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Contribution of Teaching and Learning Statistics in Initial Training to Promote Fundamental Education and Probabilistic Methodologies and Technological Resources of Mathematics Prospective Teachers for Professional Development of Future Students Classes

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Abstract

Statistical literacy and reasoning are prominent in international curriculum documents as an objective in teaching and learning of students. Thus, this study, carried out in preservice teachers (PTS) practices experience of mathematics focused on understanding perceptions about the positive contribution of the results is pertinent to promotion their education consolidated to their deepened knowledge. Thus, the adoption of collaborative work in innovative teachers training is defended as essential to promote their necessary knowledge and professional development of statistical literacy and reason practices, to promote teaching and students learning. This qualitative and interpretative research aiming to understand the contribution of the approaches considered in this teacher training course using a collaborative context to promote their statistical knowledge and professional practice of students' teaching. So, the results of this study show the relevance that the collaborative context of PTS contributed to the necessary improvement and knowledge of professional teachers practices of statistical literacy and to highlighting the support international teachers in their necessary development and knowledge to understanding experiences to provide teaching of Statistics in innovative work for use in future docents' practices.

Keywords: Contribution of Collaborative Work Teachers Learning in Training Course. Professional Practice of Statistics Literacy and Education. Statistical Education of Curricular and Professional Practice.

Introduction and Literature Review

The need to develop students' fundamental statistical literacy and reasoning is currently highlighted in several international curriculum documents because in recent decades there has been a significant importance of research for a capacity active ability to interpret the amount of data to make informed decisions from the early years of schooling that was still uncommon for teachers [1-5]. Therefore, teaching curriculum documents need to be reinforced to develop the training of future teachers (PTs) in addition to producing teaching contexts necessary to successfully achieve recent proposals. This research is relevant to present a review of published theoretical studies providing an overview of the topic and findings from different focuses of statistical education recognized and highlighted as important to support international teacher education, contributing evidence of work that supports the teaching and learning of this topic to discover the research on the generation of knowledge of prospective teachers.

It is also necessary to adopt the fundamental collaborative work context of the PTS to recognize effective participation as a contribution to assuming the adequate training to learn and teach statistical investigations to have the opportunity to carry them out to contribute and promote how to improve their knowledge in teaching classes. to adopt new student learning practices. research in the field of training is carried out with relevance of the criteria and characteristics of the contexts of the studies of the participants who developed knowledge and reported the involvement of future teachers in the exploration of tasks for the inte-

gration of statistical education and didactic training pedagogical and methodological practices to develop students' [6]. which provided conditions for mathematical modeling with plans that enable the development of classes centered on tasks. In this context, so that knowledge and skills are acquired, teachers are recommended that students between 5 and 8 years of age carry out analysis of data in tables and reading of bar graphs, columns and simple grouped tables to have contact with intuitive notions of probability, to deepen the promotion of development and the capacity of their statistical reasoning [7]. The results of this study show that the collaborative context carried out in the training course supported the necessary and adequate improvement of knowledge and professional development of statistical literacy, to be used in their practices.

Methodology and Data Collection

This study is pertinent to adopted understand the realized collaborative work of prospective teachers education experiment at the school year 2024/25, involving 10 Pts participants (male and female) of the 3rd cycle and secondary education that were enrolled in the mathematics teaching at university of Lisbon. And they are based on a cycle of steps of question formulation, data collection, data representation and analysis, and interpretation of results. At this stage, planning is carried out to select and collect relevant data for study to answer the questions formulated. This research follows a qualitative and interpretative nature aiming to understand the prospective teachers' perceptions about the positive contribution of the statistic reflective used in the PTs education experience to promoting their knowledge through formative assessment for their possible use in future students teaching practices [8]. They read annual curriculum documents analyzing the mathematical reasoning tasks teaching program and the construction of statistic graphs, circular bars and simple tables developed. The data collection and analysis included interview discussed together the analysis and reflection of contents objectives and tasks that are understood as statistical literacy to appreciate the identify methodology experiences and materials necessary in developing the necessary work to implement students in the classroom. The following section presents the results of the analysis exemplified based on the collection of the mentioned questions which consists of making justified inferences of participated PTs in this study voluntarily, that is starting knowledge of existing information to obtain new conclusions, at new knowledge. But the used names of PTs were fictitious, used by numbers, in order to guarantee ethical issues.

Results

In particular the assess of PTs perceptions of using statistics learning and reflection on the contribution of this resource and possible use in students teaching practices regarding the work carried out in the training session, where the obtained responses of the participants to know how developed their work and recognized satisfaction in the development of training.

I highlight the importance of collaborative questioning sessions of the materials made available to clearly develop the stages of statistic which prove to be useful in mathematical learning (PT1). It was important to learn how adapt to the completion of tasks that promoted my learning, leaving me confident in understanding what is intended to give appropriate statistics lessons to help improve students.(PT2, PT3). WE believe that this possibility is important to allowed me adequate managed of statistic to identify and created the answer correctly to emphasize the importance of analyzing the students resolutions motivated from traditional teaching who like these tools and reflection and currently being an important formative assessment (PT4, PT5). I am used to and enjoy participating, I noticed the way the questioning was done, I believe that by planning classes that I carried out based on tasks together with colleagues and thinking about the objective, it made me understand better. I prepared it on paper, involving numbers and having the students' knowledge and understanding of what I teach so that they can use it for better understanding (PT7, PT6). For me, building a bar graph would be great and I recognized it as a way to improve my practice for students in the classroom. I felt comfortable sharing the reading, interpretation and meaning of the suitability of the task for their implementation, highlighting that statistics in our annual plan appear to be worked on. I believe that in the document the statistics are related to investigations into the daily lives and experiences of students (PT9). I think it's really good and I like seeing the deferent forms of methodology and statistics here and I would do the same to help classes reevaluate their positive ideas and what they need to improve and it meant a lote (PT10). Everything we discussed here in the group watching videos led me to help, I learned a lot, the planning was very valuable having a look at the planning, how to apply the task in front of the classroom it was really good, I believe you can see the student's evolution. Now I know where I need to look to correct and work on a graph together with the student because I got involved in the planning. (PT 8)

Conclusions and Discussion

This study in an educational community of mathematics teachers highlights the joint enterprise, centered on the analysis of videos of a statistics class in an exploratory teaching context, enabled professional development in statistics education, especially the understanding, contextualization and justification of teaching practices, envisioning conditions for questioning and changes in their own practice (ways of operating a perspective they were accustomed to for teaching and learning statistics), privileging the problematization of students' activities. It thus highlights the potential of video as a provocateur and mediator of reflections and understandings of the statistical knowledge necessary for teaching, in this case especially on the promotion of statistical thinking. Characterize the teacher's curricular knowledge on statistical literacy and the ability to interpret and understand statistical information to what extent. this knowledge reflects the development of students' statistical literacy. Due to the recent inclusion of statistics and probability in education in other countries, it is necessary to consider knowledge of mathematical content and in conjunction with pedagogical knowledge. Studies on the assessment of mathematical knowledge for teaching VT. The results suggest the need to reinforce the FP training of statistical and pedagogical content knowledge. The analysis of the collected data allowed us to conclude that several of the strategies used correspond to the use of a set of procedures that prevail after work around the topic of Statistics. A tendency to understand several statistical concepts instrumentally was also identified. The study of Statistics highlights the importance of questioning, conjecturing and seeking relationships when formulating and solving problems. Analyzing student performance is one of the fundamental concepts for developing statistic literacy and im-

plementing classroom practices that facilitate the mobilization of knowledge in this essential concept. peer integration work is one of the ways to promote more positive attitudes towards the proposed tasks.

The topic of statistics and probabilities, uncommon in the teaching of Mathematics until the 20th century1, was privileged in the curricular guidelines that evolved internationally, from the initial years of schooling to secondary education for active citizenship of students. In keeping with the focus of this article, this section is structured into the following themes: basic notions of probability literacy and statistical reasoning. Fernandes et al [9]. also highlight the recent interest in proposing to students the resolution of more sophisticated problems with real data using technological resources, allowing them to explore concepts of probability and inferences, develop more intuitive reasoning and address more real situations in teaching and learning practices in classes taught. This study shows a predominance of investigations aimed to involve the perception of pre-service teachers were more frequently incorporated into mathematical methods courses and focused on developing perceptions about various topics of mathematics teaching to improve classroom practice and reviewed that highlight their benefits for learning statistics to be adequate. Statistics is considered both in Portugal and internationally for the organization, representation and processing of data relating to real situations on this topic. It is necessary to create situations that enable the development of literacy, reasoning and statistical thinking. This involves making appropriate interpretations based on the data sets, and having statistical summaries means understanding. Statistical reasoning allows teachers to combine ideas about data and make inferences and interpretations of the results. had the opportunity to explore their classroom reality, building tables and graphs and exploring their different representations. Implementing classroom practices that support/facilitate the development of statistical reasoning and literacy learning, a relational understanding of this concept is essential. These studies summarize the variety of programs that involve teachers to analyze mathematics teaching to develop observed skills and particular instructional practices. For Statistics to be adequately taught in schools, teachers must have a strong knowledge of this subject and its teaching. And it becomes relevant to know what teachers think about the programmatic guidelines for teaching Statistics and what they value and ways to achieve it.

References

1. Franklin, C .(2005). Guidelines for assessment and instruction in statistics education (GAISE) report: A preK-12 curriculum framework. American Statistical Association.
2. Lannin, J. (2011). Developing essential understanding of mathematical reasoning for teaching mathematics in prekindergarten–grade 8. National Council of Teachers of Mathematics (NCTM).
3. National Council of Teachers of Mathematics – NCTM. (2007). Princípios para a ação: Assegurar a todos o sucesso em matemática. Associação de Professores de Matemática (APM). Retrieved from https://www.nctm.org/Standards-and-Positions/Principles-and-Standards
4. Gal, I. (2002). Adults' statistical literacy: Meanings, components, responsibilities. International Statistical Review, 70(1), 1-25.
5. Ministério da Educação (ME). (2007). Programa de matemática do ensino básico. ME-DGIDC.
6. Santos, L. M. (2020). Pre-service teachers' pedagogical development through the peer observation professional development program. South African Journal of Education, 40(3), 1-12.
7. Pontes, M. M., & Castro, J. B. (2021). Uma breve discussão sobre a presença da estatística no currículo do ensino fundamental. Revista Espaço do Currículo, 14(2), 1-14.
8. Bogdan, R., & Biklen, S. (1994). Investigação qualitativa em educação. Porto Editora.
9. Fernandes, J. A., Bernabeu, C. B., García, J. M. C., & Batanero, C. D. (2009). A simulação em probabilidades e estatística: Potencialidades e limitações. Quadrante, 18(1–2), 161-183.