

Ciência em Foco

Volume XIII

Bruno Rodrigues de Oliveira
Alan Mario Zuffo
Jorge González Aguilera
Rosalina Eufrausino Lustosa Zuffo
Aris Verdecia Peña
org.



Pantanal Editora

2023

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Organizadores

Ciência em Foco
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I. Ciência



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Apresentação

Nesta décima terceira edição da coletânea *Ciência em Foco*, continuamos trazendo pesquisas científicas nas mais variadas áreas do conhecimento. A interdisciplinaridade deve ser um alvo sempre buscado pelos pesquisadores, pois a “ciência” é construída empregando alicerces em várias outras “ciências”. É esta coesão que tem proporcionado tantas evoluções nas mais distintas áreas do conhecimento humano, sejam em áreas mais afetadas pelas tecnologias, sejam em áreas onde as relações humanas são o cerne dos estudos.

Nesta edição, no Capítulo 1, os autores trazem uma discussão sobre um conceito basilar da matemática financeira: a capitalização. Eles abordam as três principais formas, a saber: contínua, composta e simples. A proposição geral consiste em apresentar uma formulação para a capitalização contínua. Nas palavras dos autores: “Procura-se, como um primeiro objetivo, a partir do princípio de variações infinitesimais, deduzir a expressão mais geral para a equação do montante na capitalização contínua e apresentar situações-problemas em que só se pode usá-la para resolver o problema.”

No capítulo 2, que apresenta resultados de uma pesquisa internacional realizada em Cuba, o autor discorre sobre a experiência da gestão educativa em um curso de engenharia mecânica. Esta pesquisa busca identificar as potencialidades e fragilidades da gestão educacional durante a fase de transição para a educação remota – consequência do estado de emergência decorrente da Pandemia causada pela COVID-19 –, “através da experiência da implementação da modalidade remota na carreira de ciências técnicas na Universidade do Leste”.

O capítulo 3 também apresenta os resultados de uma pesquisa internacional, mas esta realizada no Peru. O autor apresenta uma discussão profunda sobre “Pautas Jurídicas para uma nova Constituição Peruana”, discorrendo sobre os limites constitucionais, utilizando uma abordagem qualitativa, com o objetivo de entendê-los e interpretá-los, “observando que nesse tipo de pesquisa não se busca medir variáveis, bem como não se busca testar hipóteses”.

Continuando nos temas multidisciplinares, no capítulo 4, os autores discutem sobre a formação territorial do município de Feira de Santana-BA, um dos mais importantes do estado e da região nordeste, devido a sua localização, possuindo uma atividade econômica e industrial intensa e vibrante, o que garante uma posição privilegiada para a circulação de capitais, bens e serviços. De acordo com os autores seu principal objetivo é “apresentar, de forma histórica e linear, o crescimento populacional municipal e suas subdivisões, dentro dos distritos do município para justificar a demanda populacional e seu ordenamento territorial, com destaque para a população rural distrital.”

No de número 5, os autores apresentam uma revisão bibliométrica sobre a produção científica relacionada a qualidade de vida de idosos na pandemia de COVID-19. Eles buscam com a pesquisa responder algumas perguntas, como: “quais áreas do conhecimento produziram publicações, onde essas publicações estão sendo realizadas, quais são os principais periódicos, quais são os tipos de publicações e quais os principais autores dessas publicações, assim sendo.”

No último capítulo, o de número 6, redigido em língua inglesa, os autores objetivam investigar a eficácia do uso do Google Classroom, e outros recursos da plataforma Google for Education e Chromebooks na aprendizagem de estatística básica para estudantes do ensino fundamental. A pesquisa apresentada foi realizada com cerca de 240 estudantes do 7º ao 9º ano de uma escola pública do estado de Mato Grosso. Os resultados obtidos “mostraram que os estudantes apresentaram melhores resultados no pós-teste, quando comparados com outros conteúdos estudados no mesmo ano utilizando outras abordagens”. Tais resultados sugerem que o uso das plataformas investigadas pode melhorar o aprendizado dos estudantes em estatística básica.

Esperamos que cada uma das pesquisas aqui apresentadas possam ser úteis para fomentar novas pesquisas relacionadas, seja como continuação dos resultados apresentados ou na mescla multidisciplinar dos temas tratados. Desejamos também que tais pesquisas ajam como guia para as decisões, principalmente pelos governos e políticos, para as quais elas fornecem os subsídios necessários.

Uma excelente leitura a todos.

Os Organizadores

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Assessing the Impact of Google Classroom and Chromebooks on Basic Statistics Learning Outcomes through a Cross-Sectional Study in a Public School in Mato Grosso, Brazil

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INTRODUCTION

Technology in education, defined as the use of technological tools and resources to support and enhance teaching and learning (CLOETE, 2017), has become increasingly prevalent in recent years and is an important area of research (AHLFELD, 2017). The use of technology in education has the potential to transform the way that education is delivered and can provide new and innovative ways for students to learn (ALQAHTANI, 2019). For instance, online learning platforms and educational software can offer a more flexible and personalized learning experience, and can provide access to a wider range of educational resources (PRENSKY, 2012).

In addition to the potential to offer new and innovative learning experiences, technology can also support and enhance a variety of teaching and learning activities, such as collaborative projects, simulations, and interactive multimedia lessons (GAN; MENKHOFF; SMITH, 2015). This can make education more engaging and interactive for students, which can help to improve motivation and learning outcomes (CLOETE, 2017).

Furthermore, technology can facilitate communication and collaboration among students and teachers, both within and outside of the classroom (ALQAHTANI, 2019). This can support a more collaborative and inclusive learning environment, and can enable students to connect with others around the world (AHLFELD, 2017).

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Overall, the use of technology in education is an important area of research because it has the potential to significantly impact the way that education is delivered and experienced (PRENSKY, 2012). Understanding the benefits and limitations of technology in education can inform the development of effective and appropriate policies and practices that can support the learning and development of all students (GAN; MENKHOFF; SMITH, 2015).

The Government of Mato Grosso, along with the State Department of Education (Seduc-MT), has implemented initiatives aimed at improving educational outcomes. One of these strategies has been the provision of Chromebooks to schools in the state school system, in addition to the availability of institutional emails and the Google for Education platform for all students and teachers in the state-funded education network. Given the accessibility of these resources to students, and the significance of technology integration in education, we propose an investigation into the utility of Google Classroom and Chromebooks for enhancing student learning outcomes in the context of elementary education. The aim of this study is to assess the effectiveness of these tools in improving student performance.

This study used a cross-sectional survey design, with three measurement points (beginning, middle, and end of the study). At each measurement point, students were tested on their knowledge of basic statistics concepts. This study included about 240 students in grades 7-9 at a public school in the State of Mato Grosso located in Sinop, namely, the state school “Professor Djalma Guilherme da Silva”. All students had access to Google Classroom and Chromebooks for their instruction.

LITERATURE REVIEW

Chromebooks are a type of laptop that runs on Google's Chrome operating system and is designed to be used primarily while connected to the internet (AHLFELD, 2017). They are often used in education because they are lightweight, portable, and relatively inexpensive compared to other types of laptops (PRENSKY, 2012). They are often used in conjunction with online learning platforms, such as Google Classroom, to facilitate distance learning or to supplement in-person instruction (ALQAHTANI, 2019). Some of the benefits of using Chromebooks in education include the ability to easily access and collaborate on documents and other materials online, the availability of a wide range of educational apps and resources, and the ability to easily manage and update the devices remotely (CLOETE, 2017).

Google for Education is a suite of educational tools and resources provided by Google to help schools and educators improve teaching and learning (ALQAHTANI, 2019). The suite includes a range of products and services, including Google Classroom, Google Forms, Google Sheets, and many others (CLOETE, 2017). Google Classroom is an online learning management system that allows teachers to create and manage course materials, communicate with students, and assess student progress (GAN; MENKHOFF; SMITH, 2015).

Overall, the Google for Education suite offers a range of tools and resources that can be used to enhance teaching and learning in a variety of settings (CLOETE, 2017). Many educators have found

these tools to be useful for creating interactive and engaging learning experiences for their students (AHLFELD, 2017).

Google Classroom is a free, web-based learning management system (LMS) developed by Google for educational institutions (ALSHAMMARY and ALHALAFAWY, 2022). Its purpose is to facilitate the assignment and grading of schoolwork, as well as to enhance communication between teachers and students (IFTAKHAR, 2019). Google Classroom enables educators to create and organize assignments, provide feedback, and communicate with students through a variety of features, such as email, announcements, and discussions (HIKMATIAR; SULISWORO; WAHYUNI; 2020). Students can submit assignments, access class materials, and interact with their teachers and peers through the platform (ALSHAMMARY and ALHALAFAWY, 2022). Google Classroom is integrated with other Google apps, such as Google Drive and Google Docs, which enables collaborative creation and sharing of documents and other resources (IFTAKHAR, 2019). In recent years, Google Classroom has gained popularity among educators and students worldwide due to its simplicity and functionality (HIKMATIAR; SULISWORO; WAHYUNI; 2020).

In the previous paragraphs, we discussed two crucial tools employed in this study: the Chromebooks used by state schools in the state of Mato Grosso and the Google For Education platform, specially Google Classroom, which is made available by the State Department of Education of Mato Grosso (SEDUC-MT) through a partnership with Google. In the following section, we will present a summary of relevant literature on the utilization of technology in elementary education.

Nowadays, technology has become a prevalent aspect of education, with many schools and educators recognizing the potential it holds for enhancing students' learning experiences and improving educational outcomes. A study conducted by two researchers from University of Calgary and University of Kentucky (LI and MA, 2010) found that students who have access to computers at school score higher on reading and mathematics assessments than those who do not have access.

One specific application of technology in education is the use of digital learning tools, such as educational software and online resources. These tools have been found to improve student engagement and participation in class (ILIN, 2022), and to support students with diverse learning needs, such as those with disabilities (ROSE & MEYER, 2002). Research has also shown that digital learning tools can provide personalized learning experiences for students, which can increase their motivation and engagement in the learning process. In this sense, Brazilian authors such as Dos Santos (2021) have emphasized the importance of technology integration in education to provide students with a dynamic, interactive and personalized learning experience.

Technology has become an integral part of teaching and learning mathematics, and it plays an important role in providing students with interactive, dynamic and personalized learning experiences. The use of technology in mathematics teaching has been found to improve students' problem-solving skills, critical thinking, and overall understanding of mathematical concepts (WARSCHAUER &

MATUCHNIAK, 2010). In the context of Brazilian education, studies have also shown the positive impact of technology in mathematics learning, for example, Sturion, Dos Reis, and Gonçalves (2015) found that students who had access to technology resources performed better on mathematics assessments than those who did not have access.

One specific application of technology in mathematics teaching is the use of digital tools and resources, such as interactive simulations, online calculators and educational software. These tools can provide students with interactive and adaptive feedback, which can help them to better understand mathematical concepts, and improve their performance in solving mathematical problems (ASLAN, 2021). Furthermore, technology-based tools can enhance students' motivation and engagement in mathematics, making the subject more appealing and interactive (AKMAN; ÇAKIR; 2020). Authors such as Borba, Almeida, and Chiari, (2015) highlighted the importance of using technology-based tools to improve students' motivation and engagement in mathematics, by providing them with interactive and dynamic learning experiences.

Another important application of technology in mathematics teaching is statistics, as digital tools and resources can facilitate the teaching of statistical concepts and procedures, by providing students with real-world examples and interactive simulations. In this sense, some authors such as De Almeida (2008) have emphasized the importance of technology integration in statistics teaching, to provide students with an engaging and interactive learning experience, which can improve their understanding and application of statistical concepts and procedures. Additionally, studies like that of Damin et al., (2019) found that the use of technology-based resources in the statistics classroom improved students' conceptual understanding and problem-solving skills.

Furthermore, technology has also been an important factor to change the way teacher teach mathematics. Da Costa and Prado (2015) have emphasized the importance of teacher training in technology integration to improve their ability to provide students with an effective mathematics education, by adapting their pedagogical practices to incorporate digital tools and resources. Studies like that of Allan (2011) have also highlighted the importance of professional development in technology integration, in order to provide teachers with the necessary skills and knowledge to use technology effectively in the classroom.

In conclusion, technology plays an important role in enhancing the teaching and learning of mathematics, particularly in statistics. Digital tools and resources can provide students with personalized, interactive, and engaging learning experiences, and these have been consistently shown to improve students' problem-solving skills, critical thinking, and overall understanding of mathematical concepts, as well as their engagement and motivation in the subject. Furthermore, teacher's training in technology integration can improve their ability to provide students with an effective mathematics education by adapting their pedagogical practices to incorporate digital tools and resources. Studies in the Brazilian

context have reinforced these findings, underscoring the importance of technology integration in the classroom, in order to provide students with the skills they need to succeed in the digital era.

METHODS, MATERIALS AND PROCEDURES

Approximately 240 students in 7th to 9th grade were part of this study, which was conducted during the last two months of the school year, or the last bimester. The division of the classes is shown in Table 1.

Table 1. Classes that participated in the study. Source: Elaborated by the author.

Shift: Morning	Shift: Afternoon
7th grade A & B	
8th grade A & B	8th grade C & D
9th grade A	

The classes have approximately an equal number of students and participated in the same work, but with different levels of depth, according to the prior knowledge and official material of each class. All had theoretical classes, exercises, and lists, in addition to the use of Chromebooks, Google Classroom, spreadsheets, etc. It is important to mention that the development and implementation of the questionnaires was discussed in all classes, but practiced with the 8th graders. Next, I highlight the steps of the study. Initially, all classes had theoretical contact with the basic statistics topics: information treatment, graphics, basic statistical measures, data organization, variables, population, sample, census and sample surveys, as well as planning and execution of sample surveys. It is important to emphasize that the learning was evaluated during this step in a continuous manner.

In the second stage, a topic to be investigated, a population, samples and other characteristics of researches were prepared together with the 8th grade classes and discussed with the other classes. The topic to be researched was “The use of personal smartphones and Chromebooks in the classroom”, the population to be investigated were all the classes from 6th to 9th grade of the Professor Djalma Guilherme da Silva State School, being the sample ten percent of the total, that is, 69 out of a total of 691 students. The distribution among the classes was proportional, that is, classes with more students had more interviewed students and classes with fewer students had fewer interviewed students.

The 8th grade students applied the questionnaires to all the 6th to 9th grade morning and afternoon classes. Each questionnaire contained 15 questions about the student's identification, possession or not of a personal smartphone device, internet access, use of it during classes, misuse of the cell phone, about the use of Chromebooks, about advantages and disadvantages of the use of each type of device mentioned, opinions on such matters, school performance, etc.

After collecting data from all the classes studied, data organization was done on electronic spreadsheets, specifically, Google Sheets. In this step, the origin and quality of the collected data were also evaluated, and some questionnaires were excluded. It is important to note here that the students were still being evaluated and were showing more interest in the subject than in the first step.

In the fifth step of the work, a spreadsheet containing all the answered questionnaires was made available through Google Classroom for all students in all the classes of this study. Using Google Sheets, graphs were created for each question of the questionnaire and these graphs were compared among the classes. Here are some examples about interviewed students.

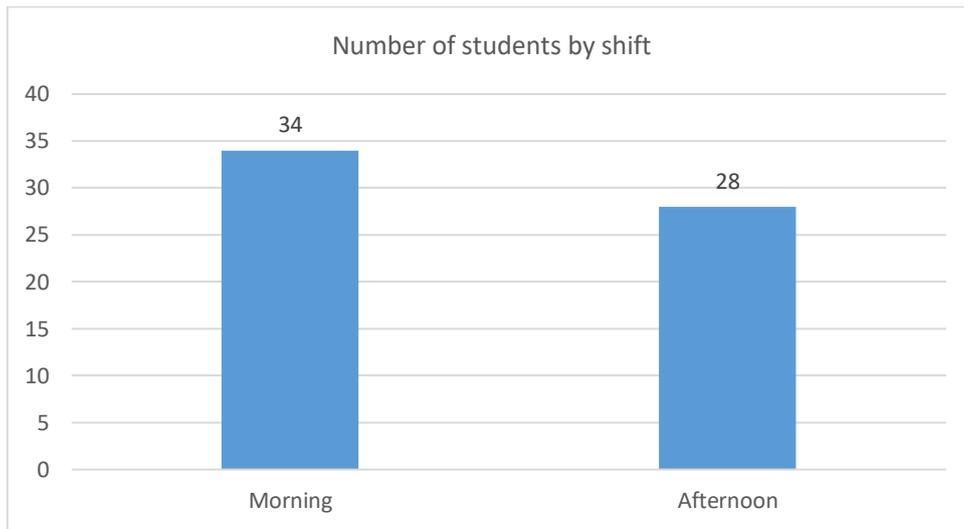


Figure 1. Number of interviewed students by shift. Source: Elaborated by the author.

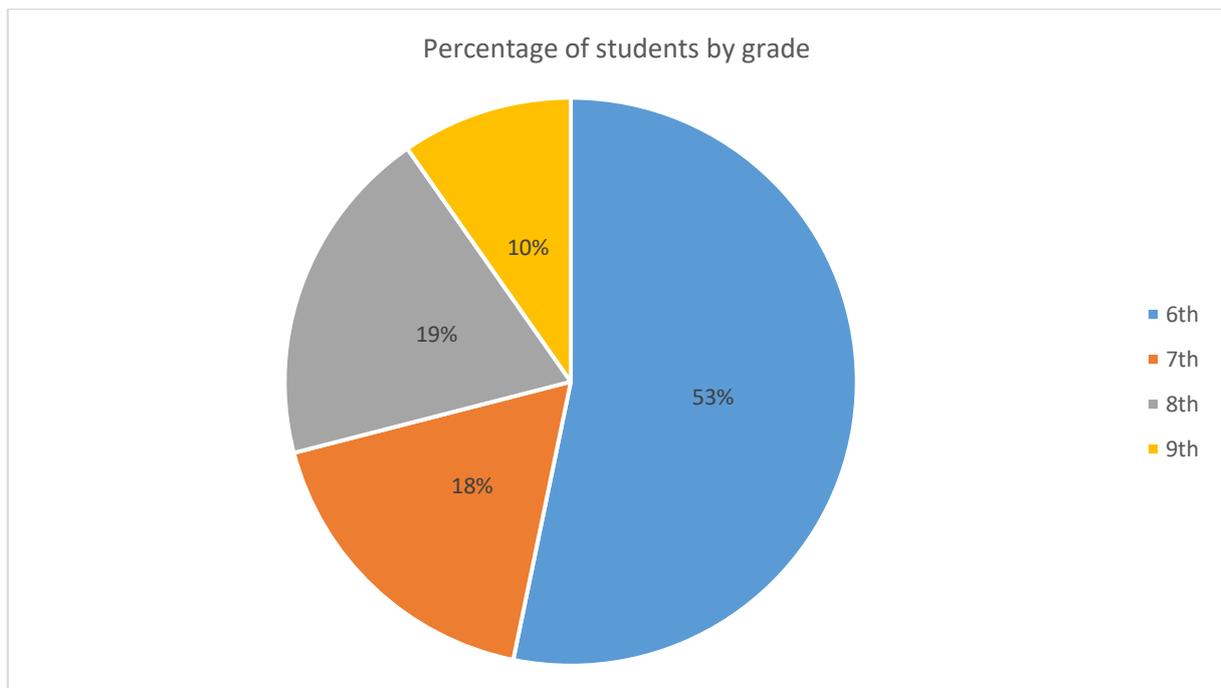


Figure 1. Percentage of students by grade. Source: Elaborated by the author.

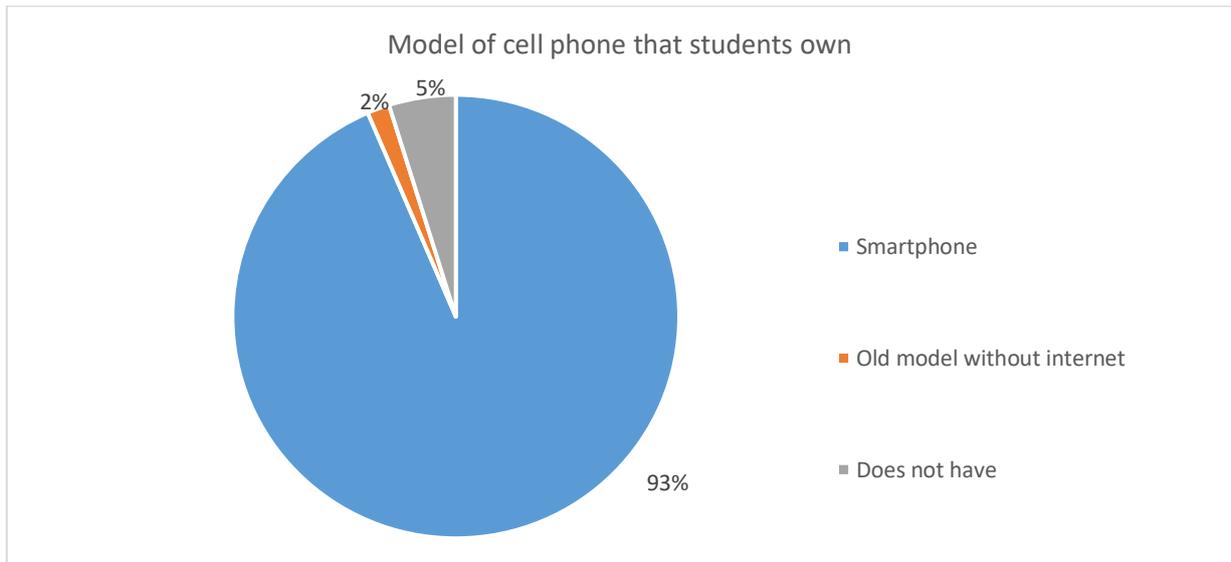


Figure 2. Model of cell phone that students own. Source: Elaborated by the author.

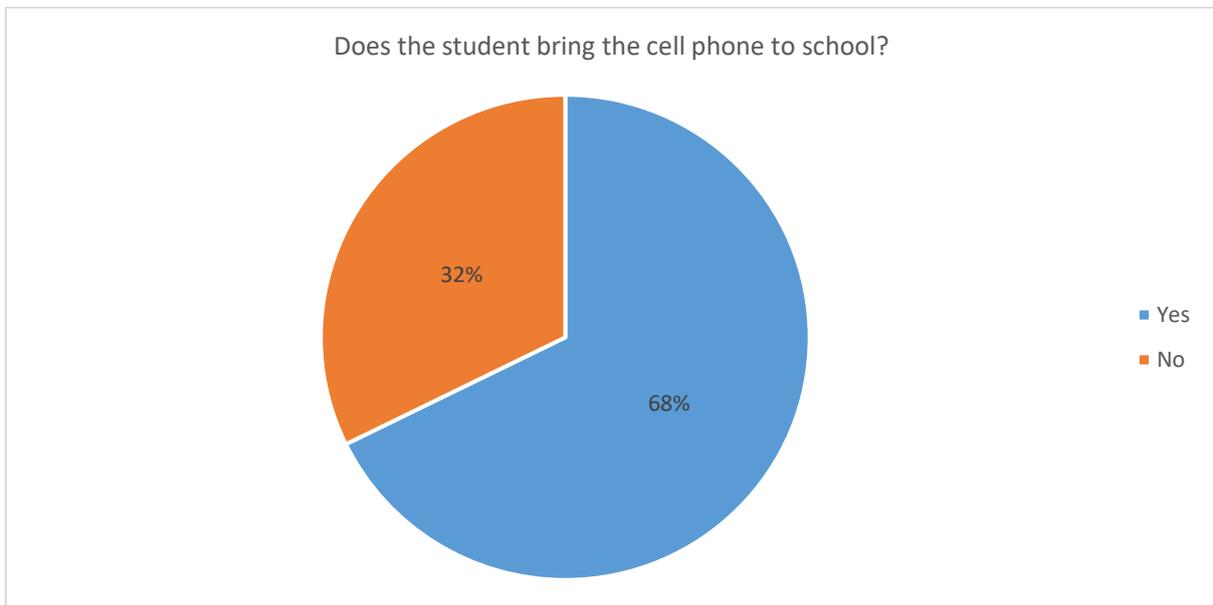


Figure 3. Does the student bring the cell phone to school? Source: Elaborated by the author.

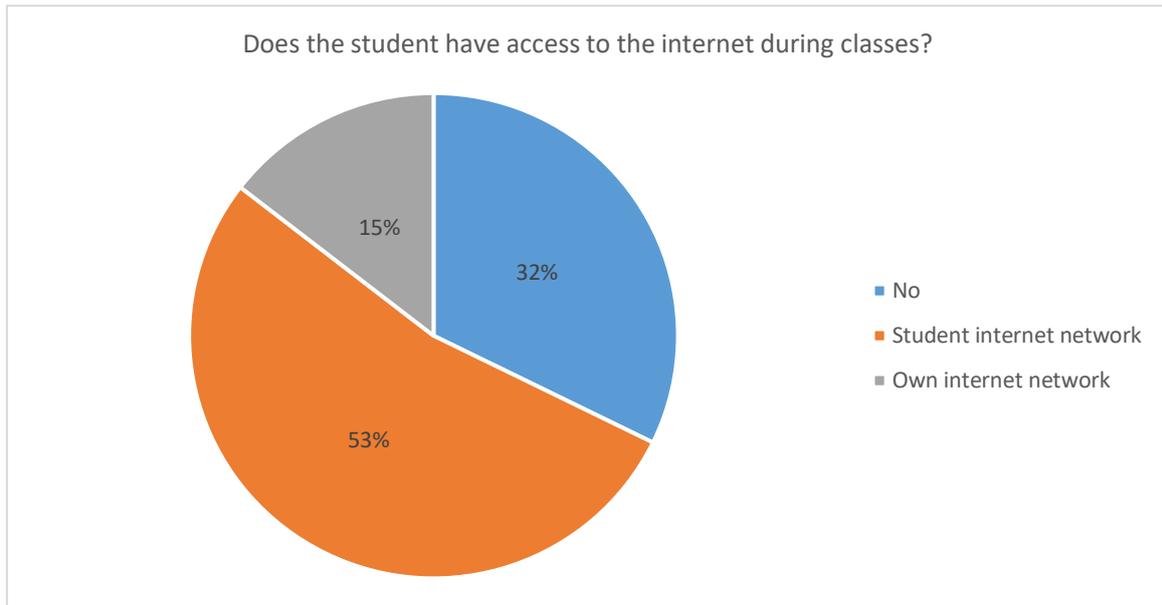


Figure 4. Access to the internet during classes. Source: Elaborated by the author.

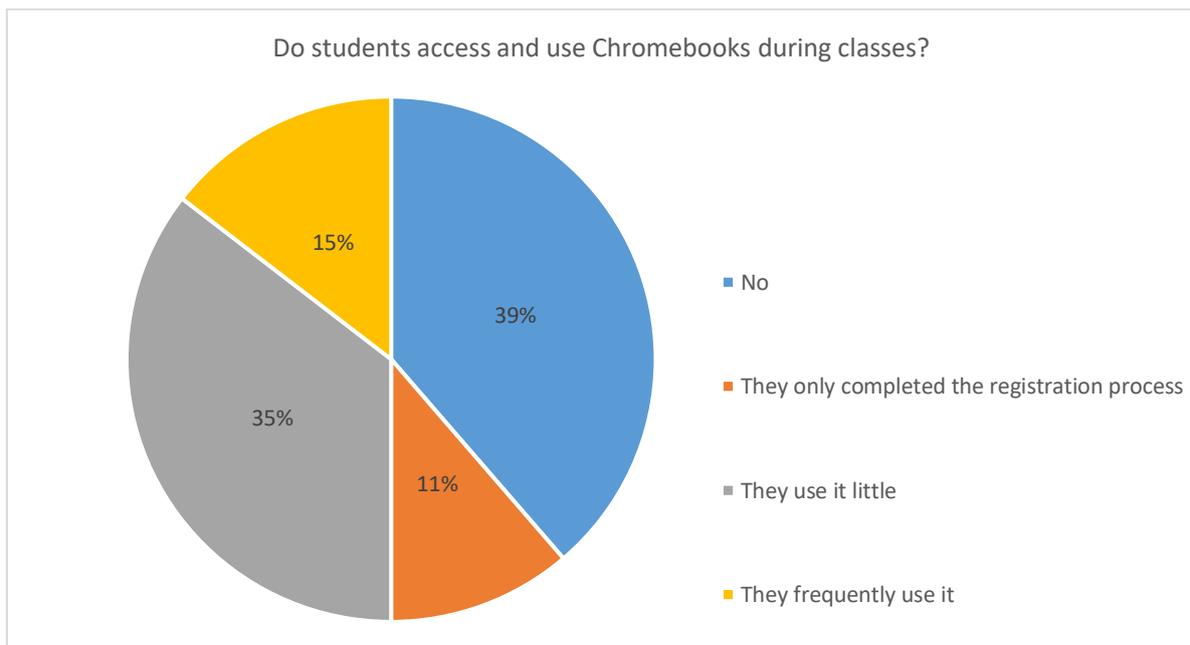


Figure 5. Use of Chromebooks during classes. Source: Elaborated by the author.

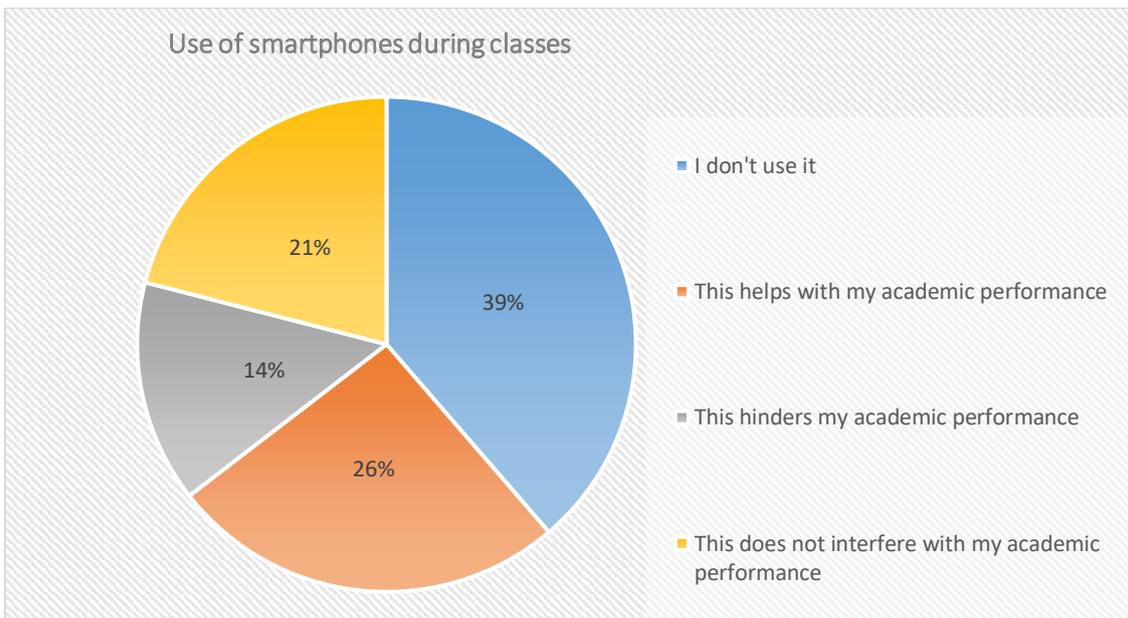


Figure 6. Opinion of students regarding the use of smartphones during classes. Source: Elaborated by the author.

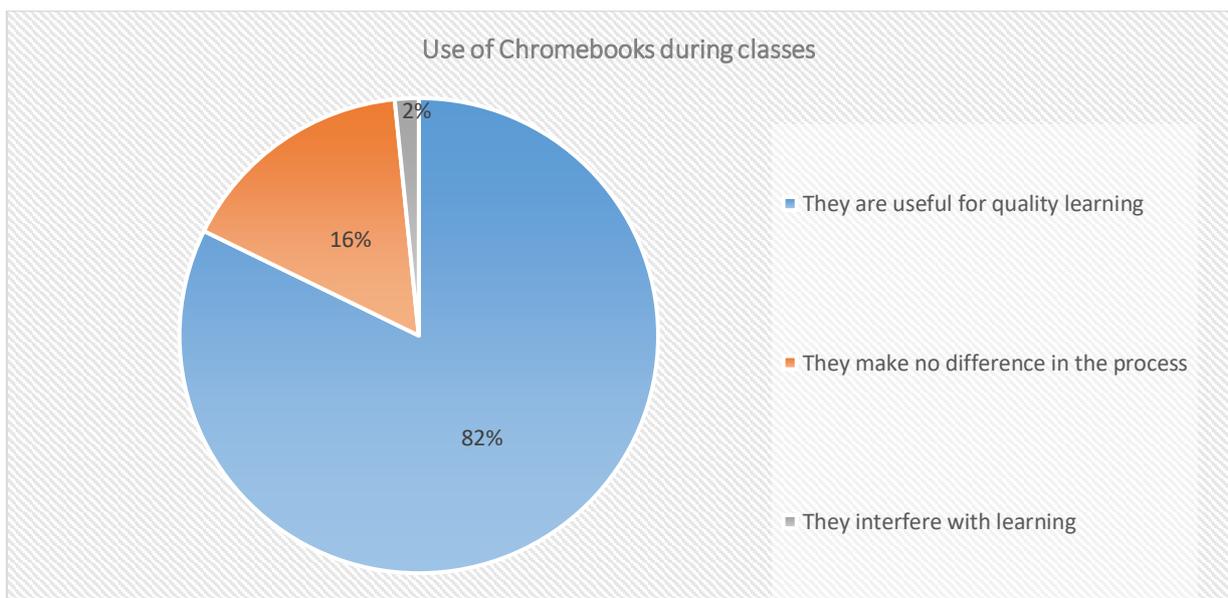


Figure 7. Opinion of students regarding the use of Chromebooks. Source: Elaborated by the author.

To conclude this study, all these charts and other along with the spreadsheets were discussed with all the students of all the classes and then they participated in a final evaluation using Google Forms within the Google Classroom platform. This evaluation covered the concepts of basic statistics studied as well as an analysis of the survey and its results.

In this research, students were exposed to a comprehensive teaching approach that included theoretical explanations, hands-on exercises, and physical queries to understand and apply statistical concepts. In addition to traditional teaching methods, technology-based resources such as Chromebooks and Google Classroom were also utilized to enhance the learning experience. The use of these tools provided students with a more dynamic way to explore and visualize data, making the concepts more

intuitive and easier to understand. For example, students were able to use the Chromebooks to access and analyze real-world data sets, which allowed them to apply their knowledge in a practical setting. Additionally, Google Classroom and other resources from Google for Education were utilized to facilitate collaboration and communication among students, fostering teamwork and communication skills. This research demonstrates that the integration of technology-based resources can enhance the learning experience and lead to better understanding and retention of the material. The utilization of this technology-based resources in the process of learning allowed the students to develop digital skills and adapt to the digital age. Furthermore, the use of these tools provided the students with a more interactive and engaging learning experience, making them more motivated and interested in the subject.

To effectively teach statistics and data analysis to students, it is important to use a teaching approach that emphasizes relevance and real-world applications, incorporate interactive and hands-on activities, and use technology and digital resources. The acquisition of basic statistical and data analysis skills in elementary education is crucial for the development of cognitive processes related to critical thinking and problem solving. As our society becomes increasingly data-driven, the ability to collect, analyze, and interpret data is essential for making informed decisions and understanding the world around us. These foundational skills are not only important for success in fields such as science, technology, engineering, and mathematics, but also in everyday life. Studies have shown that early introduction to statistical concepts and techniques leads to better understanding and application in later education and career pursuits. Therefore, incorporating statistical and data analysis education in the elementary curriculum is a scientifically supported and crucial step in preparing students for success in a data-driven world.

RESULTS AND FURTHER DISCUSSIONS

At the beginning of this study, the students showed the same level of performance and enthusiasm as in other moments of the year or in the learning of other mathematical concepts. However, with the elaboration and proposal of a sample survey, in which they actively participated, the interest increased and, consequently, the performance improved. But the greatest transformation occurred with the use of Chromebooks and the Google For Education Platform.

The introduction of Chromebooks and the Google For Education Platform in the classroom setting led to a significant transformation in the students' learning experience. The use of these technology tools had a marked impact on the students' performance and engagement in the learning process.

One of the major reasons for this improvement was the interactive and collaborative nature of these tools. The use of Chromebooks and the Google For Education Platform promoted active engagement and participation among the students, allowing them to work together in real-time and collaborate on various projects and assignments. This led to a more dynamic and interactive learning experience, which in turn, increased the students' motivation and engagement in the learning process.

Additionally, the use of technology in the classroom setting has been found to have a positive impact on students' overall performance. The use of interactive and multimedia-based learning materials, as well as online resources and tools, helped to enhance the students' understanding of the subject matter and allowed them to engage with the material in a more meaningful way. This led to an improvement in their overall performance, as well as an increase in their critical thinking and problem-solving skills.

Summarizing, the implementation of Chromebooks and the Google For Education Platform in the classroom setting led to a marked enhancement in the students' performance and enthusiasm towards the learning process, due to its interactive and collaborative nature, which promoted active engagement and participation among the students, and the use of technology in the classroom setting has been found to enhance student's motivation and engagement in the learning process which leads to improvement of their overall performance.

These observations were made based on the results obtained from the continuous evaluations that took place throughout the process, but mainly in the result of the final step evaluation using Google Forms, which covered the concepts of basic statistics studied, as well as an analysis of the survey and its results.

Our investigation brought to light conclusions that align with those of other experts in the field. The use of technology in elementary and junior high school education can have a positive impact on student engagement and learning. For young students, technology can provide interactive and multimedia learning experiences, making the learning process more engaging and memorable. Technology can support the development of important 21st-century skills such as critical thinking, collaboration, and communication. For example, students can use tools like Google Docs and Classroom to work on group projects and share their work with classmates and teachers. Furthermore, technology can provide teachers with valuable tools for assessment, such as formative quizzes, and interactive whiteboard activities, allowing them to quickly and easily assess student understanding and progress (BORBA; ALMEIDA; CHIARI; 2015; MANTOVANI, 2008; SILVA; CURI; SCHIMIGUEL, 2017).

CONCLUSION

The conclusion of this study is that the use of Google Classroom, other resources from the Google for Education platform, and Chromebooks can be an effective method for teaching basic statistics to junior high school students. The study was conducted with approximately 240 students in grades 7-9 at a public school in the state of Mato Grosso, who received instruction through Google Classroom and used Chromebooks, as well as traditional instruction using textbooks and paper-and-pencil exercises. The study aimed to investigate the effectiveness of using technology in teaching statistics, and to compare the learning outcomes of students who received instruction through Google Classroom and Chromebooks to those who received traditional instruction. The students were tested on their knowledge of basic statistics concepts at the beginning, middle, and end of the study, using a pre-test and

post-test design. The results showed that the students who received instruction through Google Classroom and used Chromebooks had significantly improved learning outcomes on the post-test, compared to their pre-test results. Furthermore, the results also showed that the students who received instruction through Google Classroom and used Chromebooks had significantly better learning outcomes on the post-test compared to those who received traditional instruction. These findings suggest that the integration of technology, specifically Google Classroom and Chromebooks, can be an effective method for teaching basic statistics to junior high school students. The use of technology in the classroom can provide students with interactive and engaging learning experiences, and can also facilitate the development of digital literacy skills. Furthermore, the use of Google Classroom and Chromebooks can also be beneficial for teachers, as it can provide them with tools for creating and delivering interactive and personalized instruction, as well as for monitoring student progress and providing feedback. This study provides evidence for the effectiveness of using technology, specifically Google Classroom and Chromebooks, in teaching basic statistics to junior high school students. These findings have important implications for the use of technology in the classroom and the integration of Google Classroom and Chromebooks in the teaching of statistics.

REFERENCES

- Ahlfeld, Kelly. Device-driven research: The impact of Chromebooks in American schools. *International Information & Library Review*, v. 49, n. 4, p. 285-289, 2017.
- Akman, Emrah; Çakir, Recep. The effect of educational virtual reality game on primary school students' achievement and engagement in mathematics. *Interactive Learning Environments*, p. 1-18, 2020.
- Allan, Luciana Maria Vaz. Formação continuada de professores em programa de informática educativa: o diálogo possível revelado na pós-formação. 2011. Tese de Doutorado. Universidade de São Paulo.
- Alqahtani, Abdullah. Usability Testing of Google Cloud Applications: Students' Perspective. *Journal of Technology and Science Education*, v. 9, n. 3, p. 326-339, 2019.
- Alshammary, Farhan Mohammed; Alhalafawy, Waleed Salim. Sustaining Enhancement of Learning Outcomes across Digital Platforms during the COVID-19 Pandemic: A Systematic Review. *Journal of Positive School Psychology*, v. 6, n. 9, p. 2279-2301, 2022.
- Aslan, Alper. Problem-based learning in live online classes: Learning achievement, problem-solving skill, communication skill, and interaction. *Computers & Education*, v. 171, p. 104237, 2021.
- Borba, Marcelo De Carvalho; Almeida, Helber Rangel Formiga Leite De; Chiari, Aparecida Santana De Souza. Tecnologias Digitais e a relação entre teoria e prática: uma análise da produção em trinta anos de BOLEMA. *Bolema: Boletim de Educação Matemática*, v. 29, p. 1115-1140, 2015.

- Cloete, Anita L. Technology and education: Challenges and opportunities. *HTS: Theological Studies*, v. 73, n. 3, p. 1-7, 2017.
- Da Costa, Nielce Meneguelo Lobo; Prado, Maria Elisabette Brisola Brito. A Integração das Tecnologias Digitais ao Ensino de Matemática: desafio constante no cotidiano escolar do professor. *Perspectivas da Educação Matemática*, v. 8, n. 16, 2015.
- Damin, W., Dos Santos Junior, G., Neto, J. C., Robim, B. N. P. A. S., & Pereira, R. D. S. G. As Tecnologias Digitais educacionais e o ensino de Estatística e Probabilidade. *Revista de Ensino, Educação e Ciências Humanas*, v. 20, n. 1, p. 53-57, 2019.
- De Almeida, Maria Elizabeth Bianconcini. Tecnologias na Educação: dos caminhos trilhados aos atuais desafios. *BOLEMA-Boletim de Educação Matemática*, v. 21, n. 29, p. 99-129, 2008.
- Dos Santos, Gilberto Lacerda. Educação, Tecnologias e Inovação Pedagógica. *Revista da FAEEDBA-Educação e Contemporaneidade*, v. 30, n. 64, p. 226-240, 2021.
- Gan, Benjamin; Menkhoff, Thomas; Smith, Richard. Enhancing students' learning process through interactive digital media: New opportunities for collaborative learning. *Computers in Human Behavior*, v. 51, p. 652-663, 2015.
- Hikmatiar, Hamzarudin; Sulisworo, Dwi; Wahyuni, Mentari Eka. Utilization of google classroom-based learning management system in learning. *Jurnal Pendidikan Fisika*, v. 8, n. 1, p. 78-86, 2020.
- Iftakhar, Shampa. Google classroom: what works and how. *Journal of Education and Social Sciences*, v. 3, n. 1, p. 12-18, 2016.
- Ilin, Vladislav. The role of user preferences in engagement with online learning. *E-Learning and Digital Media*, v. 19, n. 2, p. 189-208, 2022.
- Li, Qing; Ma, Xin. A meta-analysis of the effects of computer technology on school students' mathematics learning. *Educational Psychology Review*, v. 22, n. 3, p. 215-243, 2010.
- Mantovani, Daielly Melina Nassif. Método para implementação e acompanhamento de atividades a distância em disciplinas de Estatística: um estudo de caso. 2008. Tese de Doutorado. Universidade de São Paulo.
- Prensky, Marc R. From digital natives to digital wisdom: Hopeful essays for 21st century learning. Corwin Press, 2012.
- Rose, D.H., & Meyer, A. Teaching every student in the digital age: Universal Design for Learning. Association for Supervision and Curriculum Development, 2002.
- Silva, Josney Freitas; Curi, Edda; Schimiguel, Juliano. Um cenário sobre a pesquisa em Educação Estatística no Boletim de Educação Matemática–Bolema, de 2006 até 2015. *Bolema: Boletim de Educação Matemática*, v. 31, p. 679-698, 2017.
- Sturion, Leonardo; Dos Reis, Marcia Cristina; Gonçalves, Cecília de Moraes. Impactos da utilização das tecnologias de informação e comunicação no processo de ensino e aprendizagem da matemática. *Revista de Ensino, Educação e Ciências Humanas*, v. 16, n. 3, p. 180-186, 2015.

Warschauer, M., & Matuchniak, T. New Technology and Digital Worlds: Analyzing Evidence of Equity in Access, Use, and Outcomes. *Review of Research in Education*, vol. 34, no. 1, 179-225, 2010.

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