
FIELD RESEARCH AS A TEACHING METHOD IN STATISTICS WITH TECHNICAL HIGH SCHOOL STUDENTS

PESQUISA DE CAMPO COMO MÉTODO DE ENSINO EM ESTATÍSTICA
JUNTO A ESTUDANTES DO ENSINO MÉDIO-TÉCNICO

LA INVESTIGACIÓN DE CAMPO COMO MÉTODO DE ENSEÑANZA EN
ESTADÍSTICA CON ESTUDIANTES DE SECUNDARIO TÉCNICO

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ABSTRACT

This article describes an activity carried out in the Statistics discipline with students of the Technical High School in Agriculture at IFMT Campus Confresa, whose objective was to discuss how the activity contributed to the development of research skills, teamwork and the practical application of statistical concepts, as well as reflecting on learning and possible improvements for future activities. The students were divided into groups to carry out field research related to the topic freely chosen by them and prepare reports based on the data produced. Analysis of reports and student responses to the questionnaire revealed the importance of prior experience in Statistics, teacher guidance and belief in the relevance of practice for the success of the activity. It is suggested the adoption of more dynamic and interactive teaching methods and the inclusion of specific themes for research in future activities. The report highlights the importance of integrating practice and theory in the teaching of Statistics, serving as an inspiration for the implementation of similar activities in other institutions and disciplines.

KEYWORDS: Mathematics Teaching. Statistic. Secondary Technical Education. Field research.

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RESUMO

Este artigo descreve uma atividade realizada na disciplina de Estatística com estudantes do Ensino Médio-Técnico em Agropecuária do IFMT Campus Confresa, cujo objetivo foi discutir como a atividade contribuiu para o desenvolvimento de habilidades de pesquisa, trabalho em equipe e aplicação prática dos conceitos estatísticos, bem como refletir sobre os aprendizados e possíveis melhorias para atividades futuras. Os estudantes foram divididos em grupos para realizar pesquisas de campo relacionadas ao tema escolhido livremente por eles e elaborar relatórios com base nos dados produzidos. A análise dos relatórios e das respostas dos estudantes no questionário revelou a importância da experiência prévia em Estatística, orientação do professor e crença na relevância da prática para o sucesso da atividade. Sugere-se a adoção de métodos de ensino mais dinâmicos e interativos e a inclusão de temas específicos para as pesquisas em atividades futuras. O relato destaca a importância de integrar a prática e a teoria no ensino de Estatística, servindo como inspiração para a implementação de atividades similares em outras instituições e disciplinas.

PALAVRAS-CHAVE: Ensino de Matemática. Estatística. Ensino Médio Profissionalizante. Pesquisa de campo.

RESUMEN

Este artículo describe una actividad realizada en la disciplina Estadística con estudiantes de la Escuela Técnica Superior en Agricultura de la IFMT Campus Confresa, cuyo objetivo fue discutir cómo la actividad contribuyó al desarrollo de habilidades de investigación, trabajo en equipo y aplicación práctica de conceptos estadísticos. así como reflexionar sobre los aprendizajes y posibles mejoras para futuras actividades. Los estudiantes se dividieron en grupos para realizar investigaciones de campo relacionadas con el tema elegido libremente por ellos y elaborar informes a partir de los datos producidos. El análisis de los informes y las respuestas de los estudiantes al cuestionario revelaron la importancia de la experiencia previa en Estadística, la orientación del docente y la creencia en la relevancia de la práctica para el éxito de la actividad. Se sugiere la adopción de métodos de enseñanza más dinámicos e interactivos y la inclusión de temas específicos para la investigación en futuras actividades. El informe destaca la importancia de integrar la práctica y la teoría en la enseñanza de la Estadística, sirviendo de inspiración para la implementación de actividades similares en otras instituciones y disciplinas.

PALAVRAS-CLAVE: Enseñanza de las Matemáticas. Estadística. Educación Secundaria Técnica. Investigación de campo.

1 INITIAL CONSIDERATIONS

Statistics is a branch of Mathematics that plays a fundamental role in scientific and technological development. Its study involves the production/collection, interpretation, analysis, and presentation of data, allowing information to be extracted and used for decision-making in various areas, such as biological, social, economic, and environmental sciences. In the Brazilian educational context, the teaching of Statistics has undergone significant changes over the last decades, seeking greater adequacy to the demands of the 21st century.

The National Curriculum Parameters (PCN), documents that guide teaching in Brazil, highlight the importance of Statistics as an essential component in the education of students. According to the PCN, the teaching of Statistics should be included in different stages of basic education, developing skills in reasoning, interpretation, and argumentation based on data (BRASIL, 1998). Furthermore, Statistics should be approached in an interdisciplinary manner, allowing connections between different contents and areas of knowledge.

In schools, the teaching of Statistics has faced several challenges, such as the lack of specific training for teachers and the difficulty in contextualizing statistical content in a way that makes it interesting to students. In this sense, conducting practical activities and promoting research projects are strategies that can help overcome these difficulties and stimulate students' interest in Statistics. Research, besides enabling the concrete application of statistical concepts, also develops skills in investigation, critical thinking, and teamwork, fundamental for the comprehensive education of students (EVANGELISTA, 2015).

With the growing demand for qualified professionals capable of dealing with the complexity of contemporary issues, it becomes increasingly important to offer students educational experiences that adequately prepare them to face the challenges of today's world. Contextualized teaching of Statistics, combined with practice, has the potential to develop competencies that go beyond mastering formulas and calculations, contributing to the formation of individuals capable of critically analyzing information and making informed decisions (ZEN, 2017).

Field research is a method that allows students to experience and understand the reality around them, being especially relevant in technical education, where students must apply the knowledge acquired in the classroom to solve real problems. In the Technical High School in Agriculture, for example, students have the opportunity to investigate issues related to agricultural and livestock production, natural resource management, and sustainable development, areas where Statistics plays a fundamental role in decision-making and planning actions.

In this context, the activity was conducted during the Statistics course offered to students of the 3rd Year of Technical High School in Agriculture at the Federal Institute of Mato Grosso (IFMT) Campus Confresa, where students were divided into groups to carry out field research related to agriculture and livestock, and then prepare reports based on the data produced. The research objective was to discuss how the activity contributed to the development of research skills, teamwork, and the practical application of statistical concepts, as well as to reflect on the learnings and possible improvements for future activities.

This text aims to highlight the importance of field research as a pedagogical strategy in the teaching of Statistics. The activity demonstrates how field research can be used to connect statistical concepts to the real problems experienced by students, facilitating the understanding of these contents and stimulating interest in the study of Statistics.

Moreover, the activity also shows the relevance of teamwork in the learning process. Students, by organizing themselves into groups to conduct field research and prepare reports, had the opportunity to develop communication, cooperation, and leadership skills, fundamental aspects for the exercise of citizenship and integration into the labor market.

Furthermore, the intention was to contribute to the reflection on the pedagogical practices adopted in the teaching of Statistics, highlighting the challenges and possibilities for promoting more contextualized teaching. The results of the activity can serve as inspiration for other teachers interested in rethinking their approaches and strategies in the teaching of Statistics, always aiming to provide students with relevant, challenging, and engaging learning experiences.

2 THEORETICAL ASSUMPTIONS ABOUT STATISTICS AND ITS TEACHING

The teaching of Statistics has been the subject of study and discussion by various authors, mainly due to its importance in the formation of individuals capable of understanding and analyzing the contemporary world, characterized by the massive production of information and data. In this sense, the incorporation of technologies, such as electronic spreadsheets, in the teaching-learning process of Statistics is one of the strategies that can contribute to improving the quality of teaching and promoting learning.

According to Batanero, Godino, and Roa (2004), Statistics is an area of knowledge that should be approached at all stages of education, being fundamental for the development of critical thinking, informed decision-making, and understanding of complex phenomena present in society. The authors emphasize the importance of contextualizing statistical contents and using practical and investigative activities, allowing students to apply the learned concepts in real situations related to their daily lives.

From this perspective, the use of technologies in the teaching of Statistics is a strategy that can enhance the learning process, allowing students access to resources and tools that facilitate the understanding and application of statistical concepts. Among the various technologies available, electronic spreadsheets, such as Microsoft Excel, LibreOffice Calc, or Google Sheets, stand out for their versatility and ease of use, being widely used in teaching and professional practice (BIEHLER, 1997; DULLER, 2008).

Regarding the use of electronic spreadsheets in the teaching of Statistics, Vasconcelos (2007) states that these tools allow students to organize, analyze, and graphically represent data quickly and efficiently, enabling exploratory analyses and understanding of patterns and trends in the data. Moreover, electronic spreadsheets also facilitate the conduct of simulations and statistical experiments, providing students the opportunity to test hypotheses and investigate relationships between variables in a dynamic and interactive way (CAMPÊLO, 2014).

However, for the use of electronic spreadsheets to be effective in the teaching of Statistics, it is essential that teachers are prepared to incorporate these tools into their pedagogical practices and guide students in the proposed activities. In this regard, teacher training is a crucial aspect for the successful integration of technologies in the teaching of Statistics (ROCHA, 2020).

Teacher training in Statistics and technologies should address both conceptual and methodological aspects related to the teaching of this area of knowledge, as well as technical and pedagogical aspects related to the use of technological tools, such as electronic spreadsheets (GAL; GARFIELD, 1997). It is important that teachers develop skills and competencies to select, adapt, and create activities involving the use of these tools in an integrated manner with statistical contents, promoting contextualized teaching based on real problems (PFANNKUCH, 2006).

In this context, the elaboration of research projects and the conduct of practical activities for collecting, analyzing, and interpreting data, as reported in the Technical High School in Agriculture at IFMT Campus Confresa, can be effective strategies for integrating electronic spreadsheets into the teaching of Statistics. By working with real data collected in field research related to daily life, students have the opportunity to experience situations where Statistics and technologies play a fundamental role in decision-making and planning actions (MELETIOU-MAVROTHERIS, 2003).

In addition to enabling the use of statistical concepts and developing research skills, the use of electronic spreadsheets in the teaching of Statistics can also contribute to student engagement and motivation. According to Paula (2022), conducting activities involving the use of technologies, such as electronic spreadsheets, can arouse students' interest in statistical contents and favor the construction of knowledge in an autonomous and collaborative manner.

In summary, the teaching of Statistics in the Brazilian educational context presents several challenges and possibilities, with the incorporation of technologies, such as electronic spreadsheets, being one of the strategies that can contribute to improving the quality of teaching and promoting contextualized learning. However, it is essential that teachers are prepared to incorporate these tools into their pedagogical practices, developing skills and competencies to select, adapt, and create activities involving the use of these technologies in an integrated manner with statistical contents.

From the above, it is possible to understand the importance of addressing the teaching of Statistics and the use of technologies, such as electronic spreadsheets, in an integrated and contextualized manner. This approach favors the development of essential skills for students' formation, such as critical thinking, the ability to analyze and interpret data, and decision-making based on information. Moreover, the use of technologies in the teaching of Statistics can contribute to student engagement and motivation, promoting more autonomous and collaborative learning.

However, it is crucial that teachers are prepared to incorporate electronic spreadsheets and other technologies into their pedagogical practices, developing skills and competencies to select, adapt, and create activities involving the use of these tools in an integrated manner with statistical contents. Teacher training in Statistics and technologies is a crucial aspect for the success of integrating technologies into the teaching of Statistics,

necessitating investment in programs and initiatives that promote teacher training and improve teaching quality.

3 RESEARCH PROCEDURES ADOPTED

The activity was conducted in October 2022 with students of the 3rd year of the Technical High School in Agriculture offered by the IFMT Campus Confresa. This class had 41 enrolled students, all of whom participated in the production of reports in 1 group of 4 members, 6 groups of 5 members, and 2 groups of 6 members. However, only 31 of these students responded to the questionnaire, with 5 out of 5 in Group 1, 5 out of 5 in Group 2, 6 out of 6 in Group 3, 3 out of 4 in Group 4, 2 out of 5 in Group 5, 4 out of 5 in Group 6, 2 out of 6 in Group 7, and finally, 4 out of 5 in Group 8.

The activity was planned with the intention of providing students the opportunity to apply the knowledge acquired in Statistics in a practical context, developing skills in data production and analysis.

For the execution of the activity, the class was divided into 8 groups, which freely chose their members. The only parameters established were that the research should consist of at least six questions and be conducted with at least 50 students. Each group was responsible for devising their strategies for the development, use, production, treatment, and presentation of data collected in a field survey. At the end of the activity, the groups conducted seminars in the classroom to share the results and submitted reports containing title, theme, objective, method, results, and considerations about their respective research.

In addition to the reports, a questionnaire was applied to the students to evaluate the effectiveness of the activity and collect information about their perception regarding the learning of Statistics and the importance of practice in the classroom. The questionnaire was based on the work of Gil (2010), which highlights the importance of evaluation and self-evaluation as means to promote the development of critical thinking and continuous improvement of educational practices. The questions of the questionnaire and their respective purposes are as follows:

Question 1. Had you studied statistics before? If yes, when?

Purpose: To check for the possibility of pre-existing knowledge of students regarding Statistics.

Question 2. Had you done any practical research activity before? If yes, what?

Purpose: To identify students' previous experiences in practical research activities.

Question 3. Do you believe it is important to study Statistics?

Purpose: To inquire about students' perception of the importance of studying Statistics.

Question 4. Do you believe it is important to relate studies learned in the classroom with

practice?

Purpose: To check students' perception of the importance of linking theory and practice in the learning process.

Question 5. Do you think that doing this activity contributed to your knowledge and will assist you in future situations?

Purpose: To assess the impact of the activity on students' learning and its applicability in future contexts.

Question 6. Do you have any suggestions for improving the activity when used with other classes?

Purpose: To collect students' suggestions for enhancing the activity and adapting it for other classes.

Question 7. What grade from 1 to 5 do you give to your performance in executing the activities?

Purpose: To obtain a self-assessment from students regarding their performance during the activity.

Question 8. What grade from 1 to 5 do you give to your group's performance in executing the activities?

Purpose: To obtain an assessment from students regarding their group's performance during the activity.

Question 9. What grade from 1 to 5 do you give to the teacher's guidance during the activities?

Purpose: To obtain an assessment of students' perception of the guidance and support provided by the teacher during the activity.

Question 10. What grade from 1 to 5 do you give to the proposed activity?

Purpose: To evaluate students' satisfaction with the proposed activity and its adequacy to the learning process.

The application of the questionnaire followed the ethical principles established for research involving human beings, ensuring the anonymity of participants and the confidentiality of the information provided. The data collected through the questionnaire were analyzed both quantitatively and qualitatively, aiming to identify patterns, trends, and areas for improvement in the proposed activity.

The method adopted sought to provide students with a practical experience in learning Statistics, allowing them to apply the concepts and techniques studied in the classroom in a real context. The use of the questionnaire as an instrument for evaluation and self-evaluation enabled a reflection on the teaching and learning process, and the identification of possible improvements in the activity.

4 RESULTS AND ANALYSES

4.1 From the Field Research Reports

The report from Group 1, titled "The Importance of Sports at IFMT Campus Confresa," reveals a well-structured research that addresses the significance of sports at the IFMT Campus Confresa. The group investigated the relevance of sports to students' health, the number of students participating in sports, and the adequacy of the campus's sports facilities. With a sample of 50 students, the group managed to gather information about students' perceptions of sports within the institution.

The findings indicate that most students consider sports important at the IFMT and that sports participation holds significant relevance for their health. Additionally, students expressed interest in learning and practicing new sports and participating in more sports events and e-sports competitions. These findings suggest that the campus could invest in expanding opportunities for sports practice and promoting greater student engagement in physical activities.

The report also highlights the diversity of sports practiced by students and the need to recognize and value this diversity on Campus. The research suggests that the institution could improve the range of sports offered, including those not currently taught or practiced due to a lack of adequate facilities.

In conclusion, Group 1's report presents relevant and well-founded research that highlights the importance of sports for IFMT Campus Confresa students and points out possible improvements in the offering of sports activities at the institution. These findings can serve as a basis for future discussions and decision-making related to sports and student health.

Group 2's report, titled "Students' Learning Methods," reveals carefully conducted research that investigates the learning preferences and strategies of high school students in Agriculture and Agro-Industry at Campus Confresa. The study aimed to better understand the student profile at the institution, identifying their preferred learning methods and areas of interest.

The results show considerable diversity in students' preferred learning methods. Writing and listening were identified as the primary modes of learning, while reading, watching, and performing were also mentioned. Regarding areas of greatest ease, humanities were most cited by respondents, followed by exact and agricultural areas.

The research also revealed interesting information about students' organization and focus. Half of the respondents consider themselves procrastinators, and 54% of students claimed to have a study routine. The majority of students (78%) prefer studying alone, suggesting that the institution might consider offering more spaces and resources for individual study.

In conclusion, Group 2's report presents comprehensive and informative research on the learning preferences and strategies of students at Campus Confresa. The results could be useful for teachers and the institution in planning and implementing teaching and learning strategies that meet the needs and preferences of students. Furthermore, the findings can serve as a basis for discussions and decision-making related to supporting students in choosing their degree areas and developing study and time management skills.

Group 3's report, titled "Student Preferences on Movies and Series," addresses IFMT Campus Confresa students' preferences for movies and series, specifically the Harry Potter franchise and the series *La Casa de Papel*. The research aimed to count how many people have watched these productions and understand their preferences within each universe.

The research was conducted with 50 random students from the agriculture and agro-industry courses, evenly divided between men and women. Data were collected through printed questionnaires and interviews, with objective questions about habits and preferences related to movies and series.

The results showed that most respondents watch movies and series, with men having this habit more frequently. When asked about the preference between movies and series, most men opted for only one type of entertainment, while most women preferred both.

In the Harry Potter universe, most respondents have watched some movie from the franchise, with men showing higher participation. The Gryffindor house was considered the most powerful by respondents, and the character Albus Dumbledore was pointed out as the most powerful. Regarding the series *La Casa de Papel*, most respondents have also watched it. Preferred characters varied according to the gender of respondents: men preferred the Professor, followed by Tokyo, while women preferred Tokyo and, in second place, Nairobi.

In conclusion, Group 3's report offers an interesting insight into student preferences regarding popular movies and series. These results can be useful for understanding cultural and entertainment trends among Campus Confresa students, as well as inspiring further research and works on the subject.

Group 4's report, titled "Students' Future Perspectives," investigates the future perspectives of IFMT Campus Confresa students regarding their academic and professional future. The theme was chosen due to its significance in students' lives and to understand their expectations and interests concerning the future, whether at the IFMT or at other institutions, including universities.

The research aimed to assess students' interest in their own future, whether academic or not, their intentions to pursue a degree, and whether they are preparing for it or are focused solely on obtaining the Technical High School diploma.

The research was conducted with the participation of 50 students from the technical courses in agriculture and agro-industry. Questionnaires with six multiple-choice questions were applied, whose answers were tallied to obtain the results.

The results showed that the majority of respondents (41) intend to take the National High School Exam (ENEM), and 46 believe that the exam is important for the future. Only 18 intend to pursue a career as technicians, while 33 plan to pursue a degree after the technical course. Moreover, 16 respondents intend to graduate in Agronomy at IFMT Campus Confresa. Regarding the reasons for studying at IFMT, 23 respondents like the course area, 20 are preparing for the ENEM, and 14 wish to work as technicians in companies.

In conclusion, Group 4's research reveals that respondents are confident about their future goals, although some may not fully realize the impact of these decisions on their lives.

Group 5's report, titled "Bullying," addresses the issue of bullying in and out of schools, highlighting the frequency with which it occurs and the romanticization of the phenomenon. The research involved 60 students from the 1st and 2nd year of the Technical High School, without gender distinction. The theme was chosen due to the numerous cases of bullying leading to severe consequences, such as deaths and massacres, and the emotional problems that victims may develop.

The research aimed to assess how much students care about bullying, whether they have suffered or witnessed such behavior, and encourage the holding of lectures on the subject on campus. The research was conducted with the participation of students from IFMT Campus Confresa. Questionnaires with 5 questions were applied, three of them multiple-choice.

The results showed that 61.6% of respondents are concerned about bullying. Regarding the types of bullying suffered, 63.3% reported having experienced racism. Moreover, 63.3% of respondents who suffered racism stated they were emotionally affected by it. As for witnessed bullying situations, 38.3% witnessed a peer assigning nicknames to another. Finally, the reasons for bullying were divided, with 41.6% believing that people think they are being funny.

In conclusion, the research highlights the importance of discussing bullying both inside and outside of school and emphasizes the need to address the issue to prevent severe consequences. Awareness and support for victims are essential to effectively tackle bullying and promote healthy and inclusive school environments.

Group 6's report, titled "Drugs," addresses the theme of drug use, including alcohol and tobacco, among students at IFMT Campus Confresa. The research seeks to understand the prevalence of the consumption of these substances and young people's self-control regarding them.

The study aimed to identify how many students consume drugs, whether they are addicted or have self-control, and whether they feel guilty after use. The research was conducted with the participation of 50 students aged between 14 and 25 from the courses of Agriculture, Agro-Industry, and Bachelor of Agronomy. Six "yes" or "no" questions were applied, along with other questions related to the theme.

The results showed that 42 out of 50 students have consumed alcoholic beverages, and 21 have smoked cigarettes or similar substances. Only 4 students reported using other types of licit or illicit drugs. Most respondents (42) believed they had self-control, and only 4 felt guilty after drug use. Regarding the frequency of consumption, 7 students reported using frequently, 4 sometimes, 34 rarely, and 3 never used.

The report highlights the importance of understanding the prevalence of drug use among students and shows that the majority do not consume illicit substances. Disseminating this data can encourage young people to avoid drug use and develop healthier habits. The research also emphasizes the need to address the issue of drugs and promote awareness and support for students facing problems related to substance use.

Group 7's report, titled "The Main Causes of Not Wearing School Uniform," conducted research to identify the main reasons behind this lack of compliance and seek possible solutions to the problem.

The study aimed to assess students' use of uniforms and understand the reasons for the lack of adherence. Researchers applied questionnaires in different classes with 80 respondents from the courses of Agriculture and Agro-Industry at the first, second, and third-year levels.

The results indicate that the main reason for not wearing the uniform is the lack of availability of sufficient pieces provided by the campus. This suggests that students are not failing to wear the uniform due to disinterest or rebellion but rather due to insufficient availability of pieces for daily use.

Based on this research, Group 7 hopes that those responsible for the institution will take this situation into account and take measures to solve the problem. The suggestion is to redistribute the uniforms to ensure standardization and adherence of students to the campus rules. The research highlights the importance of understanding the reasons behind not wearing the uniform and working together with students to find solutions that benefit the entire school community.

Group 8's report, titled "The Future of Technicians in Agro-Industry and Agriculture Courses," investigates the future of students in the technical courses of Agro-Industry and Agriculture at IFMT Campus Confresa. The research addressed the importance of planning and opportunities for young people and sought to understand the choices and expectations of students regarding their studies and future careers.

For this purpose, questionnaires were applied to students, aiming to understand the reasons for choosing the courses, expectations regarding the continuation of studies, and perception of the relevance of the knowledge acquired. The research involved 50 students from the first, second, and third years.

The results show that the majority of students (64%) chose the courses thinking about their future, and 10% of them do not intend to pursue an academic career after Technical High School. Moreover, 60% of the respondents consider pursuing a college degree in the same area as their technical course, and 68% state that their decision about their academic future would not change based on their ENEM score.

The research also revealed that 90% of the students entered IFMT by choice, and 64% of them intend to take preparatory courses for college entrance exams after completing their studies. The conclusion is that, in general, students have realistic and positive perspectives about their academic and professional future. The research highlights the importance of supporting young people in their decisions and encouraging them to seek opportunities and hope in their paths.

Analyzing the eight reports presented, it is possible to identify some connections and common themes. The reports cover a variety of topics related to student life at IFMT Campus Confresa, such as sports, learning, culture and entertainment, future perspectives, bullying, drug use, school uniforms, and future professionals. While the themes are distinct, the main points of convergence are the school context, student behavior, the role of educational institutions, and preparing students for academic and professional futures. Thus, a practice of contextualized teaching and problem-based learning was conducted, as indicated by Pfannkuch (2006) and Meletiou-Mavrotheris (2003). The relationships established between the researches can be found in Table 1.

Table 1. Relationships Established Between the Research Based on Their Reports

Theme	Groups	Perspectives
Student Health and Well-being	Group 1 Group 5 Group 6	Os relatórios do Group 1 (Importância do esporte), do Group 5 (Bullying) e do Group 6 (Drogas) abordam aspectos relacionados à saúde e ao bem-estar dos estudantes. O esporte e a atividade física são importantes para a saúde física e mental, enquanto a prevenção e o combate ao bullying são cruciais para promover um ambiente escolar saudável e inclusivo.
Learning Skills and Strategies	Group 2 Group 4	The report from Group 2 (Students' Learning Methods) analyzes students' learning preferences and strategies. This knowledge can be useful for planning and implementing teaching strategies, as well as supporting students in choosing their degree areas and developing study skills, as mentioned in Group 4's report (Students' Future Perspectives).
Academic and Professional Future	Group 4 Group 8	The reports from Group 4 (Students' Future Perspectives) and Group 8 (Future of Technicians in Agro-Industry and Agriculture Courses) discuss students' future expectations and plans regarding their academic and professional formation. Understanding these expectations and supporting students in their choices is essential for ensuring their success after completing their courses.
School Rules and Norms	Group 6 Group 7	The reports from Group 6 (Drugs) and Group 7 (The Main Causes of Not Wearing School Uniform) investigate issues related to compliance with school rules and norms. Understanding the reasons behind drug use and the lack of uniform use can help the institution develop effective policies and strategies to promote compliance and support students' needs.
Academic Performance	Group 2 Group 4 Group 8	The reports from Group 2 (Students' Learning Methods), Group 4 (Students' Future Perspectives), and Group 8 (Future of Technicians in Agro-Industry and Agriculture Courses) are related to academic performance, career planning, and future expectations of students. They offer a comprehensive view of how students view and plan their academic and professional lives.
Social Issues	Group 5 Group 6	The reports from Group 5 (Bullying) and Group 6 (Drugs) address social and health issues affecting students, such as bullying and drug use. Both researches aim to understand and address problems that can have negative consequences for students' well-being, highlighting the importance of promoting healthy and inclusive school environments.

Source: Research Data.

In summary, these reports cover a wide range of topics related to student life at IFMT Campus Confresa, from academic and sports issues to social and health concerns. Analyzing the relationships between the reports helps identify common areas of interest and concern, as well as opportunities to improve student well-being and academic success. By combining the information and insights from these reports, the institution can develop more effective and comprehensive strategies to address challenges and support students on their academic and personal journeys.

4.2 From the Responses to the Questionnaire

Based on the questionnaire data, an analysis of students' responses helps understand their perceptions regarding the importance of Statistics and the relationship between theory and practice in learning.

Previous Experience with Statistics: The majority of the students (18 out of 31) had not studied Statistics before or did not remember doing so. The remaining students (13 out of 31) mentioned some previous experience, either in Elementary School or other contexts.

Previous Research Experience: Most of the students (18 out of 31) had previously conducted some type of research, with varied topics such as fruit farming, body postures, and doping. The rest (13 out of 31) had no prior research experience.

Importance of Statistics: All students (31 out of 31) believe it is important to study Statistics, citing its application in the job market and various professional fields.

Importance of Linking Theory and Practice: All students (31 out of 31) find it important to relate classroom learning to practical application, as it enhances knowledge and is relevant for the workplace.

Contribution of the Activity to Knowledge and Future Situations: All students (31 out of 31) stated that the activity contributed to their knowledge and would assist them in future situations, especially in terms of research and data analysis.

Suggestions for Improvement: Suggestions for improvement varied, including more time for seminars, adoption of more dynamic methods, conducting research with teachers and staff, implementing challenges and competitions, and slide presentations. This aligns with Vasconcelos (2007) and Campêlo (2014), who indicated that electronic spreadsheets can provide students with opportunities to investigate in a more dynamic and interactive way. Some responses (8 out of 31) indicated no suggestions or were satisfied with the current method.

Evaluation of Personal Performance, Group Performance, Teacher Guidance, and Proposed Activity: The ratings given by students to their own performance, group performance, teacher guidance, and the proposed activity were generally positive. The average ratings out of 5 for each category were:

- Personal performance: 3.87;
- Group performance: 4.03;
- Teacher guidance: 4.68; and
- Proposed activity: 4.55.

These data demonstrate that students recognize the importance of Statistics and practice in learning. Moreover, most have had research experience and positively evaluate the conducted activity and the role of the teacher. As indicated by Gal and Garfield (1997) and Rocha (2020), teacher training for the use and guidance of technology use is an important factor in the teaching and learning process. Consistent with Batanero, Godino, and Roa (2004), students consider statistical knowledge as fundamental for decision-making and reflect this in their future professional careers. Also, it is noteworthy the lower average for personal performance, which might reveal a higher self-demand for success in their activities.

4.3 Intersections Between the Reports and the Responses to the Questionnaire

Upon briefly analyzing the relationships between each group's reports and the members' responses in the questionnaire, we can observe some potential connections:

Group 1: This group had a good experience with the activity, with high ratings for group performance, teacher guidance, and the proposed activity. The students also believe in the importance of Statistics and practice. Most of the members had previously studied Statistics and conducted research activities, which might have facilitated the development of their report.

Group 2: This group also had a positive experience with the activity and high ratings for group performance, teacher guidance, and the proposed activity. Most students in this group had not studied Statistics before but had conducted research. Previous research experience might have contributed to the group's performance in the activity.

Group 3: Students in this group had varied experiences with Statistics and research before the activity. Ratings for group performance, teacher guidance, and the proposed activity were generally positive. Previous experience with Statistics and research might have influenced the development of their report.

Group 4: Previous experience with Statistics and research in this group was varied. Ratings for group performance, teacher guidance, and the proposed activity were positive. Students' belief in the importance of Statistics and practice in learning might have influenced the development of their report.

Group 5: Students in this group had no previous experience with Statistics, and most had not conducted research before. However, ratings for group performance, teacher guidance, and the proposed activity were positive. Interest in Statistics and practice in learning might have contributed to the group's performance in the activity.

Group 6: Most students in this group had not studied Statistics before but had conducted research. Ratings for group performance, teacher guidance, and the proposed activity were positive. Previous research experience might have assisted in the development of their report.

Group 7: This group had varied experiences with Statistics and research before the activity. Ratings for group performance, teacher guidance, and the proposed activity were high. Previous experience with Statistics and research might have contributed to the group's success in the activity.

Group 8: Previous experience with Statistics and research in this group was also varied. Ratings for group performance, teacher guidance, and the proposed activity were positive. Previous research experience might have influenced the development of their report.

Overall, it can be observed that previous experience with Statistics and research might have influenced the development of the reports in each group. However, even students with no prior experience in these subjects rated the activity and teacher guidance positively. Belief in the importance of Statistics and practice in learning also appears to have been an important factor for the groups' performance.

Teacher guidance, as reflected in the questionnaires, had a positive impact on students' experiences, regardless of prior knowledge. This indicates that the teacher managed to tailor guidance to meet the different needs and experience levels of the students.

Furthermore, the positive perception of the proposed activity suggests that it was effective in engaging students and helping them develop their skills in Statistics and research. The reports may have been influenced by the students' motivation and interest in the subject, as well as their willingness to learn through practice.

In summary, the relationship between each group's reports and the members' responses in the questionnaire indicates that previous experience in Statistics and research, teacher guidance, and the proposed activity, as well as the belief in the importance of practice, contributed to the development of the reports. At the same time, the teacher played a key role in ensuring the success of the activity, adapting to the needs of each group and providing appropriate guidance.

5. FINAL CONSIDERATIONS

The activity proposed in the Statistics course for the Technical High School students in Agriculture at IFMT Campus Confresa proved to be an enriching and effective experience for developing research skills, teamwork, and practical application of statistical concepts. Through the analysis of each group's reports and the students' responses to the questionnaire, it was observed that previous experience in Statistics and research, teacher guidance, the proposed activity, as well as the belief in the importance of practice, contributed to the development of the reports and student engagement.

The practice developed with the Technical High School students in Agriculture at IFMT Campus Confresa was of great relevance, both for the development of specific skills in Statistics and for promoting transversal competencies such as teamwork and conducting field

research. The possibility of applying the theoretical knowledge acquired in the classroom in a practical and real context highlighted the importance of integrating theory and practice, providing students with a deeper and applied understanding of statistical concepts.

Reflecting on the possibility of replicating this practice by other teachers at Federal Institutes (IFs), various positive and negative aspects emerge. Among the positive aspects, the practice's potential to promote student engagement, develop practical skills, and provide a richer and integrated learning experience stands out. Additionally, the flexibility of the practice, allowing students to choose their research topics and form their groups, can be adapted to different contexts and subjects. However, it is also essential to consider potential challenges, such as the need to adapt the practice to different educational realities and contexts and ensure that students receive the necessary support and guidance to conduct their research.

The experience provided valuable learnings for researchers, highlighting the importance of teacher guidance and previous experience in Statistics for the activity's success. Students' responses to the applied questionnaire showed a positive perception of the practice and offered insights for improving future activities. Students' feedback reiterated the value of integrating theory and practice and highlighted the need for more dynamic and interactive teaching methods. Researchers, by analyzing the collected data and reflecting on the implementation of the practice, gained a deeper understanding of students' needs and perceptions, which will contribute to the development and enhancement of future pedagogical practices.

Some suggestions for improvements in future activities include adopting more dynamic and interactive teaching methods, such as conducting broader seminars with slide presentations and allowing more time for discussion, as well as including specific themes for the research. These modifications can further increase students' interest and motivation, providing an even deeper and more comprehensive learning experience.

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