students' assessments of the “*Wheel of knowledge*” model.

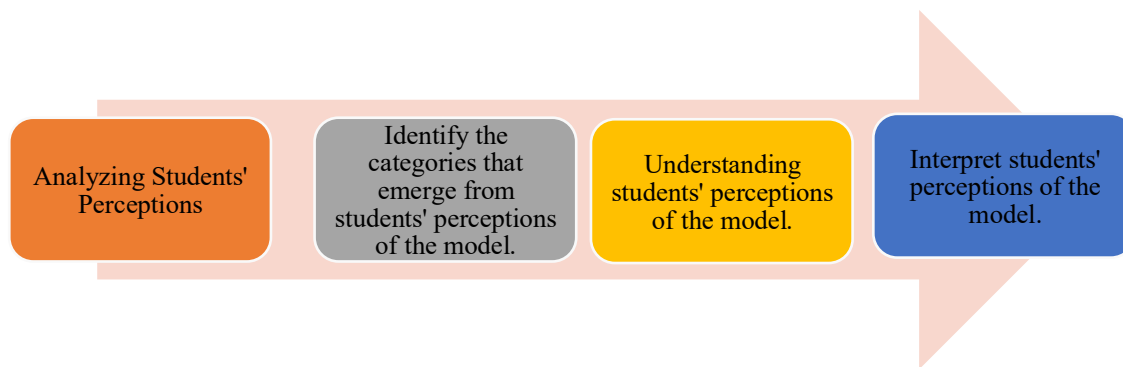


Figure 1. Hermeneutic design phase.

To comply with the interpretive scope, as explained in Figure 1, the process included the selection of units of analysis, the coding of information, categorization according to dimensions, and finally the interpretation of the results regarding perceptions of the implementation of the “*Wheel of knowledge*” teaching model. The following sections present the steps carried out using the hermeneutic technique developed in the following stages:

- a) Pattern identification: This involves tracking information related to the subject of study, counting the selected responses in relation to the categories, and then identifying the code.
- b) Coding: The categories of analysis identified in the students’ responses were assigned specific colours to guide the identification of codes generated with Atlas.ti 24.
- c) Comprehension: This involves synthesizing the category analysis, followed by determining the participating students’ perceptions of the model and what it contributes to the process of learning to teach wheeled sports.
- d) Interpretation: At this stage, the participants’ perceptions are interpreted using the interpretive exercise provided by Atlas.ti 24, followed by the connections between each of the students’ responses and the categories “*didactic model*” and “*learning to teach wheeled sports*.”

Coding procedures

The qualitative analysis was conducted using Atlas.ti 24 software through a three-phase hermeneutic process: a) selection of units of analysis from the ad hoc questionnaire and document matrix; b) deductive and deductive-emergent coding, assigning codes to the central categories: Didactic Model (Code MED) and Learning to Teach (Code PAAE); and c) axial categorization, establishing semantic networks of density and interconnection among dimensions (Didactics, Implementation, Learning, Teaching) and subdimensions (Creativity, Transformation, Support).

Information triangulation

A triangulation of sources and methods was applied, comparing: a) the discursive perceptions of the 50 student teachers collected via the questionnaire; b) the document analysis matrix; and c) the practical teaching evaluations and field observation protocols recorded in session logs and photographic/video-graphic evidence.

To ensure the rigor of the qualitative research, care was taken to ensure that: a) the implementation of the model with participants in the field over 16 weeks and 32 sessions was carried out directly by one of the researchers; b) the credibility of the findings was supported through expert review and the use of representative verbatim quotes; c) a meticulous record was kept in the field journal; and d) data were stored in coded folders to preserve the participants’ identities.

Results for the “teaching model” category

This section presents an analysis of perceptions regarding the “*Teaching model*” category, based on student responses. The semantic network visualizes the most significant relationships that emerge from student discourse regarding the elements that compose and structure the teaching model discussed during the course. Using Atlas.ti 24, thematic clusters, recurring phrases, and significant links were identified, reflecting how students understand, interpret, and internalize the fundamentals of the proposed model for teaching wheeled sports.

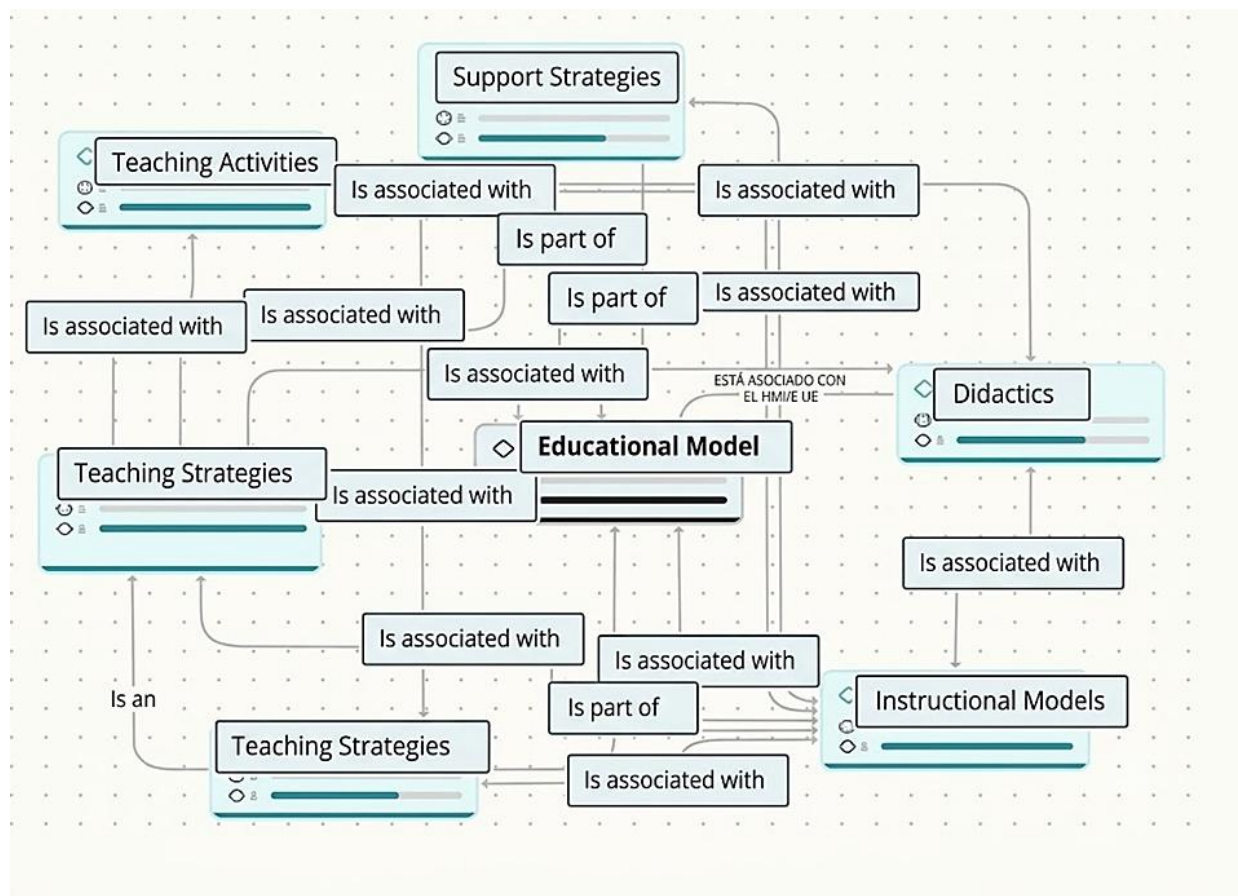


Figure 2. Analysis of perceptions regarding instructional models.

Figure 2 highlights the detailed relationships within the network of dimensions generated using Atlas.ti 24. It demonstrates how teaching strategies emerge in close connection with support strategies, forming a conceptual framework in which teaching practice and the instructional model are integrated as elements for the development of meaningful teaching learning experiences. The category “*teaching model*,” in conjunction with the dimensions of model implementation and teaching practice, reflects how these aspects do not operate in isolation but rather through constant dialogue and joint construction. According to the perception of the student teachers, they recognize the implementation of the “*Wheel of knowledge*” teaching model as an organized, coherent, and relevant framework for approaching the teaching of wheeled sports.

The implementation of the “*Wheel of knowledge*” model requires not only a clear conceptual structure but also intentional teaching practice that combines creative strategies with appropriate didactic principles, adapted to the specific characteristics of the sports being studied. Figure 2 illustrates how the students

participating in the study directly associate teaching methods with the implementation of the “*Wheel of knowledge*” teaching model. This association is reflected in the connection that emerges between the methodological strategies used in class and the proposed teaching models, where a close relationship is perceived between teaching practice and instructional strategies, including those oriented toward formative support. Thus, the teacher’s pedagogical practice is understood as a systematic construction that incorporates relevant resources, clear timelines, and opportunities for constant feedback.

The category “*teaching model*” detailed in Figure 2 is understood by students as a process that integrates practical and recreational activities with support strategies, enabling an experiential approach to disciplines such as hockey, skateboarding, and roller skating. Participants highlight the importance of class organization, content distribution, the pedagogical intent of each activity, and the active role they play in the process. This semantic network thus demonstrates that students not only recognize the components of the model but also interpret its application as a coherent, effective educational experience centred on the development of their competencies as future physical education teachers.

To support the analysis, direct quotations taken from the statements of the 50 UPN students (Students 1 through 50) were included and organized according to the analytical categories and dimensions listed below. Some of the perceptions are presented as follows:

Category 1: Teaching Model (Dimensions: Pedagogy, Teaching Practice, Student Support)

- Quote 1.1 (Student 5): *“First of all, the class provided a foundation for sports practice with teaching tools that made learning easy... The professor uses various teaching methods, such as ball games and circuit training, to encourage active participation from the group.”*
- Quote 1.2 (Student 1): *“I liked the way she used teaching methods to spark our creativity and employed various strategies to show us, for example, the correct way to teach hockey... In class, I really liked the explanation of each exercise.”*
- Quote 1.3 (Student 8): *“The teacher is always respectful both inside and outside the classroom. She guides and directs each process; in my case, she always supported me with the equipment (skates) since it made me afraid, providing active feedback.”*
- Quote 1.4 (Student 50): *“I feel that the class gave me much more than I expected—not just materials, strategies, lesson plans, and pedagogy... but it also enriched me emotionally, in my soul, and in my heart.”*

Results for the category “*learning to teach wheeled sports*”

The “*learning to teach wheeled sports*” category focuses on the relationships revealed by the network of dimensions generated using Atlas.ti 24. It shows how the dimension of creativity is directly associated with the teaching phases proposed within the didactic model, highlighting that such creativity becomes a fundamental alternative for stimulating the process of learning to teach wheeled sports. This finding is illustrated in Figure 3, showing that the “*Wheel of knowledge*” didactic model not only generates a content structure but also stimulates the development of innovative teaching proposals by students.

In this regard, the category “*the process of learning to teach wheeled sports*” highlights how future teachers recognize and value their training experience within the framework of the implemented model. Finally, it is acknowledged that the training process is not limited to the acquisition of technical knowledge, but also involves a connection to the student’s attitude, commitment, and willingness to participate in the environments proposed by the model. This leads to the conclusion that teacher training within the “*Wheel of knowledge*”

model is oriented toward the reflective, participatory, and creative construction of pedagogical knowledge in sports.

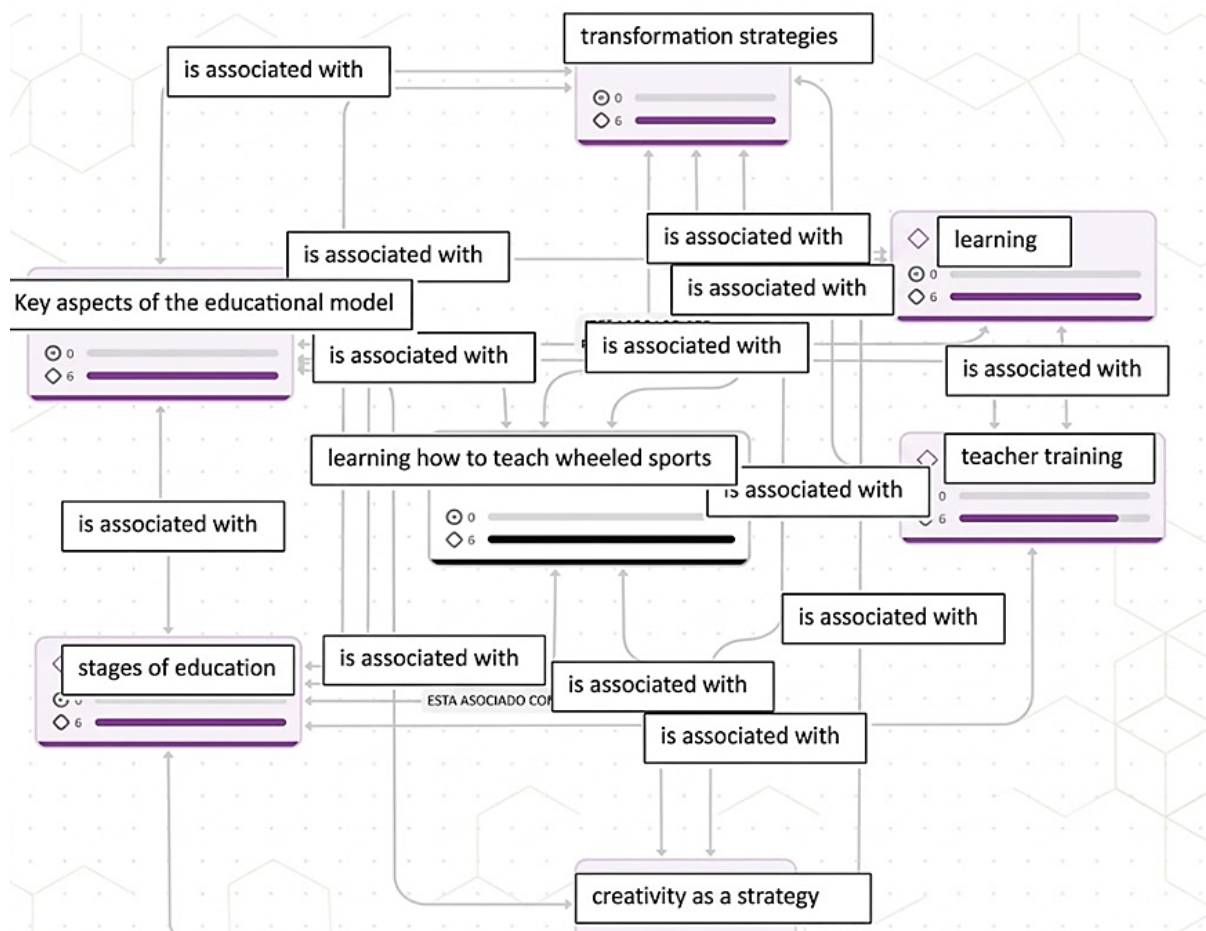


Figure 3. Analysis of perceptions regarding the “*learn to teach wheel sports*” model.

The process of learning to teach is understood as an intentional and structured scenario that enables the progressive development of skills aimed at transmitting and mediating specific content or topics. Thus, the interaction between teaching methods and practical classroom scenarios fosters a broader understanding of the content and allows future sports education graduates to integrate knowledge, values, and skills to build their role as teachers. From the students' perspective, there is a connection that helps identify the process of learning to teach wheeled sports through methodologies and activities that involve teaching from the simplest to the most complex, integrating specific knowledge from each of the sports disciplines: skating, hockey, and skateboarding. Broadly speaking, there is evidence of a shared understanding of the teaching process as a transformative and enriching space, both conceptually and experientially.

Figure 3 illustrates how students are able to establish meaningful connections between the process of learning to teach wheeled sports and various elements related to creativity, understood as a key strategy for facilitating learning while simultaneously laying a solid foundation for the transformation of acquired knowledge. Based on the analysis conducted, it is highlighted that students not only recognize the content of the implemented educational model but also identify that its structure incorporates the instructional moments

defined in the model and aligns with the phases of sports instruction, encouraging them to create and apply teaching methodologies appropriate to a given context.

Below are some of the insights from: Category 2: Learning to Teach Wheeled Sports (Dimensions: Learning, Transformation, Creativity).

- Quote 2.1 (Student 6): *"It was very interesting that we, as teachers in our academic settings, were encouraged to seek out this creative alternative so we could develop our own materials (making skates and sticks)."*
- Quote 2.2 (Student 14): *"I feel that from the very first day, the instructor was charismatic and respectful of our different backgrounds... She takes the time to observe each of us individually to teach us the importance of personal growth, focusing more on technique."*
- Quote 2.3 (Student 18): *"In this age of technology, learning to conduct observational work using technological tools (such as recording one's posture on a cell phone) is a necessary skill that this course provided."*
- Quote 2.4 (Student 1): *"This teaching model applied by the teacher not only successfully taught us how to use or put these tools into practice but also allowed us to absorb her knowledge so that we could learn to teach our own students."*

To complement the triangulation process, this study combined student perceptions with three practical field assessment instruments:

1. Postural and video observation protocols:

During the Diagnostic and Interaction Sessions, biomechanical observation templates were used to assess the students' performance. Analysis using mobile devices allowed for a comparison of the student's self-perception with the observed technical execution, regarding qualitative improvements in each movement, the identification of starting posture, gliding, and the stability of the centre of gravity on wheels.

2. Practical assessments based on teaching competencies (experiential classes):

In the Specialization Phase, each teacher in training enrolled in the Bachelor of Sports Science program completed the process of learning to teach wheeled sports by conducting an actual teaching session with an assigned learner. The future teacher's performance was evaluated using a matrix of pedagogical competencies: a) mastery of technical and didactic language; b) management of the learner's physical and emotional safety; c) methodological progression from simple to complex tasks; and d) warmth and empathy in formative feedback.

3. Integrated triangulation matrix:

The findings showed convergence between the prospective teachers' self-reported confidence in the questionnaire and the pedagogical effectiveness observed in the teaching practicum. Those who reported a high impact in the creativity dimension also designed notable teaching variations during the performance at the *"Rueda el saber"* Festival, suggesting that the model helped transform theory into professional practice.

This establishes a link to the study by Olvera and Fernández-Morales (2021). Their findings reveal the persistence of traditional teaching models and, to a lesser extent, the implementation of innovative approaches such as meaningful learning and shared classrooms. Both studies agree on the importance of reforming teacher-training processes to meet contemporary educational demands. A significant dialogue was found with the research by Moreno et al. (2024), who analysed teachers' conceptions of physical education oriented toward the student's holistic development. Both studies agree on the importance of rethinking

teacher training, not only from a technical perspective but also from a human, affective, formative, and ongoing support perspective. This study incorporates a complementary perspective from Saraví (2019) research, which examines the construction of professional and academic identity in skateboarding. Although focused on a specific sport, the study provides key insights into the role of professional training in emerging and alternative disciplines, highlighting the need to strengthen the competencies of those who take on roles as coaches or trainers. This line of analysis aligns with the findings of this research, as it proposes a pedagogical model that focuses not only on the technical instruction of roller sports but also on the development of a teaching profile with a professional, pedagogical, and social vision.

Cisternas et al. (2023), who, through a review, identified key elements in the development of physical educators' professional identity. While this research proposes a training framework based on pedagogical practice and the use of teaching strategies applied to wheeled sports, the study emphasizes that teaching identity is progressively shaped through meaningful training experiences. Both studies agree that pedagogical practices are fundamental to consolidating the role of the future teacher, not only in terms of technical knowledge but also in terms of their social, personal, and professional dimensions. A point of convergence is established with the study by González and Abad (2023), who examine artistic-visual and digital learning in figure skating within higher education. Both works, although from different perspectives, agree on the need to integrate new methodological strategies that enrich the training of sports professionals. While this study proposes a pedagogical model with a specific focus on developing teaching competencies in roller sports, it highlights the importance of incorporating digital, visual, and artistic elements into instruction, aiming for a more comprehensive education. Last but not least, the research by Manso et al. (2021), who developed an innovative proposal based on the alternative sport Goubak as a collaborative strategy in the initial training of physical education teachers. This convergence demonstrates that the use of teaching models centred on practical and collaborative experiences not only improves teaching performance but also addresses contemporary challenges in physical education, broadening the methodological and pedagogical scope of future professionals.

CONCLUSIONS

Through an analysis of the implementation of the "*Wheel of knowledge*" teaching model, it became evident how pedagogical practice can be adapted and enriched by designing learning environments that foster active participation and the acquisition of knowledge through experience. This research promotes the development of specific knowledge related to sports instruction, with an emphasis on the disciplines of roller skating, skateboarding, and inline hockey, approached not only from a technical perspective but also from a didactic and formative one.

Looking ahead to future work, we propose conducting a systematic follow-up on the implementation of the "*Wheel of knowledge*" teaching model, with the aim of formally integrating it as a curricular strategy within the curriculum for training future physical education teachers. This integration would help consolidate pedagogical processes that are more relevant and better adapted to the realities of today's sports environment. From there, this research opens the door to developing new lines of inquiry in university settings, school environments, and the field of sports training.

Another line of research emerging from this study focuses on evaluating the transfer of the didactic principles and strategies of the "*Wheel of knowledge*" teaching model to other sports contexts that share similar functional characteristics, such as Paralympic sports, which are also played on wheels. This proposal would allow for an analysis of how the model's methodological foundations can be adapted to specific scenarios,

opening the door to the possibility of conducting comparative studies that contrast the application of the teaching model with other content areas.

AUTHOR CONTRIBUTIONS

All authors meet the criteria for authorship in accordance with established ethical guidelines. Contributions are specified according to the CRediT (Contributor Roles Taxonomy) as follows:

Conceptualisation: Diana Andrea Vera Rivera. Methodology: Luz Amelia Hoyos Cuartas, Diana Andrea Vera Rivera. Formal analysis: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas. Investigation: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas. Data curation: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas. Writing – original draft: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas. Writing – review & editing: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas. Supervision: Diana Andrea Vera Rivera, Luz Amelia Hoyos Cuartas.

All authors have critically reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

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