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Using Simulation to Develop Divergent and Reflective Thinking in Teacher Education

Sima Zach * and Miki Ophir

School of Education, The Academic College at Wingate, Netanya 4290200, Israel; ophir-m@013.net
* Correspondence: simaz@wincol.ac.il; Tel.: +972-522811133

Received: 15 March 2020; Accepted: 2 April 2020; Published: 4 April 2020



Abstract: Purpose: This study examined the influence of simulation on flexible and reflective thinking in student teachers (STs), and appraised how they evaluate its potential contribution to teacher education programs. Method: Twenty-three Israeli physical education STs participated in a simulation course. They planned teaching-learning conflict scenarios, and served as actors or volunteers in these scenarios, which were filmed and discussed. Discussions were videotaped and transcribed. Content analyses were conducted on the discussions and the written reflections. Results: STs not only increased their flexible and reflective thinking, but they gained an understanding of how to do it independently. As they were learning how to be more open-minded, they were able to feel, think, and behave authentically, and to offer a variety of solutions regarding conflictual situations. Conclusion: STs developed flexible and reflective thinking, and widened their repertoire of behaviors that succeeded in integrating thoughts and feelings into learning-teaching situations.

Keywords: simulation; high order thinking; divergent thinking; reflective thinking; teacher education

1. Introduction

Already by the end of the 20th century educational philosophers contended that the rapid global changes and innovations taking place in educational settings require higher order thinking, such as divergent, flexible, and creative thinking, from learners of all ages [1]. It was recommended that teacher education—and specifically physical education teacher education programs—that neglect these aspects should include higher order thinking in their preparation programs. Nevertheless, a search in various Internet databases (e.g., EBSCO, Google Scholar, Science Direct, and ProQuest) for studies with titles that include the words divergent and/or reflective and/or creative thinking, and/or higher order thinking in physical education teacher education, did not yield articles that dealt with such programs and their impact on student teachers (STs).

The term "divergent thinking" was coined by Guilford [2] to describe the processes of deconstructing a topic into parts and then producing as many creative, original, and varied productions responses as possible in the shortest time possible. Such a way of thinking requires imagination, flexibility, and intellectual risk-taking that can be navigated into brainstorming, with an array of feasible answers to challenging problems or situations. This is followed by sharing the new beliefs/opinions/viewpoints with a group, so that the participants can teach and learn from one another [3].

According to Hargrove and Rice [4], divergent thinking strengthens learning and incorporates a variety of abilities, such as generating many new and different ideas in a situation, which are relatively free of restrictions, reconstructing a problem or situation, allowing for and encouraging in-depth investigation, and recognizing that a problem can be viewed from multiple perspectives. Barak and Levenberg [5] generated a model that indicated three main themes that underlie flexible thinking in

education: open-mindedness to others' ideas, adapting to changes in learning situations, and accepting new or changing learning technologies.

Creative teaching was often labeled in educational research as effective teaching [6,7]. Torrance [8] noted that creative teachers are also effective teachers because they are willing to experience new approaches and ideas that vary from traditional educational beliefs, to improve practice. In addition, Anderson [6] stated that creative teachers are willing to confront both success and failure in the interest of teaching better. According to teachers' perceptions, the promotion of student autonomy and self-confidence may be the most valued aspect for defining a creative teacher [9]. Other aspects are providing opportunities for students to choose tasks or to make their own self-correction [10]. However, although teachers may be aware of the characteristics that promote student creativity, they still might face difficulties transferring them into practice, as this knowledge can be insufficient, and practical knowledge is needed as well [11].

Since teachers are the major mediators of thinking and learning for their students, understanding how the students' behave and how to promote their thinking and learning skills are important areas of research [12]. Henrikson discusses the use of seven building blocks that constitute creativity—or transdisciplinary thinking skills—among highly accomplished and national award-winning teachers. She relies on Root-Bernstein's [13–16] and Mishra, Koehler, and Henriksen's [17] transdisciplinary framework, with the following specific set of building blocks or creative-cognitive skills that explain how successful and innovative thinkers solve problems: observing, patterning, abstracting, embodied thinking, modeling, play, and synthesis.

We followed Henrikson's [12] recommendation to further research these cognitive skills, choosing pre-service teachers as the target population. Our rationale stemmed from the notion that they will be required to promote such skills among their students; therefore, acquiring and being able to implement creative-cognitive high order skills through teacher preparation is imperative.

An additional path to developing divergent thinking is through the systematic improvement of reflective thinking [18,19]. Many models have been developed to describe how reflection can be acquired in teacher education [20–22], all by means of levels of reflective abilities. The "onion" model of Korthagen and Vasalos [21] has six levels of reflection: mission, identity, beliefs, competencies, behavior, and the environment. The model described by Bain and colleagues [20] is a five-level scale: reporting, responding, relating, reasoning, and reconstructing. Larrivee's [22] model features a three-level scale: the initial level, focusing on teaching functions, actions, or skills; a more advanced level, considering the rationale for current practice; and a higher order where teachers examine the ethical, social, and political consequences of their teaching. Bubnys [23,24] demonstrated in his research that student teachers' reflections enhance their divergent thinking, because they are obliged to think about alternative solutions to problems that they have identified, or because they need to prepare alternative action plans.

Flexible fast thinking is required in order to develop divergent thinking [25], a mode of reasoning that is characterized as intuitive, and is based on memory and emotion. This mode goes along with the convergent mode, which is slow, reflective, and rational, and calculates the consequences. Both modes of reasoning are various combinations of attributes [26]. These two modes of reasoning are required for creativity [27].

As stated above, divergent thinking and reflective thinking can be developed, and both are considered among the underpinnings of teachers' skills in the 21st century (e.g., [28,29]. Therefore, we aimed at improving these skills—using simulation.

1.1. Simulation in Teacher Education

The first years of teaching are considered the most difficult period in a teaching career – a time when novices must cope with a whole new set of events and make decisions before they have acquired the skills necessary to do so. Attempts have been made to ease the transition from theory to practice, and at the same time to reduce attrition from the education system among novice teachers [30,31].

One of the directions taken by these attempts has been the development of simulation as a tool for acquiring effective practical, substantial, and relevant knowledge [32]. The idea underlying the development of simulation for use in teacher education is to create a situation that resembles real-world behaviors as accurately as possible, whether with actors in live simulations or with avatars (computerized figures) in computerized simulations. By having the actors/avatars mimic behavioral characteristics that reflect those exhibited by pupils/pupils' parents/teaching colleagues, or any other figure in the school environment that novice teachers might encounter in real time, these systems can be used to serve a variety of aims in teacher education, including instruction; training; learning and explanation; practicing teaching skills; practicing problem solving in class management; assessment and training in solving problems; dealing with conflicts; and decision making [33,34].

Simulation makes it possible to focus on specific tasks that require certain skills, to practice various class scenarios or meetings with parents and then to analyze them, to engage in reflection, to discuss mistakes, if any, and consequently to improve the skills that will help reduce or even prevent future damage to pupils, teachers, or the system [35]. Simulating the real world allows teachers in training to face difficult and challenging situations without suffering the consequences or concomitant complexities of the real world [36].

1.2. Simulation in Physical Education

Although simulations have been used in education and teacher education, the use of this technology in physical education is only in its infancy. As physical education and sport deal with human movement, it is necessary to analyze and assess movement; therefore, simulation of the human body is required, as well as the integration of human engineering and biomechanics sciences [37]. Yang reported on a simulation based on movement-capture technology and picture processing on the computer that helps to determine what the ideal movement is for an athlete. Using this simulation can help coaches improve athletes' techniques and the training environment [37]. Another system for physical education and sport teacher education was developed in Russia. This simulation creates a didactic virtual environment that simulates athletic pedagogic teaching. Users practice building a program of preparatory exercises, correcting mistakes, and choosing exercises to refine skills and develop personal techniques [38]. Although this system places less emphasis on teaching classroom management than the other simulations described above, it deals with teaching physical education and sport and makes it possible to improve strategies for teaching movement. Baghurst [39] reported on physical education students in a rehabilitative sport department who experienced 24 h of simulated disabilities, such as blindness, limb amputation, or deafness, to appreciate the feelings viewpoint of people with disabilities. The author concluded that practical experience can heighten teachers' understanding of disabled pupils.

Nevertheless, the reviewed articles in physical education concentrate on enhancing physical skills' performance of students, whereas no research has been conducted, to the best of our knowledge, on simulation regarding physical education teacher education. We were interested in examining the relationships between enhancing creative/divergent thinking, and reflective thinking and student teachers' behavior. We tried to identify thoughts and feelings regarding certain behaviors, and to demonstrate how thinking differently would change their emotional and behavioral responses.

Knowledge about the potential influence of simulation on teacher preparation may assist teacher education program developers in assimilating innovative and efficient teaching methods. Consequently, this study had two purposes: to examine the influence of simulation on high order thinking, namely divergent/creative thinking and on reflective thinking, and to report on the STs' evaluation of the contributions of the simulation course to their teacher preparation program.

2. Method

2.1. Participants

Twenty-three physical education student teachers (STs) at a physical education teacher college, 12 females and 11 males, aged 20–31 (M = 24.5; $S.D$ = 1.7), 14 second-year and 9 third-year students, participated in a unique and innovative physical education teacher course based on simulation principles. All of the participants carried out all of the steps that are described in the procedure.

The main purpose of this simulation-based learning was to provide the STs with the more simplified conditions of a professional-educational laboratory than those found, for example, in a gymnasium or on a playing field. Hence, they could achieve several sub-purposes: (a) to learn how to cope with conflictual situations; (b) to examine their responses through self-observation and peer feedback; (c) to examine professional-educational issues; and (d) to discuss alternative responses to similar situations in their future experience.

2.2. Procedure

We began the study after obtaining permission from the Institution Review Board. In addition, all of the participants signed a consent form of agreement to participate in the study. A weekly 90-minute course was implemented over two semesters. The course included three introductory meetings for acquainting the participants with one another, and for creating trust and open communication. Before each lesson, one of the sophomore second-year students, hereafter called the volunteer, was called in to receive general instructions regarding his/her position in the scenario, and then entered the scenario, which lasted about five minutes. A professional photographer filmed all the scenarios. Immediately after the scenario, the class watched the film, and then discussed firstly the volunteer's perceptions, thoughts, feelings, and reactions, secondly the actors' analysis of the volunteer's feelings and responses, and thirdly the reference of the whole class. The STs were required to promote positive thinking by suggesting alternative solutions to the scenarios. At the end of the lesson, the volunteer received the film for further observation, and was required to submit an assignment of his/her reflections on the scenario. All the discussions were recorded by video, audio-recorded, and transcribed verbatim. In order to protect the privacy of the participants, after completion of all transcriptions all real names were deleted and randomly replaced by two letters.

The second-year students developed a scenario based on each of the following six themes, based on their field experience: (1) teacher–class: coping with dividing into pairs and a spurned girl—the task is a 60-meter dash; (2) teacher–class: coping with fear—the task is vaulting; (3) teacher–class: a case of theft and collective punishment; (4) ST–cooperating teacher: different strategies for ball-game teaching—a conversation; (5) teacher–student: a student gives parental written consent preventing him/her from participating, but asks the teacher to let him/her join the class as the lesson develops; (6) teacher–student: a conversation after a student exhibits inappropriate behavior during the lesson.

2.3. Data Gathering

The aims of the discussions that followed each scenario were to create alternative responses to conflicts, to analyze the situations, and to create an empathetic and reflective conversation.

Three levels of discussion involvement and anonymous reflection assignments were gathered and analyzed separately, as follows: (1) The transcript of the volunteer conversation (second-year students) that occurred in the class immediately after the scenario was considered. The volunteers opened this conversation by relating their thoughts, feelings, and behavior during the scenario, and then other participants joined the conversation. (2) Home reflection assignments of the volunteers regarding their (a) feelings during the simulation, (b) reactions towards any conflicts, and (c) thoughts were collected. Taking these two points in time enabled the participants to have wide and deep reflections. (3) The observers' transcripts were also collected. The observers were the students who had not participated in the scenarios, but had watched them and contributed to the class conversation, so their input was

transcribed as well. All possible viewpoints were represented—both in the scenarios that were shown in the classroom and in the transcripts that were derived from them.

In addition, after the entire cycle of simulation, observation, conversation, and reflection was finished, the STs who participated in the course were required to submit a summary assignment: a "view from above" describing their evaluation of the course's contribution to their teacher preparation.

3. Data Analysis

Data analysis was conducted looking through two lenses: those of (1) the volunteer and (2) the observers—the STs who did not participate in the scenarios but participated in the class conversation. Content analyses were conducted on both the discussions and on the written reflections. The assignments summarizing the course by the participants that were submitted at the end of the course were analyzed as well, using the same procedure.

The approach used in this study was to focus on the semantic meanings of participants' experiences in teaching, and on their perceptions of their peers' and students' behavior, feelings, and thoughts [40]. We chose to focus on the semantic meanings of the participants' experiences in teaching, because they had not yet participated in teaching as instructors, cooperating teachers, or teachers' educators.

All data were independently analyzed by the two authors, compared, and contrasted to confirm and/or refute each other's data analysis. Agreement was reached through further discussing the different tentative assertions and categories. Data were analyzed via continuous comparison [41]. Descriptive and pattern coding was used to analyze both within-case and cross-case patterns, and all the written data were sorted into categories according to their content [42].

Trustworthiness

Trustworthiness was established using multiple techniques that enhance credibility, transferability, dependability, and confirmability, and ensure methodological rigor, as follows: (a) conducting an audit trail, specifying the steps involved in the methodological procedures followed in the study; (b) cross-checking multiple data sources for consistency to locate cases that could challenge emerging themes; (c) formulating a detailed description of the site, participants, and procedure; (d) member-checking the manuscript, providing feedback on content and accuracy, and utilizing researcher triangulation and participant feedback to ensure that the participants' experiences and perceptions in the simulation were accurately represented [43,44]; and (e) ensuring that the researchers worked as a team, to increase the credibility of the findings [45].

4. Results

The first aim of the study was to examine the influence of simulation experiences on the divergent and reflective thinking of physical education STs. We analyzed three levels of "opportunities to reflect" (OTRE)—the four sources of data according to themes that we identified in our analysis. In other words, content analysis was applied on the following: (1) the transcript of the volunteer conversation second-year students immediately after the viewing the **scenario**; (2) volunteer reflection assignments regarding their (a) feelings during the simulation, (b) reactions towards conflicts, and (c) thoughts; (3) observers—analysis of the discussion transcription, focusing on their role in the discussion.

The first source for content analysis was the immediate response of the volunteers. The most prominent and immediate response of all the volunteers was the reaction of self-defense, justifying their response. Furthermore, they said that they would have acted/responded in the same way if they had been given a second chance, see Table 1.

Some volunteers justified their behavior by connecting their intentions to the sake of the weak pupil in the class. The action they chose stemmed from their empathy with his/her feelings: "All that mattered to me at that point was to prevent her misery. I wanted the other children to try to feel as she might have felt, and to be more compassionate." (DO)

Table 1. First source of opportunity to response and the identified theme.

Immediate Response: The Transcript of the Volunteer Conversation Second-Year Students Immediately after the Viewing the Scenario	
Reaction of self-defense, justifying their response	"I would act the same way and would not change anything. I think my action was the ultimate one, since I considered all the implications that might appear after my response." (ET) * "I do not agree with the criticism against my action. I would have made the same decision if I had a second chance." (RO) *

* In order to protect the privacy of the participants, after completion of all transcriptions all real names were deleted and randomly replaced by two letters.

The second OTRE was "home-reflection assignments." In the first order of content analysis categorization, the nine following themes were identified by the authors: a description of actions that were taken; thoughts/intentions/wishes; feelings; justifications/standing firm in their opinions; looking for affirmation/searching for reinforcement; looking for similarities between self-response and others' suggestions; generalization; criticism; and suggestions. In a second-order analysis, we grouped the nine categories into three upper-level categories, see Table 2.

Table 2. Second source of opportunity to response and the identified themes.

Home-Reflection Assignments	
Self-justification and objection to alternative responses suggested by their peers	"There is no option for any other reaction. I felt that my behavior was exactly what the pupil had to hear and understand. Other suggestions given by my peers were not relevant." (DS) * "After receiving feedback from peers, I am even more convinced that my first reaction in the simulation was the best." (GB) *
Thoughts	"I thought that the whole class should pay so that all the pupils would take responsibility as a group. That gives the individual the feeling of trust in his/her peers' friendship." (OS) "It was important for me to put the class in its place, because respect for the individual is an ultimate value; honesty and integrity are basic values in a civilized society." (DO)
Feelings	"I felt that they were standing together and were protecting each other against me." (YA)
Actions	"It didn't work. I began talking about the importance of values above and beyond the importance of playing." (DA) "I told them that I was leaving the gym so that they would solve the problem by themselves, and to call me when they arrive at a solution." (Si)
Criticism and suggestions	"I recommend implementing a similar scenario in a lesson at school, or in peer teaching, and then discussing it in the class." (DO) "I recommend acting out different solutions to the one of a conflicting situation, and then to discuss the strengths and weaknesses of each." (OF)

* In order to protect the privacy of the participants, after completion of all transcriptions all real names were deleted and randomly replaced by two letters.

The most prominent reaction that emerged in this analysis repeated the same pattern of self-justification and of objection to alternative responses that they could have made and that were suggested by their peers, exactly the content that emerged immediately after their initial reaction in the scenarios. Since they were required to reflect not only on their behavior but also on their feelings and thoughts, the home assignments were more detailed than the monologue in the class, and enabled a greater perspective regarding the scenarios. As can be seen in Table 2, the STs' actions, feelings, and thoughts are presented, even though within this category the vast majority of the responses were related to their actions and less to their thoughts. Only few of the written content were identified as feelings, whether of the volunteers, the actors, or the observers.

The third category that was identified by the authors was "criticism and suggestions." In this category, we saw the fruits of reflective thinking that led to the beginnings of, or enabled, divergent thinking. It appeared that the STs started to ask themselves what might be the reason for conflicts that arose, or what might have been done differently, only when they arrived at home, far away from the

class event. They might have viewed their peers as too intimidating, and therefore hardly could or could not admit that other options of responses were plausible. See examples in Table 2.

The third level of OTRE was the observers' "objective reflections." Content analysis was performed on the transcripts of the conversation that took place immediately after the scenarios. The three main categories, with three sub-categories, that the authors agreed upon through content analysis were as follows: (1) clarification of statements/trying to understand (a) the volunteers' intentions, (b) the actors' feelings, (c) and the reasoning for changing the volunteer's initial plans and the actions taken as alternatives to the initial plans; (2) criticism; and (3) alternative action/suggestion. These are presented in Table 3.

Table 3. Fourth source of opportunity to response and the identified themes.

Observers' Reflections	
Clarification statements:	
Volunteers' intentions	"What did you actually want to do and why?" (DA) *
Actors' feelings	"If I understood you correctly, you felt deserted?" (OS)
Reasoning	"Can you elaborate on why have you changed your original plans?" (SH)
Criticism	"You should have responded immediately without hesitating. The student was being humiliated by her peers. Her feelings were hurt." (YA)
Alternative action/suggestion	"I would prefer a more receptive response to alleviate the class climate." (NE)

* In order to protect the privacy of the participants, after completion of all transcriptions all real names were deleted and randomly replaced by two letters.

A summary of the results that were obtained from the four sources of data revealed that STs experience a four-stage learning process, as follows: First, there is observation and listening to the self and to others. In order to understand and identify with others, it is necessary to observe and listen with empathy to everything that occurs and to all viewpoints. Second, case analysis that considers the emotions of all the participants is conducted. Bringing scenarios to the group in front of all the participants creates a strong emotional expression, which makes the conversation that follows very intensive. The STs learned to be considerate of their peers' feelings and to honor them. Third, many alternative ways of behavior that can solve the problem presented in the scenario are suggested. In this stage, the main purpose of the study—to develop divergent thinking—is achieved. The last stage is a dual-level reflection: on one level, reflection about actions while reasoning and making conclusions; on another level, reflection on thoughts (meta-cognition) concerning the planning quality and the motives for the teacher behavior, and concerning the quality of the decisions and the solutions that were applied.

The second purpose of this study was to describe how participants in a simulation course—feedback providers, instructors, and STs—evaluate the potential contribution of such a course to a physical education teacher education program. All the course participants took part in the data collection, both through a focus group conversation that met twice and through their written final summary reflection, which was labeled: "view from above." The authors categorized the data into seven main themes while analyzing the final assignment concerning the STs' perception of the course's contribution: (1) emotional regulation, (2) creative and flexible thinking, (3) the group invitation to learning, (4) multiple internal reality—visiting the students' world, (5) personal development, (6) moderator responsibility, and (7) introduction to future situations; see Table 4 for quotes.

Table 4. The course contribution—main content categories and quotes.

Content Category	Quotes
Emotional regulation	I learned that in actual teaching you do not always have to respond immediately. Sometimes you can step back, think in a relaxed manner, and respond later after careful and deep thinking. In addition, I learned that sometimes I can make mistakes, admit that I made a mistake, and fix it later, even with pupils and with school staff. (NI) * I learned that there are different approaches to different situations, and positive ways should be considered to empower the pupils rather than hold steadfastly to the teacher's strong position and use threats, such as marks. (NL)
Creative and flexible thinking	I developed creativity in my thinking concerning myself and all class members when attempting to find appropriate solutions to complex situations. (HB) It expands the response repertoire of each one of us for lesson management and coping with the pupils. (EG)
The group invitation to learning	I always have someone from my peers/colleagues who listens to me, and whom I can consult with. (OF)
Multiple internal reality—Visit to the pupils' world	In the simulation I had to become a pupil. It forced me to see the pupil's point of view. I understood again how different pupils feel in a variety of situations. I am sure it will help me to reach them in the future. (AM)
Personal development	The class conversations emphasized to me my personal characteristics, and to what should I pay attention. (YI) The course helped me to cope with criticism. This was very difficult for me in the past. When I overcame the personal barrier, I learned how to receive criticism and take the parts that were suitable for me. (OD) In the past, my attitude towards conflicting situations was black-and-white and very emotional. Today I know how to regulate myself and think rationally and in proportion to the situation. (GG)
The moderator responsibility	I learned to differentiate between judgmental response and reflective response, and how important it is to notice these differences while you talk. (JP) There is no need to speak harshly or steadfastly about your own opinion. I learned a lot about the importance of the tone of the voice, about asking questions—open but focused, about dynamic nature of a lesson—when to stay with your plans, and that sometimes you must identify a situation in which you must improvise. (YA)
Introduction to future situations	I feel more confident to teach. I can solve unexpected problems. I can identify with the pupils' feelings and point of view, and get closer to them. I feel it will help me a lot. (MA) In school, when we face problems, we do not always have the time or the knowledge of how to respond. In contrast, when a situation is presented in a safe environment that promotes thinking and creativity, I feel that I can express myself better. It is a proper preparation for us to work with children in the future. (LB)

* In order to protect the privacy of the participants, after completion of all transcriptions all real names were deleted and randomly replaced by two letters.

5. Discussion

The first purpose of this study was to examine the influence of simulation experiences on divergent and reflective thinking of physical education STs. Looking first at the content analysis of all four sources of OTRE, the common denominator that appears across the four sources of data is the feelings-thoughts-behavior relationships. The STs explained and analyzed their behavior either by their intentions and thoughts, or by their feelings. Looking deeper into the results, we showed that intentions and thoughts were much more evident than feelings. The current results point to the participants' abilities to reflect at different levels, as described in a variety of previous reflection models such as the onion model [21], Bain and colleagues' [20] five-level scale, or Larrivee's [22] three-level scale. However, as demonstrated, these abilities had two characteristics: first, they developed along the course of the initial level of reporting, to a higher level of dealing with ethical and social levels. Second, the vast majority of the conversations emphasized cognitive aspects. We noticed that the emotional component of the participants' reflection was negligible. In the first stage of the simulation analysis, they demonstrated a need to steadfastly defend their attitudes. Only later in time, and not in front of everyone, was a climate of inclusion created. Only then did the openness to think differently or to accept others' opinions/ideas/criticisms begin.

In spite of this, the conversations held immediately after viewing the scenarios were the main ground where emotions could be processed and perceptions could be changed. In these conversations, as demonstrated in the results, actors and observers increased the scope of the scenario's analysis in their feelings and in the actors' feelings. Hence, we attribute several benefits to the conversations. First, since the conversations were conducted immediately after the scenario, at the moment that the reflection is the most emotionally authentic, the volunteers could ventilate their feelings. We claim, as reported by others [46,47], that teachers in general and STs in particular rarely take the opportunity to process their own feelings [48]. Usually they are occupied with processing their pupils' feelings [49,50]. We join others' claim that the teachers' ability to regulate their emotions is an efficient tool that can ease the achievement of the balance of school events and everyday life hassles regarding emotions-thoughts-behavior relationships [46–48]. Moreover, this was important to them not only as teachers, but also in terms of the continuation of the conversation, in a way that the volunteer would be receptive to feedback and suggestions given by their peers. Second, the STs had the opportunity to listen to how behavior

can vary, so that they could see how one conflict can have different solutions. Different solutions are explained by different sources of motives, such as feelings-emotions and intentions-thoughts. Such an understanding not only increases their behavior repertoire, but also their richness of reflective thinking, which leads to, or goes hand in hand with, divergent thinking [18,51]. Third, the discussion with all the course participants enabled opening the conception of the situation at hand to a broader scope of educational and professional aspects, which advanced the cognitive level of the discussions.

It should be noted that opinions and verbal reactions that occurred immediately after the scenarios, during the class conversation, were different in nature than the reflections that were written later at home. The most prominent difference from a technical aspect was the richness of the descriptions. From a content aspect, two major differences were evident: first, the need for self-justification was replaced with observations oriented toward the self, meaning that they were trying to explain and understand their feelings and behavior rather than justify it; second, they acknowledged the advantages of other possibilities of teacher behavior rather than arguing for or against each possibility. By requiring both, we assured that student teachers would make their reflections at two different points in time and place, to increase the possibility of divergent thinking.

The second purpose of this study was to describe how participants in a simulation course—feedback providers, instructor, and student teachers—evaluate the potential contribution of such a course to a physical education teacher education program. The main themes that emerged in the conversations that were conducted regarding this issue pointed to a high appreciation of the course's contribution. Developing skills, such as giving and receiving feedback, increasing empathy of teachers towards students, openness to listening to others' suggestions, and divergent thinking, are considered among the keystones of teachers' skills in the twenty-first century [28,29]. Divergent thinking as well as creativity were demonstrated both along the process of the course, and by the summary "view from above" assignment. The STs perceived their improvement in divergent thinking as one of the major contributions of the course. They specifically described their appreciation of acquiring these skills.

Three well-reasoned benefits were raised by the STs concerning the course importance and its contribution to the teacher education program, which are in line with the theoretical concept of the benefits of divergent thinking [4,5]. First, the STs noted that, through their own learning process, which began with strong resistance and ended with openness, they probably achieved two benefits simultaneously: They improved their ability to think openly, and they increased their confidence in their ability to understand resistance and find ways to lessen or diminish it, while learning how to openly listen to their friends. In other words, the STs felt that they acquired a tool for both self-use as an individual and for use as a PE teacher. Second, the STs compared cases that were dealt with in the course and those that occurred during actual teaching, and they concluded that simulation provides added value to the program due to its several advantages, as follows: (a) It facilitates divergent thinking as a result of the use of the "wisdom of crowds" technique. All the course participants cooperated in suggesting a variety of alternative solutions, and by doing this expanded their arsenal of behaviors. (b) A multi-level reflection is achieved because all aspects of the scenarios are presented and discussed by all the participants—volunteers and observers. This is unlike actual teaching, where the ST conducts personal reflection usually from only one point of view—his or hers. (c) Similar to the description of the models suggested by Bain and colleagues [20] and Larrivee [22], the opportunity to reflect both immediately after the scenario and later at home enabled a better and deeper understanding, and enabled the STs not only to analyze the cases, but also to conduct a synthesis of several suggestions, in order to reach conclusions for future practical implications. Hence, they were not only reflecting on their actions, but in addition they were using a meta-cognitive strategy to reflect on their thoughts concerning planning, decisions, and problem solving. Third, as reported in other studies that used simulation in general teacher education [35], some of the cases that were chosen for the scenarios were related to everyday school-life situations, with which the STs are usually not familiar when they are concentrating on teaching their lesson plan, such as conflicting dialogues with colleagues, conversations with parents, conversations with management personal, or situations with pupils

focused on educational-ethical values. These simulations paved the way to their understanding of the school life context, and specifically instilled in them the understanding that the PE teacher first and foremost deals with education.

The limitations of the study relate to its reflexivity and to power dynamic issues. It should be noted that the course was given as an elective one, without grades. Participants were awarded academic credits by passing the course. However, the course had several learning assignments, and the STs received them when they registered for the academic year. Concerning the reflexivity and positionality of the authors, although we could reflect on simulation as a learning tool, in the current study we deliberately chose to concentrate on STs rather than on our own expertise regarding the insights that emerged from teaching the new course. The narrative can be seen as our interpretation of their voices.

An additional aspect is the power dynamic of the study, which interfaces to an ethical issue concerning the teachers and students as participants in the study. Some might argue that there is a researcher role conflict in a course where the instructor is the researcher. However, others [52] claimed that this alleged conflict can easily be solved, especially in action research where the presence of the researcher is necessary since he/she is part of the researched site domain. In other words, while some in the research literature claim that being an insider in a research is a study limitation, or even should involve a penalty due to the inability to be objective or to being disinterested [53], others, by contrast, believe that insiders have special advantages when doing research in their own domain [54].

To conclude, using simulation in teacher education is a powerful means for developing higher-order thinking skills that are essential for teachers in the 21st century. The course created for the STs gave them an opportunity to employ a learning process in which they used thinking strategies such as asking questions, bringing about a variety of points of view, comparing between them, and making arguments for their behavior. By doing so, they developed processes of high order thinking, such as divergent and reflective thinking, which are pertinent for their future planning, decision making, and problem solving.

Along the course, the STs became involved in a process in which they learned to observe, listen, and open their mind to each other. They learned to tend to others' feelings, to be considerate, and to show empathy. In addition, they learned to consider a number of solutions for one problem, to reflect upon their own and others' behaviors, and to broaden their repertoire of behaviors. It is recommended that the cases that are chosen as scenarios for the simulation be taken both from situations that occurred in the class and from everyday school life.

Pedagogical Implications for Physical Education and Sport Pedagogy

Training the physical education STs to identify multiple internal realities can help them to cope with a variety of situations and conflicts. In our perception, in physical education teacher education, it is important to train for conducting personal conversations with pupils, following experiences that occurred in the lesson. The contexts can vary from the moral-social, such as dealing with acceptance or spurning of children working in pairs or in teams, to the emotional, such as those concerning winning or losing a game, and to the physical, such as acknowledging the physical developmental stage of the pupil to focus on process versus a product. The teacher should be able to discuss different types of conversations for different purposes, such as acquaintance, enhancing closeness, placing limits, and solving problems.

In terms of physical education field experience, STs are busy organizing from one lesson to the following one, with short breaks between them. It is very difficult to conduct deep feedback conversations. Moreover, the STs experience an emotional stress and are not free to listen. Therefore, in a simulation without these stressors, the conversation can reach a higher order level of thinking.

The simulation is a trigger to speak about values, attitudes, perceptions, and assumptions. It promotes critical thinking and presents how the teacher can switch from automaticity in their responses to reasoning in a future planning. To move from unidimensional of their role as a physical educator to multi-dimensional perception of their role as teachers that deals with educational aspects

as well. Based on the results of the current study, we recommend implementing simulation courses within teacher education, in which STs can develop not only their cognitive but also their emotional levels of reflection.

6. Summary for Practitioners

This study examined the influence of simulation on divergent and reflective thinking of student teachers (STs), and appraised how they evaluate their potential contribution to teacher education programs. Twenty-three physical education STs participated in a simulation course. They planned teaching-learning conflict scenarios, and served as volunteers in these scenarios, which were filmed. They then watched the film, and a discussion was conducted aiming to create alternative responses to conflicts, and an empathetic and reflective conversation. Additionally, the STs were required to submit a summary assignment describing their evaluation of the course's contribution to their teacher preparation. Content analyses were conducted on the discussions and the written reflections. Results demonstrated that STs were able to feel, think, and behave authentically regarding the situations depicted in the scenarios. They developed high-order thinking: divergent, reflective, and creative thinking, and expanded their repertoire of behaviors that integrated thoughts and feelings in learning-teaching situations.

Initiating simulation centers in teacher education departments can provide greater support for the holistic approach. Such centers will also be able to support student teachers that are in the field experience phase, and they will be relevant to scenarios from school life. It is recommended that this method in teacher education be assimilated as part of peer teaching or micro-teaching at several stages along the program, so that each stage will achieve a representative response ahead of entering school. First, an infrastructure of communication skills within the group should be facilitated in order to build a safe environment for the trainees and to understand the simulation as a tool. Second, the scenarios that the student teachers are practicing should follow the stage of their professional development and the subject matter they are dealing with. Third, the training of actors among the course graduates should be considered.

Author Contributions: Conceptualization, S.Z. and M.O.; methodology, S.Z. and M.O.; software, S.Z. and M.O.; validation, S.Z. and M.O.; formal analysis, S.Z. and M.O.; investigation, S.Z. and M.O.; resources, S.Z. and M.O.; data curation, M.O.; writing—original draft preparation, S.Z.; writing—review and editing, S.Z. and M.O.; visualization, S.Z. and M.O.; supervision, S.Z. and M.O.; project administration, M.O.; funding acquisition, N/A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare that there is no conflict of interest.

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