

EXPLORING BELIEFS ABOUT TEACHING SPORTS: AN APPROACH TO CONCEPTUAL CHANGE IN TEACHER EDUCATION

EXPLORANDO AS CRENÇAS SOBRE O ENSINO DOS ESPORTES: ABORDAGEM DA MUDANÇA CONCEITUAL NA FORMAÇÃO INICIAL 

EXPLORANDO CREENCIAS SOBRE LA ENSEÑANZA DEPORTIVA: ENFOQUE DEL CAMBIO CONCEPTUAL EN LA FORMACIÓN INICIAL 

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Abstract: The study analyzed the change in beliefs of an undergraduate student about sports teaching during her initial training in Physical Education at a public university in southern Brazil. In this qualitative, descriptive, and interpretive longitudinal study, the unique case of an undergraduate student was investigated, based on semi-structured interview procedures, systematic observation, memory stimulation and Content analysis technique. The results revealed that throughout her initial training, the undergraduate student changed her beliefs related to the purposes, strategies, and organization of content through different processes of conceptual change. This evidence shows that professional learning, comprehensive from the perspective of conceptual change, is an active, long, slow, and gradual process that involves a continuous revision of beliefs.

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1 INTRODUCTION¹

When entering initial training, undergraduate students in Physical Education bring with them beliefs developed from social and educational experiences in authentic learning contexts, especially in sports, with significant impacts on personal patterns of thinking about teaching (FEU *et al.*, 2016; SOUZA *et al.*, 2017; BACKES *et al.*, 2021). They determine most of the decisions in the teaching and learning process of sports and in the teacher education; they act as filters that condition the directions of learning throughout the course (SOUZA *et al.*, 2017; RAMOS *et al.*, 2018).

These beliefs can be considered naive (VOSNIADOU *et al.*, 2020) because although they have subjective validity, they often do not agree with scientific knowledge of the literature in the area (SYRMPAS *et al.*, 2019; VOSNIADOU *et al.*, 2020). Studies reveal that undergraduate students have beliefs that conflict with contemporary conceptual perspectives on sports teaching and learning (SILVA; FARIAS; MESQUITA, 2021) and converge with the teaching of technique and analytical teaching tasks (MOY *et al.*, 2016; SOUZA *et al.*, 2017; FEU *et al.*, 2019); prescriptive and corrective verbal interventions (SOUZA *et al.*, 2018); controlled environment management, teacher-centered decisions and student passivity (SYRMPAS *et al.*, 2019).

Therefore, conceptual change should be the objective of teacher education programs in the field of Physical Education (HUSHMAN; NAPPER-OWEN; HUSHMAN, 2013). The theory of conceptual change (POSNER *et al.*, 1982; VOSNIADOU, 1994) has been used to understand learning in Physical Education teacher education (HUSHMAN; NAPPER-OWEN; HUSHMAN, 2013; SINCLAIR; THORNTON, 2016; SYRMPAS *et al.*, 2019) and explore how learning occurs when future teachers' previous beliefs are exposed to new information, allowing us to understand how individuals change their beliefs over time about a given domain (VOSNIADOU *et al.*, 2020). Among the different perspectives on conceptual change, in this study the re-framing approach was adopted, which, from a constructivist learning orientation, interprets conceptual change as an active and gradual process that involves the revision of beliefs (VOSNIADOU, 2013).

Conceptual change can occur through the enrichment of information to the cognitive structure, or it can require a revision/restructuring to integrate concepts that challenge previous knowledge. Specifically, regarding the review, it can be of a weak level, when there is a reorganization in the knowledge base, resulting in the modification of a hierarchy of concepts and connections between them, as well as a strong review, which generates a change in the cognitive structure, leading to more complex levels of understanding (ENNIS, 2007).

Internationally, studies on the conceptual change in the Physical Education teacher education have investigated teaching styles (SYRMPAS *et al.*, 2019; SYRMPAS; DIGELIDIS, 2020), instruction models (GURVITCH *et al.*, 2008), the constructivist teaching (SINCLAIR; THORNTON, 2016), and effective teaching of

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Physical Education (HUSHMAN; NAPPER-OWEN; HUSHMAN, 2013; LEE, 2018) in some specific stages of training, from a transversal or longitudinal design. Evidences reveals that the training program experiences facilitated processes of conceptual change, allowing future teachers to reach understandings about the strategies and models typical of constructivist teaching practices and effective teaching (HUSHMAN; NAPPER-OWEN; HUSHMAN, 2013), understanding learning as a process in which students are actively involved and the teacher should be a guide or mediator of a collaborative teaching environment where students share their ideas and work in groups in the construction of knowledge (SINCLAIR; THORNTON, 2016; SYRMPAS *et al.*, 2019). However, there are gaps in the investigation of the conceptual change on sports teaching throughout all stages of initial training.

In addition, the international level initiatives do not seem to reflect on the scientific production on the subject in the Brazilian context. In Brazil, some studies investigated the beliefs of future teachers regarding the teaching of sports (SOUZA *et al.*, 2017; RAMOS *et al.*, 2018; BACKES *et al.*, 2021), from a cross-sectional design, but did not explore the conceptual change process. Thus, the aim of this study was to analyze the change of beliefs on the sports teaching of an undergraduate student during the initial training course in Physical Education, at a public university in southern Brazil.

2 METHODS

A qualitative, descriptive and interpretive (DENZIN; LINCOLN, 2018), longitudinal (VISBAL; OTERO; OSUNA, 2008) with Case Study procedures (YIN, 2018) research approach was adopted. An undergraduate student in Physical Education at a public university in southern Brazil participated in the investigation. The degree course in Physical Education in which the student was enrolled has a total workload of 3,366 class hours, spread over eight semesters, corresponding to four years. From these, 414 class hours are focused on the Supervised Curricular Internship at different educational levels and 414 class hours are focused on practice as a curricular component. She was intentionally selected for not having teaching experience; being enrolled in the first year of the undergraduate course; taking a class in Sport Pedagogy; and showing interest in participating in the research stages.

When starting the first stage of the research, the undergraduate was eighteen years old. Her first personal practice's experiences in the sport occurred during the Physical Education classes of the fifth grade in elementary school, where he had contact with the volleyball practice and had some negative experiences with the learning process of this sport. Before joining the Physical Education course, the graduate student participated in a volleyball referee's course promoted by the State's Volleyball Federation, which enabled her to act as a scorer in regional and state competitions promoted by the entity, a role she performed throughout the survey period. The option for the Degree in Physical Education was motivated by the interest he had in recreational, cultural and sports activities in the context of Physical Education classes and by the influence of his father, who was fond of football, and especially her mother, who was a teacher of basic education.

Data collection instruments combined systematic observation and semi-structured interview, along with memory stimulation procedures. Data collection was carried out in four stages, including 1st, 2nd, 3rd, and 4th year of initial training. In the first stage, systematic observation of a simulated class conducted by the undergraduate student to classmates in a Sport Pedagogy class, lasting 45 minutes, was carried out. The observation was recorded with a camera that was positioned at a distance that allowed the complete visualization of the teaching context and that had minimal interference. To capture verbal information, a recorder was used along with a lapel microphone attached to the student's clothing. Subsequently, a semi-structured interview was conducted with memory stimulation procedures. Episodes of the given class were reproduced, requesting a description of the procedures adopted, using a script composed of 12 questions about purposes, content, strategies, students' learning, and sources of beliefs.

In the second stage, an interview was carried out with memory stimulation using the video of the class recorded during the first stage of the study as a reference. This same procedure was reproduced in the other stages, at the end of each year. For all interviews with memory stimulation, a microcomputer, voice recorder, and mobile phone were used as support. At all stages, interviews were conducted by the same investigators in the same location at the university and using a similar script stage, adding the questioning about the maintenance or change of the pedagogical behavior adopted in the previous stage. Average time for each interview was 1 h 30 min.

Data were analyzed using Content Analysis (BARDIN, 2016) with prior determined categories, based on the model proposed by Grossman (1990), covering knowledge about the purposes, content, strategies, and learning of students. In the analysis of the observations of the strategies, typology of learning tasks, by Ticó-Cami (2002), was adopted, namely: analytical, synthetic, and global.

Content analysis was performed in three phases. The first consisted in the preparation of materials and constitution of the analysis corpus (a video recording and 68 transcript pages of the four interviews). In the second, the raw transcripts were transformed into content representations, identifying the units of meaning for each of the prior elaborated categories. The third phase corresponded to the organization of results. Recurrence procedures were carried out with the undergraduate student to ensure information credibility (DENZIN; LINCOLN, 2018). In addition, a review was carried out by two researchers with experience in qualitative research, who analyzed the same set of data, comparing their interpretations (MAXWELL, 2013).

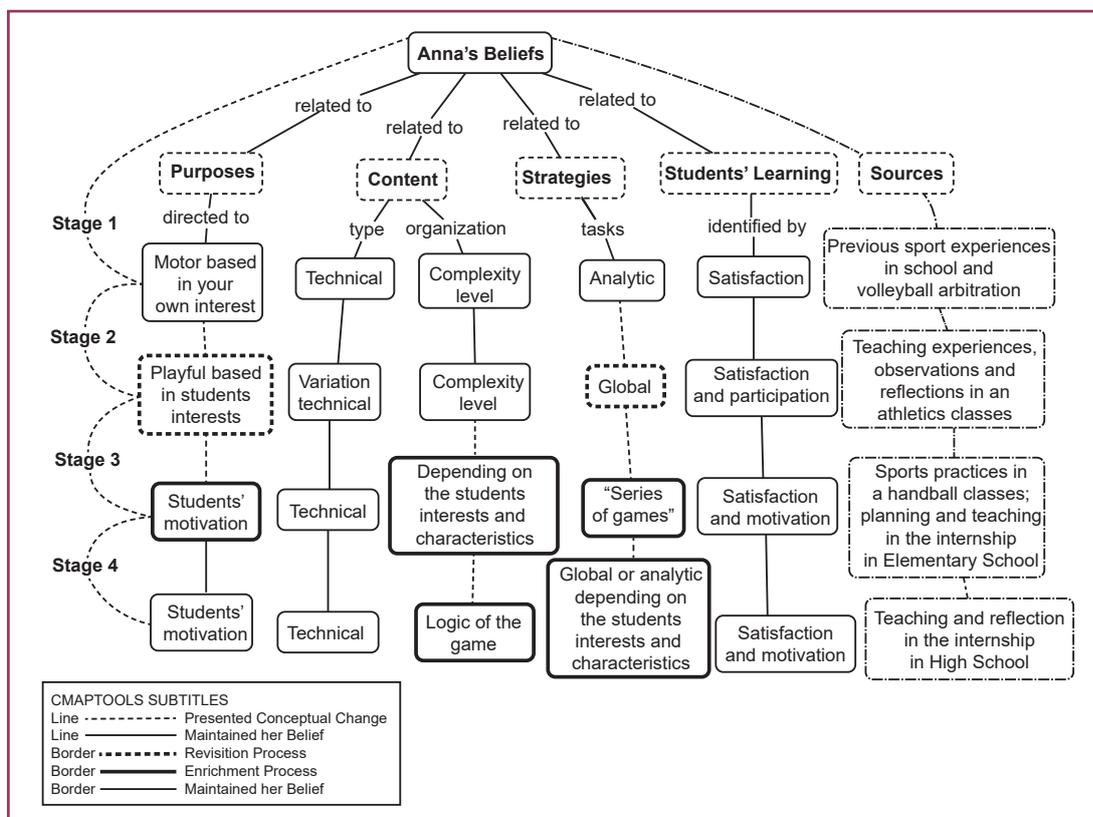
This study was approved by the Human Research Ethics Committee of a Brazilian public university (number 83238/2012) and the undergraduate student signed an Informed Consent Form (ICF). Participant's (pseudonym Anna) and institutions' anonymity and confidentiality were preserved by assigning fictitious names.

3 RESULTS

The results were presented using concept map constructed with the CmapTools (Figure 1). Results regarding Anna's beliefs about the teaching of sports were analyzed

based on the purposes, content, strategies, and students' learning evidenced in the four stages of the investigation. For each category, Anna's sources of beliefs are also presented.

Figure 1 – Anna's beliefs conceptual map



Source: research data

3.1 ANNA'S PURPOSES

In the first stage of the study, Anna's purpose was focused on the development of the students' motor dimension: "I believe that the sport and practice of the game are not as fundamental as teaching a pass, bump, the game rules". Developing your own "interest" in sports was a constituent part of Anna's purposes, based on her sporting experiences: "I think that since I didn't like it, I should also try to obtain this interest."

The experiences in school Physical Education classes, watching games on television and readings during childhood and adolescence, contributed to the development of Anna's beliefs: "Among most of the girls in class, I was the only one who would participate... when we needed to play with boys, I played; I would only scape in volleyball. And I was like that; I would ask the reason for that; I saw a lot and read about sports".

In the second stage, Anna's purpose changes to awakening her students' interest into sports. The perspective is that by developing the sport in a "playful" way, students will be able to enjoy and "deal" with the situations and challenges of sports practices:

In volleyball, we can rescue those quieter, more shy students, and in the face of that, I used to do recreational activities to try to take volleyball; more

movement; to have this practice. In my point of view, if the teacher does not give this (playful) emphasis, they (student) will not know how to deal with it later on.

The first teaching experiences with young children in an athletics class were important to Anna so she could modify the direction of her teaching purposes: “In school. Mainly, as we know, Physical Education is always the most expected [class], children always want this.”

In the third stage, Anna adds concepts to justify her beliefs about students’ motivation. For her, due to the low level of physical activity of the population, it is the responsibility of the Physical Education teacher to provide opportunities for the practice of sports seeking the “motivation” of students, so they become active adults:

I have a different view. [...] Today, the level of physical activity is falling. [...] I want to see if this motivation grows and perhaps people who have never practiced, sometimes find themselves in sports; if this door is not opened, they do not run after it. Because if you do, you tend to be an adult who practices physical activity too.

Teaching experiences in a gym extension project for seniors at the university, as well as the research conducted in Anna’s bachelor thesis contributed to her achievement of the understanding on educational purposes in this stage of the study: “[...] of the (extension) scholarship, as well as undergraduate thesis, which mine is about the motivation level in physical activity.”

In the last stage, Anna added to the purposes of the previous stages of the research the understanding that sport should be used as a “means” to achieve student motivation. In addition, she reinforces the projection of her purpose in seeking her own interest in sports, towards a concrete teaching goal:

In that class I saw that they were unmotivated; I couldn’t work the sport itself, but the sport as motivating environment. I’ve never been so much into sports; I didn’t like sports! So, I thought: “What can I do that I would like, [and] that my students would also like?”

As a source to change her beliefs about the purposes, in the last stage of the study, Anna stated that: “[...] through observation (reflection) I saw that the class was un motivating, so for me class wasn’t productive and neither to them, so I realized that I should try to bring playfulness.” Transferring her personal motivating purpose to a student’s motivating purpose was reinforced in her bachelor thesis: “In my bachelor thesis I presented [a study] about motivation, due to the fact that the extrinsic motivation is greater than the intrinsic one because others have to see that I’m doing it; I saw it in my study. [...] But it starts with me, and I have to motivate the students.”

3.2 CONTENT PRIORITIZED BY ANNA

In the first stage, Anna’s preference for volleyball was driven by the idea that teaching this sport could change the negative perception of her experiences in Physical Education classes at school. In addition, Anna considered her own “involvement” and her experiences as a referee in Volleyball Federation games.

[...] since I'm involved in volleyball, sometimes on the weekend there are games, and maybe I'll create an extra taste for teaching. [...] I see a lot during warm-up games, I'm a scorer and sometimes, when I fill in the scoresheet, I wait for the time and watch; that's where I thought about doing it (the volleyball class).

As for the selected content, the emphasis on the technical fundamentals of volleyball and the priority of passing over other fundamentals was evidenced, based on the observations of the teams' warm-up as a scorer. The justification is due to the fact that passing is the most natural gesture, the easiest to perform, and also the most useful due to the goal of this game.

Passing is the first, depending on the direction of the ball, it is always the pass. [...] So, I believe passing is easier. Always in volleyball, the ball is coming and instead of running to catch the ball (with a bump) we try to catch it with one hand, and we can do the passing when the ball comes higher.

Content prioritized by Anna was organized in her class in four parts: warm-up, technical content, formal game, and stretching. This sequence was based on the joining and reproduction of activities observed in volleyball competitions:

I frequently see this sequence in games, warm-up, and in high school. Sometimes, there was no passing, and it was just the one I told, already divided with the net, then the ball passes, and the serve, and it goes straight to the game. But I only understood this sequence during the games (in championships) that I keep watching.

In the second stage, Anna reinforces the choice for volleyball, highlighting her personal concern for her "taste" for the volleyball practice, projecting this perception into her teaching purpose: "[...] I still have this idea of not enjoying playing volleyball very much, as I said in the first interview. But teaching is different." Anna kept emphasis in the technical content of volleyball, but she would promote changes in the variation and expansion of her students' movement repertoire. She developed this perspective from research activities to develop the lesson planning and also in the teaching practice classes of an athletics class.

And now I see that it is needed, as if it was the father of all sports... the running, jumping, leaping. So, it totally changed after athleticism. My biggest vision was in the athletics subject, in practical classes. From observing so much, athletics class was the basis of everything; perhaps because they were the first ones that we made lesson planning.

In organizing the content, Anna would promote changes in the implementation of the formal game in different parts of the class, so that: "I could put the game at the end to see these fundamentals, or I could put it at the beginning and the end to see if they could change the type of play." Anna believes that she should promote greater equity in the time spent exercising each foundation, exploring one of them per class to meet the students' learning pace: "[...] one day it would be just passing, another day just bump; it would be different, not all in one day." Observations in volleyball competitions and teaching experiences in a basketball classes were fundamental to the changes in Anna's beliefs: "[...] the setting up of the volleyball class I always notice during the games, that I work as scorer [...] and in the basketball class, where I started to have this different vision."

In the third stage, Anna reinforced her preference for choosing volleyball, maintaining her belief in prioritizing technical content according to age group, learning time, and students interest, but more clearly justifying a sequence to favor progression of learning technical movements:

Passing not going straight, putting it in a playfulness, balloon, for example, to get to know the movement. If I had that much time, I would put it all: one class for passing, a playful activity at first, and then the passing with the volleyball ball, but the technique itself could not be deepened in one or two classes.

As for the organization of the content, Anna would promote changes gathering stretching and warm-up, adding elements that would introduce the main content of the class, depending on the needs and interests of the students:

I would remove this stretching at the end, even though I don't have a minimum time, I would not split stretching and warm-up, I would put them together, which would be a playful activity. That's because sometimes you set five minutes, then sometimes students like it, sometimes they don't; it depends a lot on the progress of the class.

These new beliefs of Anna about the sequencing of content are the result of her practical teaching experiences in a gymnastics extension project for adults and seniors at the university:

[...] I had (in previous stages) the vision of a scorer watching the warm-up. [...] It was in practice (in the extension project). I did it at the beginning (the warm-up and stretching) thinking it was because it was better for this age, people in their thirties to sixties. I realized (later) that at this age there is no stretching more, pulling more.

In the last stage, Anna expanded her understanding that the task of teaching should be related to her teaching goals and not conditioned to her personal purposes and tastes. She justified that to teach, knowing the characteristics of students is as important as specific knowledge of the sport:

Volleyball is not something I liked. And at all internships I had to work volleyball. So, in a way, I learned to like volleyball... If I didn't like it, at least I'll try to make others like the sport. [...] We say: "I have more affinity (specific knowledge of the modality), and everything will be fine." Comma, it depends on the class.

At this stage, although Anna reinforced the prioritization of technical content, she mentioned elements of volleyball tactics: "I managed, through playfulness, to teach them positions: Position two, position four, position six." Her belief about the sequence of content changed to: "[...] first come the serve because I start the game by serving, then the bump or passing, because I can receive more for the bump or passing, it depends." Such change was supported by the understanding that the teaching of technical fundamentals should follow the logic of the volleyball game, so students develop skills that allow them to play with enthusiasm:

In High School I made the sequence differently. [...] But my first fact was that they left happy. Afterwards, I started to see that my lessons were giving meaning to the game because previously the ball didn't pass in the serve and then, the *rally* lasted a long time; they started to explore the three hits. At the end of the class, I always saw that they left motivated.

The beliefs revealed in the final stage of the course were built in situations of the Supervised Internship, in their observations and experiments in High School class: “[...] for me it was more the internship, the observations of other teachers, both from the school and from classmates. In the serve case, it was the experience of starting with the serve. Whether it was going to work or not, I didn’t know.”

3.3 STRATEGIES ADOPTED BY ANNA

In the first stage, Anna prioritized analytical learning tasks that were performed in pairs or trios, under simple exercise conditions or combining technical fundamentals, without opposition. Her perspective was teaching technical fundamentals of volleyball, in the amount and variety they occur in games, in a progression that prepares students for the game: “Let’s suppose, the first one would go, pass the ball to another one, and then go to the end of the queue; and he (or she) could pass either with the bump or with the pass he (or she) had learned before; and then, in the corner of the net as well, because often the game is worked only in the middle, so I also thought of the corner of the net.”

From Anna’s perspective, the content taught in class represent a synthesis of the fundamentals of volleyball that students need to learn so that “[...] they can play at the end.” The observations in the scorer function have influenced the learning tasks that Anna prioritized: “The spiking one, I’ve never done it, I’ve only observed it. And during the game I realize that there is a lot of this work in the corner, so I thought about working in this corner of the court. [...] But as I always saw these steps, and then the game, I followed it that way.”

In the second stage of the research, Anna began to consider that the game and its playful character should be present at all times in volleyball teaching, as analytical tasks are not very attractive to student participation:

I took this class more to the sports side than to the pedagogical activity side. Today, when we had more classes and had the preparation, in an initiation, I would do it totally different, especially because the kid will not just do that. [...] Maybe if it was a more playful part, everyone would do something at the same time.

Practical teaching experiences, observation of the subjects, and readings carried out in athletics classes during the second year of the course, helped her to consider games as teaching strategy: “In classes, especially the athletics discipline [...] we start to research, start to read, start to see from the other classes of other groups and start to have ideas and see that we can bring in a playful way the skills of the sport itself.”

In the third stage, in addition to reinforcing the belief of using games as a strategy for teaching volleyball, Anna mentioned the adoption of strategies more adjusted to the age group, interests, and motivations of students: “[...] depending on age I wouldn’t do any of that. What brings the time answer is the class, and the game was the funniest moment of the class. When an activity draws more attention, I always use more time.” When teaching classes to adult and elderly students, in the gymnastics extension project, Anna found that: “[...] at this age (from thirty to sixty

years old) the more I presented the playful, the more they felt involved and the more productive the class was.”

At this stage, Anna showed that her options already had a conceptual basis, mentioning methodologies that emphasize the teaching of sports through games and promote fun and motivation in Physical Education classes: “I would do it differently, like in the internship, a series of games in the methodology, I would split into more teams so that everyone could participate, had more chance to reach the goal of the game; and the game series was more fun”. The practical classes of a handball class, as well as the experimentation of this methodology in the classes taught during the internship, were significant for Anna:

We learned a lot in handball. We saw the (method) focused on technique, the advantage and disadvantage, the advantage of improving, the disadvantage that it becomes tiring, monotonous, always the same movement. And the series of games we did in college, we had to prepare the lesson plan with the tactical processes, and I put it in the internship to see if it would work with the kids.

In the fourth stage, Anna maintained the understanding that she should use games to teach volleyball: “[...] the fact of having playfulness, of running, of having to go after the other, and making everyone participate at the same time, it was different from volleyball, where I have to wait for the ball.” However, she also justified the use of global or analytical tasks, based on the belief developed in the previous stage, that is, teaching strategies should be implemented depending on the characteristics of the students:

It depends on the characteristics of the class. If I took a motivated group who liked to play volleyball, perhaps I would be able to apply this type of (analytical) class, because they wanted to improve themselves in what they already liked to do. As for other groups, those that didn't like it, I wouldn't apply it that way. Today, it depends a lot on the class, after the experiences I had.

Anna mentioned that the main experience to reach understanding about the strategies in the last stage was obtained in handball classes, as she reported: “When I took handball. And from that, we manage to assemble the activities according to the classes he taught, when it's a game, when it happens, strategy.”

3.4 STUDENT LEARNING FROM ANNA'S PERSPECTIVE

In the first stage, Anna reported identifying the students' learning by the “satisfaction” shown by them when they participated in classes: “[...] not in the correct way to make the move, passing, but to see the person's satisfaction: I tried; I made it; it wasn't the right way, but I can improve myself. In each class, seeing the student leaving satisfied.” The reflection on her own negative experiences with volleyball practice was crucial for Anna's perspective on learning: “[...] when it was volleyball class, I wouldn't leave the class happy. So, when I tried to play, whether it worked or not, at least I tried, and something would come out.”

In the second stage, Anna added the “participation” and “student commitment” criteria to the perspective of “satisfaction” to identify improvement and learning in

other domains of sport. Also, Anna mentioned that such aspects should be analyzed individually, according to the characteristics and level of student learning.

I think it depends on the student. When we see that those who don't participate are then participating, it's already a start. I take more to this side, than those who already know how to do it, [...] not that they pay more attention, but I believe that those who don't know how to do it, have this initiative, start [...] not doing the right thing itself, but already start in that fact of "I went there, and I tried."

In the third stage, Anna's beliefs indicate the addition of the "motivation" idea to her previous beliefs based on the "satisfaction" and "participation" criteria. This understanding revealed the intention to keep the motivation of her students so they can be engaged in their own learning process.

So, I think there are children who can do it and we say: "oh, you can do it like this, or like that to improve." Or those who can't do it for certain (reasons) and you motivate them to do it, I think each one has its own (process). This motivation process, of not letting the person down, that we don't know for what reasons they are making mistakes, or not doing that particular (task).

By analyzing her students during practical experiences in the Supervised Internship in High School, Anna reinforced this understanding of learning, remembering that: "In the internship this happened a lot. [...] Because my answer was them [...] so my answer was the students if the class was favoring learning or not."

In the last stage, Anna added to her beliefs about learning perceptions about how students should deal with "error," considering it as a "strategy" to achieve success in learning tasks:

It's just like the (collaborator) teacher said: "The fact that they are leaving the class happy at the end of it doesn't mean that they learned." And I said: "I agree with you! But my first fact was that they left it happy." Then I saw that I was achieving at least the first fact, that they were leaving happy. [...] So, the mistake, I used it as a strategy to succeed, not as a negative point.

Her reflection, at the end of the course, on the personal experiences and challenges she faced led Anna to consider the personal purpose of her students as a regulatory aspect of learning: "[...] it was my own experience. It's just that, sometimes, the pressure, I've already been in their place, so I know. [...] But wait, am I doing what I like? Am I doing it because I want to? This made me suffer a lot, I say due to anxiety."

4 DISCUSSIONS

Throughout the undergraduate course, Anna changed her initial beliefs related to the purposes, strategies, and organization of content through different processes of conceptual change, in which some beliefs related to the prioritized content and students' learning underwent little change. This shows that conceptual change comprises an active, long, slow, and gradual professional learning process that involves the continuous review of beliefs (SYRMPAS *et al.*, 2019; VOSNIADOU *et al.*, 2020).

Studies show that, upon entering initial training, undergraduate students have beliefs about teaching sports (FEU, *et al.*, 2016; SOUZA *et al.*, 2017; RAMOS *et*

al., 2018; BACKES *et al.*, 2021). In Anna's case, beliefs encompassed choosing volleyball to awaken her own "interest" in this sport, prioritizing technical content, teaching through a progression of complexity and analytical tasks. These beliefs can be considered naive, as they allowed Anna to provide explanations about her perspective on teaching volleyball, but without scientific foundation (VOSNIADOU, 2013). Such beliefs, developed from childhood/adolescent experiences and arbitration experiences, influenced the reproduction of pedagogical behaviors that do not agree with contemporary teaching concepts and proposals in the specialized literature in the field of Physical Education (SYRMPAS *et al.*, 2019), in particular, the Teaching Games for Understanding (TGfU) and Sport Education (SE), which emphasize the tactical dimension in the teaching and learning process of team sports, through games (CASEY; KIRK, 2020; SARRUGE; GINCIENE; IMPOLCETTO, 2020).

From the second stage of the research, Anna revised her teaching purposes, which are related to the personal values of teachers, assuming a hierarchical position in which they overlap and direct other beliefs about teaching (RAMOS; GRAÇA; NASCIMENTO, 2008). By modifying the (core) personal purpose of developing her own "interest" or "taste" for volleyball to a pedagogical purpose related to the students' "motivation", Anna presented a conceptual change resulting from a strong restructuring (ENNIS, 2007), which implies changes in cognitive structure, leading to higher and more complex levels of understanding and with the potential to influence other underlying beliefs.

The change in beliefs about purposes, through teaching experiences in athletics classes and Anna's reflection, was also verified in other studies carried out with undergraduate students in Physical Education (PHILPOT; SMITH, 2011; ADAMAKIS; ZOUNHIA, 2016; LINKER; WOODS, 2018). The development of her bachelor thesis, from the third stage, led Anna to enrich her purpose with justifications about encouraging her students to become physically active adults based on scientific evidence.

Still, in the second stage of the research, Anna started to review the naive beliefs in order to make them coherent with her teaching purpose (VOSNIADOU, 2013). Through a set of teaching practice experiences, subject observation, and readings carried out in sports curricular classes, Anna developed a weak restructuring (ENNIS, 2007) as she adjusted previous beliefs about global tasks, redefining the role of the game in the teaching and learning process to motivate students, as advocated by current proposals for teaching volleyball (NIEVES; OLIVER, 2019; SARRUGE; GINCIENE; IMPOLCETTO, 2020). The change achieved in the second stage on teaching strategies was expanded in the third stage, by adding the concept of the "game series" methodology to the existing cognitive structure, characterized as an enrichment process (ENNIS, 2007). This process was facilitated by experiences of sports practice in handball classes, the development of planning and teaching practice in the supervised internship in Elementary School.

Guided by her teaching experiences with students of different profiles, Anna gradually enriched her cognitive structure with justifications by the end of the course about the importance of considering the students' characteristics (age group, prior

knowledge, level of motivation) in order to define a sequence to the content and to choose teaching strategies. This evidences a perspective of sports teaching oriented towards constructivism, in which the students' previous knowledge and/or experiences guide the teaching strategies and content (ROVEGNO; DOLLY, 2006; SILVA *et al.*, 2021).

In the last stage, influenced by the experiences of teaching practice and reflection in the supervised internship in High School, Anna revised her initial belief about the organization of content, proposing a sequence based on the phases of the volleyball game to provide greater "sense" and "motivation" to student learning. This process evidenced a weak restructuring (ENNIS, 2007), where there was a modification of some attributes of previous beliefs about content, although other fundamental beliefs such as the emphasis on technical content remained unchanged. This perspective of Anna presented some "misconceptions" (VOSNIADOU, 2013), as the recommendation is that the teaching sequence should be developed from the tactical principles of the game, teaching technique subordinate to tactics, to facilitate understanding of the game and appropriate decision-making on "what" and "when" to perform technical actions in each situation (SARRUGE; GINCIENE; IMPOLCETTO, 2020; SILVA *et al.*, 2021). Misconceptions consist of the distortion of new knowledge to fit it into existing beliefs in an attempt to understand new relevant information, which may help in the enriching process and/or revising beliefs in the future (VOSNIADOU, 2013).

5 FINAL CONSIDERATIONS

The evidence allows us to conclude that the investigated undergraduate student changed her initial beliefs linked to a personal purpose to a purpose with pedagogical intention, seeking to motivate students to practice sports. This process facilitated the review and enrichment of other underlying beliefs, leading to the recognition of the pedagogical role of the game and the use of the game series methodology; the organization of technical content based on the game logic; and considering the characteristics of the students when choosing the sequence of content and strategies, which indicated similarity with the constructivist principles of sports teaching, developed in experiences throughout their initial education. Some beliefs related to the content and learning of students underwent little change. This evidence highlights the long, slow, and non-linear nature of professional learning in the context of Physical Education teacher education.

Limitations of this study may be related to the fact that observation was carried out only in the first stage of the study and the data collection occurred at the end of each academic year of the undergraduate course and not at the end of the academic semesters attended, so the participant may have recalled recent memories, and not mentioned other important sources of change. It is suggested the expansion of investigations using the theoretical perspective of conceptual change in the Physical Education teacher education, with the periodic monitoring of undergraduate students, based on a combination of instruments, such as interviews, questionnaires, observations, elaboration of concept maps to provide greater depth to the analysis of

change processes and the sources (situations and contexts) that facilitate conceptual change for teachers and undergraduate students.

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Resumo: O estudo analisou a mudança de crenças de uma graduanda sobre o ensino dos esportes ao longo da formação inicial em Educação Física, em uma universidade pública do sul do Brasil. Neste estudo qualitativo, longitudinal, de caráter descritivo e interpretativo, investigou-se o caso único de uma graduanda, a partir de procedimentos de entrevista semiestruturada, observação sistemática, estimulação de memória e a técnica de Análise de Conteúdo. Os resultados revelaram que, ao longo da formação inicial, a graduanda modificou suas crenças relacionadas aos propósitos, estratégias e organização do conteúdo, por meio de diferentes processos de mudança conceitual. Essas evidências mostram que a aprendizagem profissional, compreendida na perspectiva da mudança conceitual, é um processo ativo, longo, lento e gradual, que envolve a revisão contínua de crenças.

Palavras-chave: Formação de conceitos. Ensino. Esportes. Capacitação Profissional.

Resumen: El estudio analizó el cambio de creencias de un estudiante de posgrado sobre la enseñanza del deporte durante la formación inicial en Educación Física en una universidad pública del sur de Brasil. En este estudio longitudinal, cualitativo, de carácter descriptivo e interpretativo, se investigó el caso único de un estudiante, con base en procedimientos de entrevista semiestructurada, observación sistemática, estimulación de la memoria y técnica. Contenido Análisis. Los resultados revelaron que durante la formación inicial, los estudiantes cambiaron sus creencias relacionadas con los propósitos, estrategias y organización del contenido, a través de diferentes procesos de cambio conceptual. Esta evidencia muestra que el aprendizaje profesional, entendido desde la perspectiva del cambio conceptual, es un proceso activo, largo, lento y gradual, que implica la revisión continua de creencias.

Palabras clave: Formación de concepto. Enseñanza. Deportes. Capacitación Profesional.

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CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest.

AUTHORS' CONTRIBUTIONS

Ana Flávia Backes: Escrita do texto, estudo da teoria, seleção e análise dos estudos sobre a mudança conceitual.

Valmor Ramos: Coleta de dados, análise e revisão geral do texto.

Matheus da Lapa Costa: Coleta de dados.

Leonardo Ristow: Seleção e análise dos estudos sobre a mudança conceitual, escrita, formatação e revisão geral do texto.

Rodolfo Silva da Rosa: Escrita, formatação e revisão geral do texto.

Thais Emanuelli da Silva de Barros: Escrita, formatação e revisão geral do texto.

Vinicius Zeilmann Brasil: Análise dos dados, escrita, formatação e revisão geral do texto.

Juarez Vieira do Nascimento: Análise e revisão geral do texto.

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