

Analysis of Brazilian YouTube Channels Dedicated to Mathematics Teaching

Análise de Canais Brasileiros de YouTube Dedicados ao Ensino de Matemática

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Abstract

With the popularization of the internet, the teaching-learning process has changed. Today, students can watch online classes ubiquitously and on demand through video platforms such as YouTube. In this context, teachers have acted as digital influencers, creating educational content using teaching methodologies different from traditional ones. This study aimed to analyze Brazilian YouTube channels dedicated to teaching Mathematics with at least ten thousand subscribers ($n=50$). A strong correlation ($R^2=0.83$) was identified between the number of video views and the number of subscribers. In addition, elementary Mathematics topics were found to generate substantial engagement, such as square roots, division, and exponentiation.

Keywords: Mathematics education. Virtual learning environment. Interactive technology. Statistical information.



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Resumo

Com a popularização da internet, o processo de ensino-aprendizagem tem se modificado. Atualmente, os alunos podem assistir aulas online, ubiquamente, sob demanda, através de plataformas de vídeos, como o YouTube. Nesse contexto, os professores têm atuado como influenciadores digitais para criar conteúdos educacionais, usando metodologias de ensino diferentes das tradicionais. Esta pesquisa teve como objetivo analisar canais brasileiros de YouTube dedicados ao ensino de Matemática e com no mínimo dez mil inscritos ($n=50$). Foi identificado que existe uma correlação forte ($R^2=0,83$) entre o número de visualizações de vídeos do canal e a quantidade de inscritos. Além disso, verificou-se que assuntos elementares de Matemática geram muito engajamento, tais como: raiz quadrada, divisão e potenciação.

Palavras-chave: Educação matemática. Ambiente virtual de aprendizagem. Tecnologia interativa. Informações estatísticas.

1. Introduction

Non-digital teaching-learning resources, such as encyclopedias, notebooks, and books, are increasingly distant from the reality of many students at all educational levels, especially in view of the new generations (Y, Z, and Alpha). Currently, students have opted for digital resources that, in theory, make learning more dynamic, such as the video platform YouTube. Screens have been used not only for leisure but also for studying.

Caldart et al. (2025) examined theses, dissertations, and undergraduate final papers on the use of YouTube in Mathematics Education, retrieved from the repositories of CAPES and UFRGS (Universidade Federal do Rio Grande do Sul). Ten studies were identified, in which YouTube is regarded as a versatile tool for consuming, producing, and publishing educational videos. It was found that the majority of the studies analyzed regard YouTube merely as a support for students' learning, with few investigations addressing its potential as a working tool and as a means of teaching practice. In this regard, it is suggested that studies mapping the teaching practices observed in YouTube videos be carried out in order to identify the elements that contribute to a video's success on the platform.

Junges et al. (2021) analyzed five Brazilian YouTube channels devoted to mathematics teaching, using netnography as their method. The study found that the videos follow the traditional expository model, with an average duration of 8 to 14 minutes. Channels with more subscribers display a larger number and greater diversity of comments, mainly expressions of gratitude and questions about the content. However, the interaction among users, and between users and content producers, is limited.

De Aguiar and De Lima Sales (2022) evaluated YouTube videos on the "History of Mathematics," seeking to identify their main approaches and characteristics, such as views, channels, and transcripts. Content analysis revealed four categories: biographies of mathematicians, the use of mathematics in the past and the present, relationships between geometry and trigonometry, and examples applied in the classroom. The videos were found to retain approaches similar to those of traditional teaching and were recommended as supplementary material.

Dos Santos and Gonçalves (2017) carried out an analysis of the ten YouTube channels with the largest number of subscribers devoted to mathematics teaching. Aspects such as authorship, purposes, and the resources used in video lessons were examined. It was observed that teachers and exam-preparation courses use YouTube mainly for school reinforcement and exam preparation. The lessons retain the traditional expository format, indicating limited pedagogical innovation despite the use of digital technologies.

The objective of this study was to perform a quantitative analysis of Brazilian YouTube channels dedicated to teaching Mathematics with at least ten thousand subscribers. Several parameters were extracted from 50 channels in the aforementioned field (Figure 5), making it possible to identify the most popular channels and the videos with the greatest engagement. Accordingly, the following research questions were formulated and answered throughout this study:

Among the metrics number of subscribers, number of views, number of published videos, and channel age, which one exerts the greatest influence on the popularity of Brazilian Mathematics-teaching YouTube channels?

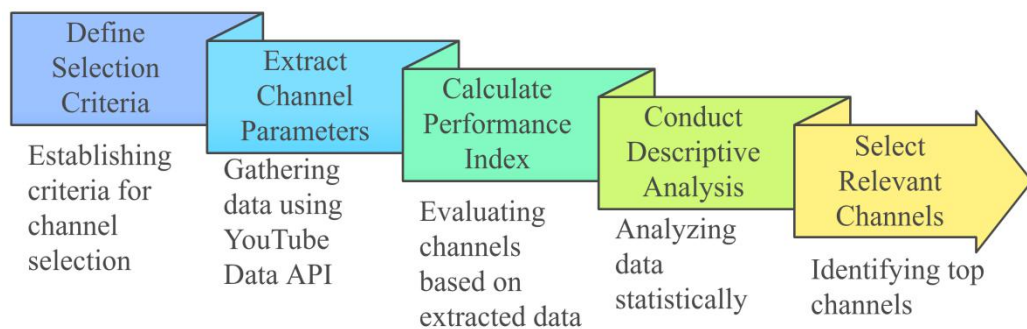
Which Mathematics topics generate the greatest audience engagement on the channels with the best performance metrics?

The next section of this paper describes the methodology used to obtain the results, which are presented and discussed in Section 3. The final considerations are presented in Section 4.

2. Methodology

The methodology of this study was based on Souza, Corrêa Jr., and Pereira (2025), and is summarized in Figure 1.

Figure 1 - Methodology overview.



Source: Souza, Corrêa Jr. e Pereira (2025).

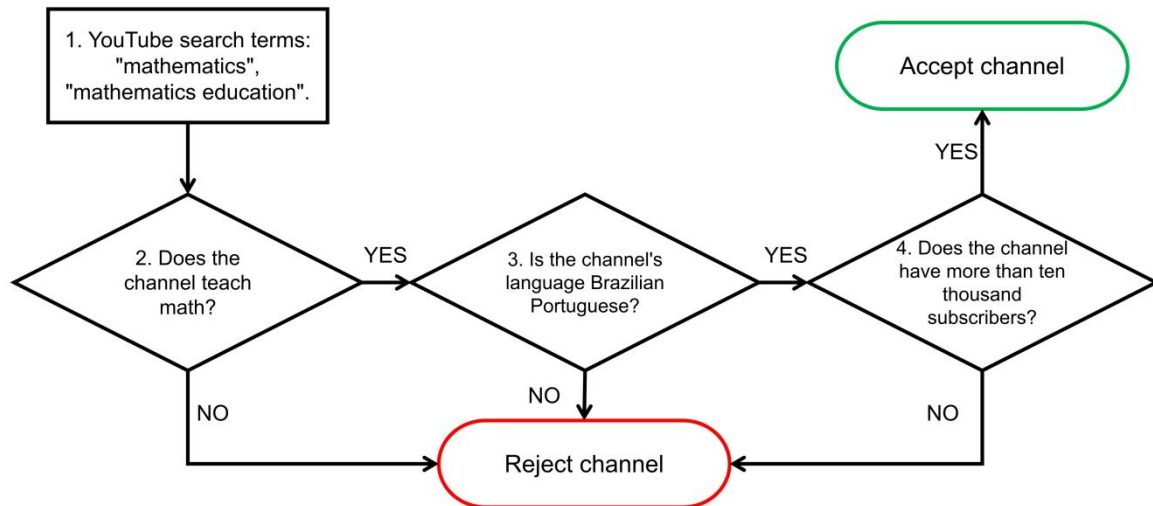
The first step was to define the channel parameters used in the quantitative analysis. Frame 1 shows the variables considered and their respective statistical types, classified according to Escovedo et al., 2024, p. 16.

Frame 1 - Variables for Each Analyzed Channel.

Variables	Type
Channel name	Qualitative nominal
Age	Quantitative continuous
Subscribers, views, and videos	Quantitative discrete

Source: prepared by the authors.

The second step consisted of selecting, through the search filters of the YouTube web platform, fifty channels devoted to teaching Mathematics, subject to the following restrictions: the channel had to be Brazilian and have at least ten thousand subscribers. The figure of 50 channels was determined by a limitation of the computational tool used for automated data access, which allows querying at most fifty channels at a time. Figure 2 shows the channel-selection flowchart.

Figure 2 - Flowchart for selecting research channels.

Source: prepared by the authors.

Next, the channel data extraction was carried out using a computer program developed in Python (version 3.12.12) running on Google Colab, which used the “YouTube Data API v3” to automatically capture the values of the variables listed in Frame 1 for each of the fifty channels. The same program was used to analyze the channel data quantitatively. It should be noted that data acquisition was performed in January 2026.

The next step consisted of calculating the performance index (PI) of each channel using Equation 1, adapted from Souza, Corrêa Jr., and Pereira (2025). It is worth noting that the median is used to reduce the impact of outliers, and the logarithmic transformation is applied to standardize values on smaller scales, given that the figures for some YouTube channels are very large while others are very small. It is important to emphasize that the PI calculation model does not take into account aspects such as didactic quality, conceptual accuracy, or the frequency of publication of new videos.

$$IP = \log \left(\frac{S \times V \times W \times A}{\tilde{S} \times \tilde{V} \times \tilde{W} \times \tilde{A}} \right) \quad (1)$$

where: PI is the performance index; S is the number of channel subscribers; V is the number of videos published by the channel; W is the total number of views of the channel; and A is the channel age; the variables $\tilde{S}$, $\tilde{V}$, $\tilde{W}$, $\tilde{A}$ are their respective medians.

A descriptive statistical analysis of the collected data was then performed. Subsequently, the three most relevant channels, based on PI, were selected in order to identify which Mathematics topics generate the greatest engagement on YouTube. The results obtained through this methodology are presented in the next section.

3. Results and Discussion

The descriptive statistics of the information extracted from each channel are presented in Table 1. A significant difference between the median and the mean is observed, especially for the parameters views, number of subscribers and number of videos, whose means are far higher because of the presence of channels with extremely elevated values. The channel age, by contrast, shows similar means and medians, indicating less dispersion for this parameter.

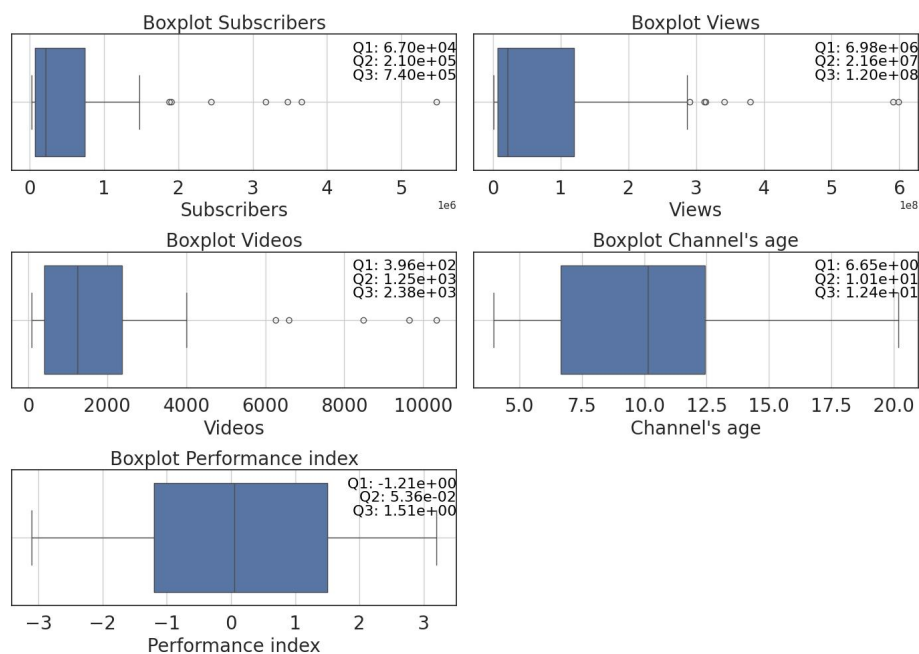
Tabela 1 - Estatística descritiva dos 50 canais pesquisados.

Statistic	Subscribers	Views	Videos	Age	PI
Statistic	720.114	94.288.275	2030	9,82	0,099
Mean	1.131.096	146.272.167	2377	3,76	1,79
Standard deviation	29.700	813.198	91	3,61	-3,10
Minimum	66.950	6.976.500	395	6,29	-1,20
1st quartile	210.000	21.624.737	1250	9,79	0,053
2nd quartile	739.500	119.771.788	2379	12,08	1,50
3rd quartile	5.470.000	598.341.343	10.332	19,82	3,20

Source: prepared by the authors.

The discrepancy between channels can be confirmed by means of the boxplots shown in Figure 3. The number of views of the seven outliers range between 290 and 598 million; in decreasing order, they are: “Professor Dr. Rafael Bastos - Mr. Bean da Matemática”¹, “Gis com Giz Matemática”², “Equaciona Com Paulo Pereira”³, “Marcos Aba Matemática”⁴, “Dicademat Sandro Curió”⁵, “Profdombrauskas”⁶, “Matemática Rio com Prof. Rafael Procópio”⁷.

Figure 3 - Boxplots of the data collected from the channels.



Source: prepared by the authors.

¹ <https://www.youtube.com/@mrbeandamatematica>

² <https://www.youtube.com/@Giscomgiz>

³ <https://www.youtube.com/@equacionamatematica>

⁴ <https://www.youtube.com/@professorferretto/>

⁵ <https://www.youtube.com/@sandrocuriodicademat>

⁶ <https://www.youtube.com/@profdombrauskas>

It is also noted that there are outliers in the parameters number of subscribers and number of published videos. Regarding the number of subscribers, there are seven channels in the range of 1.8 to 5.4 million subscribers; in decreasing order, they are: “Gis com Giz Matemática,” “Marcos Aba Matemática,” “Professor Ferretto | ENEM e Vestibulares”⁷, “Dicasdemat Sandro Curió,” “Matemática Rio com Prof. Rafael Procopio,” “Professora Angela Matemática”⁸ and “Equaciona Com Paulo Pereira”⁹. Regarding the number of published videos, there are five channels with between 6,257 and 10,332 videos posted on YouTube; in decreasing order, they are: “Planeta Matemática”¹⁰, “Professor Dr. Rafael Bastos Mr. Bean da Matemática,” “Profdombrauskas,” “Portal da Matemática OBMEP”¹¹, “Matemática Pra Passar”¹².

By means of the correlation plots in Figure 4, it is possible to identify the relationship between the parameters analyzed for each channel. With respect to the PI, views ($R^2=0.77$) and subscribers ($R^2=0.72$) are the most relevant factors, with a strong correlation, whereas published videos ($R^2=0.58$) show a moderate correlation. These three factors together are the main components of the PI.

Still considering Figure 4, views and subscribers show a very high correlation with each other ($R^2=0.83$), whereas views and published videos show a moderate correlation ($R^2=0.50$), indicating that the number of videos matters, but subscriber retention and virality are more important. Channel age shows a weak relationship with views ($R^2=0.17$), indicating that a channel’s longevity does not determine its growth and that younger channels can surpass older ones.

Also considering Figure 4, the impact of published videos on the number of subscribers is weak ($R^2=0.17$), indicating that publishing excessively is not sufficient if the content posted is not appealing or interesting enough for the target audience. Channel age and the number of published videos show a null relationship, indicating that posting cadence is individual and newer channels can produce at a faster pace than older, rarely updated channels.

⁷ <https://www.youtube.com/@professorferretto/>

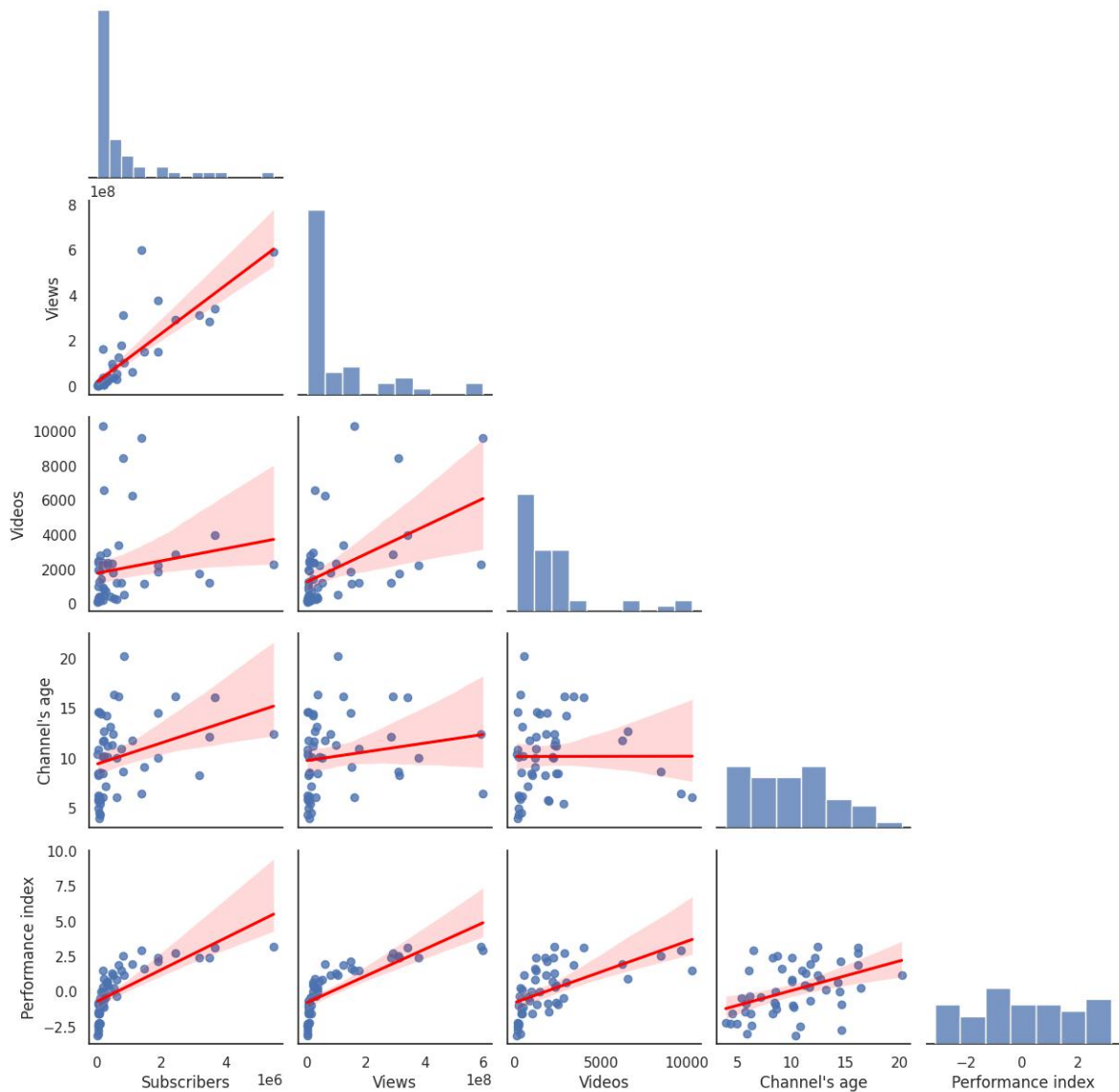
⁸ <https://www.youtube.com/@professoraangelamatematica>

⁹ <https://www.youtube.com/@equacionamatematica>

¹⁰ <https://www.youtube.com/@planetamatematica>

¹¹ <https://www.youtube.com/@portalmatematicaobmep>

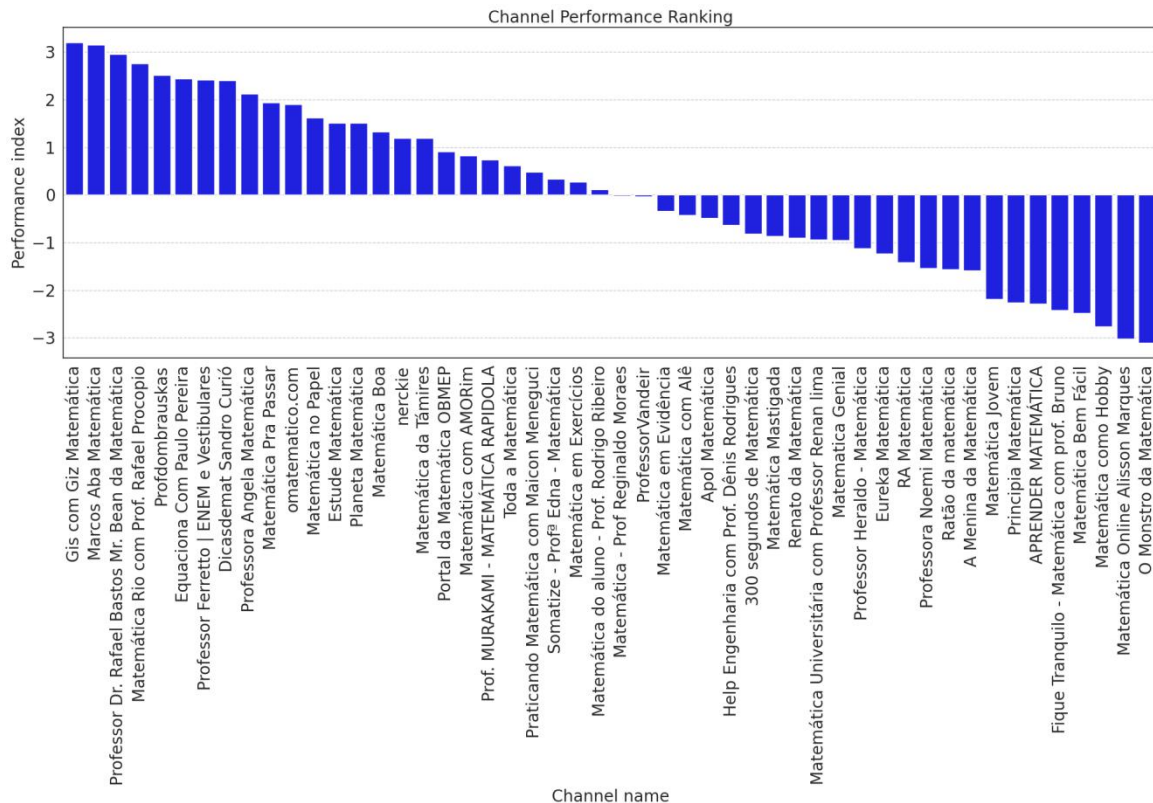
¹² <https://www.youtube.com/@matematicaprapassar>

Figure 4 - Scatter plot of the analyzed parameters.

Source: prepared by the authors.

Figure 5 shows the ranking of the surveyed channels by PI. The three channels with the highest PI values, in decreasing order, are: “Gis com Giz Matemática,” “Marcos Aba Matemática,” and “Professor Dr. Rafael Bastos - Mr. Bean da Matemática.” The following subsections describe which topics generated the most engagement within each of these three channels.

Figure 5 - Channel PI Ranking.

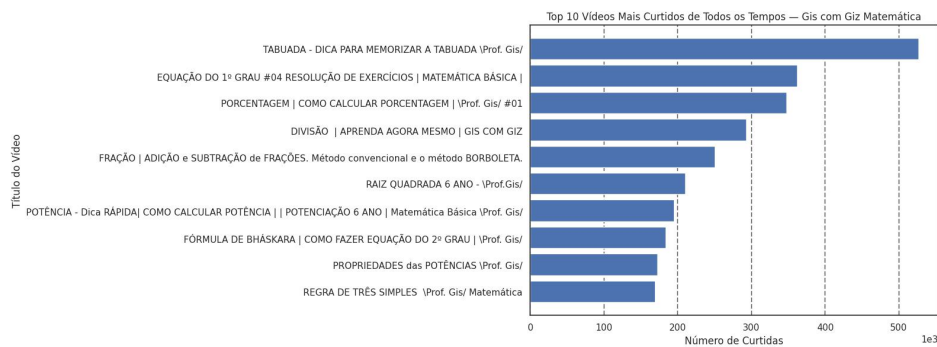


Source: prepared by the authors.

3.1. Gis com Giz Matemática

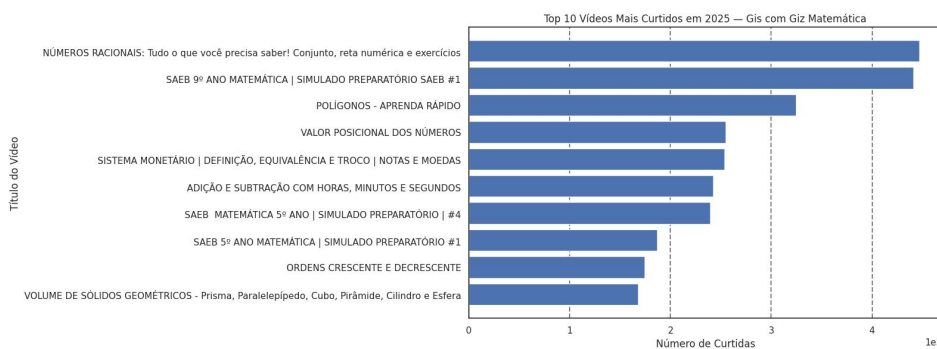
Gis com Giz Matemática is the analyzed channel with the highest PI (3.20). Created on December 18, 2013 on YouTube (12 years old in 2025), it has 5.47 million subscribers, 2,269 published videos, and approximately 591 million views. The following message appears in the channel description: “Come learn MATHEMATICS with GIS. I hold a master’s degree in Mathematics Education and created the channel in order to show that learning mathematics is easy, which is why I aim to provide clear and objective explanations. I hope my channel helps to enhance the mathematical knowledge of my students, former students, future students, and everyone who wants to learn mathematics. Happy studying.”

The titles and respective like counts of the ten most-liked videos, considering all materials ever published, are presented in Figure 6. The predominant topics among these ten videos are: exponentiation, with two occurrences; first-degree equation; percentage; division; multiplication table; Bháskara’s formula; least common multiple (LCM); fraction; and square root. Silva et al. (2025) reported that students face considerable difficulty with exponentiation, even though they have already studied the topic in earlier grades. Silva et al. (2025) also highlighted the challenge of converting information from natural language into mathematical language.

Figure 6 - Top 10 Most-Liked Videos of All Time - Gis com Giz Matemática.

Source: prepared by the authors.

The titles and respective like counts of the ten most-liked videos, considering only materials published in 2025, are presented in Figure 7. The predominant topics among these ten videos are: SAEB mathematics mock exam, with two occurrences; numerical types (natural and decimal numbers), with two occurrences; rational numbers; place value of numbers; monetary system; polygons; addition and subtraction with hours, minutes, and seconds; and division of decimal numbers. Interest in SAEB is justified by the limited familiarity of students and teachers with this assessment system (GONÇALVES and DE ALMEIDA, 2023; TOMAZI et al., 2024).

Figure 7 - Top 10 Most-Liked Videos in 2025 - Gis com Giz Matemática.

Source: prepared by the authors.

Furthermore, although progress has been made in promoting educational equality, in the field of Mathematics women remain an underrepresented population as a result of various sociocultural factors (NASCIMENTO et al., 2023). In this scenario, the channel “Gis com Giz Matemática” stands out as having the highest PI among the fifty channels analyzed, and is led by a woman.

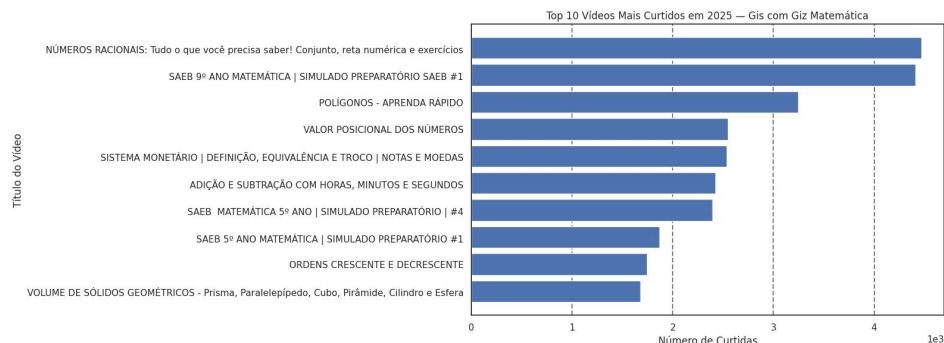
3.2. Marcos Aba Matemática

Marcos Aba Matemática is the second-ranked channel by PI (3.15). Created on April 10, 2010 on YouTube (15 years old in 2025), it has 3.66 million subscribers, 4,009 published videos, and approximately 341 million views. The following text appears in the channel description: “Professor Marcos Aba is one of the earliest YouTube teachers; he began teaching on YouTube in April 2010 (15 years ago), at a time when teachers were generally skeptical of this new wave of online instruction. This channel is aimed at all students (Brazilian and foreign) who experience considerable difficulty with mathematics.”

The titles and respective like counts of the ten most-liked videos, considering all materials ever published, are presented in Figure 8. The predominant topics among these ten videos are: division, with four occurrences; first-degree equation, with two occurrences; percentage;

multiplication; and rule of three. De Holanda and Freitas (2020) and Santos (2023) analyzed the difficulties faced by elementary and secondary students with the four basic mathematics operations (addition, subtraction, division, and multiplication), which helps to explain why videos on these topics show high engagement levels.

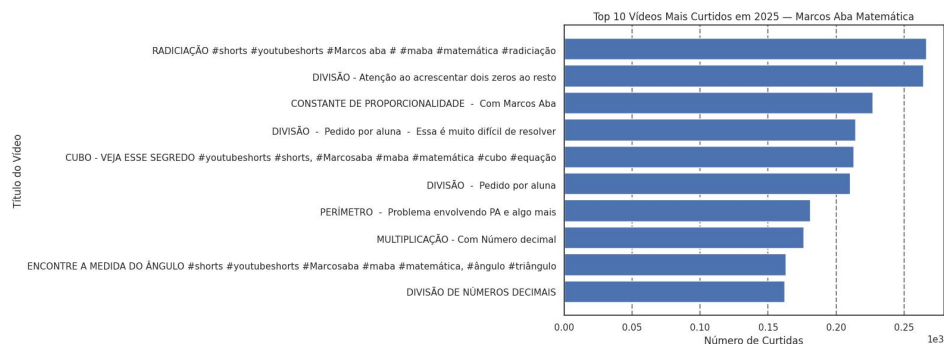
Figure 8 - Top 10 Most-Liked Videos of All Time - Marcos Aba Matemática.



Source: prepared by the authors.

The titles and respective like counts of the ten most-liked videos, considering only materials published in 2025, are presented in Figure 9. The predominant topics among these ten videos are: division, with four occurrences; proportionality; perimeter; fractions; first-degree function; multiplication; and one other topic (electricity consumption).

Figure 9 - Top 10 Most-Liked Videos in 2025 - Marcos Aba Matemática.



Source: prepared by the authors.

The teacher adopts traditional teaching methodologies. A preliminary analysis of his channel made evident the absence of elaborate thumbnails on the published videos; the channel's main image shows the teacher next to a woman, both in casual attire, and the banner has a simple, functional design.

His direct approach, focused on the transmission of technical content, appears to appeal to an audience that values objectivity over the visual elements typically found on the platform, such as eye-catching thumbnails, elaborate transition animations, and exaggerated, caricature-like speech mannerisms.

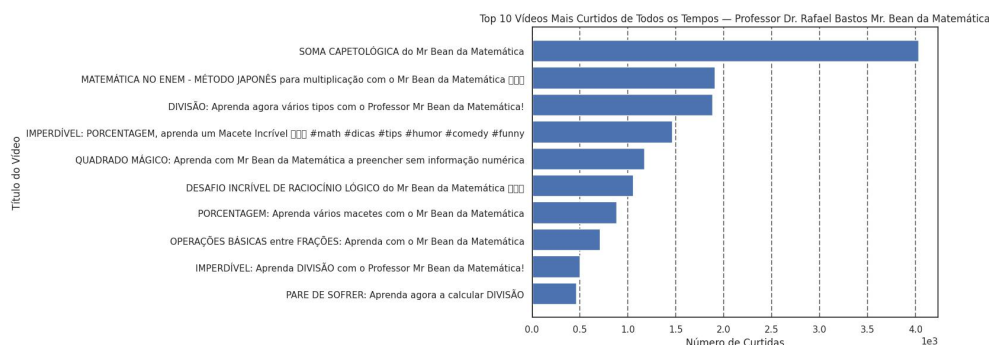
3.3. Professor Dr. Rafael Bastos - Mr. Bean da Matemática

Professor Dr. Rafael Bastos - Mr. Bean da Matemática is the third-ranked channel by PI (2.74). Created on November 30, 2019 on YouTube (six years old in 2025), it has 1.39 million subscribers, 9,643 published videos, and approximately 598 million views. The channel's description text reads: "With Mr. Bean da Matemática, learning becomes much easier. My mission is to Spread Mathematics Across the World, through videos prepared with great care and that special touch of

humor. In addition to being a content creator, I am a university professor, with a bachelor's degree in Mathematics from UNIFAL-MG and a master's and doctorate in Statistics from UFLA."

The titles and respective like counts of the ten most-liked videos, considering all materials ever published, are presented in Figure 10. The predominant topics among these ten videos are: division, with three occurrences; percentage, with two occurrences; addition; multiplication; logical reasoning; fraction; and one other topic that has no direct relation to Mathematics.

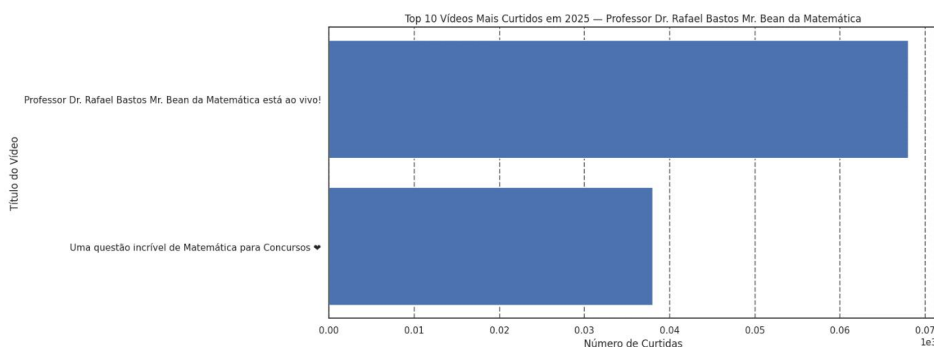
Figure 10 - Top 10 Most-Liked Videos of All Time - Mr. Bean da Matemática.



Source: prepared by the authors.

The titles and respective like counts of the two videos – the only ones meeting the criterion – with the most likes among materials published in 2025 are presented in Figure 11. The two predominant topics among these videos are: question-solving and a Mathematics livestream.

Figure 11 - Most-Liked Videos in 2025 - Mr. Bean da matemática.



Source: prepared by the authors.

The costume worn by the Mr. Bean teacher, which references a world-famous comedy character, adds a layer of humor to the videos that can contribute to greater attention retention and engagement with the content presented (APPLEBAUM, 2020). This touch of humor can also help reduce mathematics anxiety (SAGARDUY et al., 2024).

4. Conclusions

Fifty Brazilian YouTube channels – focused on mathematics teaching and with at least ten thousand subscribers – were considered in order to identify which parameters most influence their popularity. The PI was also calculated in order to rank them, allowing the selection of the three top-performing channels and a quantitative examination of the videos that generate the greatest engagement on each of them.

Two research questions were formulated and answered:

Among the metrics number of subscribers, number of views, number of published videos, and channel age, which one exerts the greatest influence on the popularity of Brazilian Mathematics-teaching YouTube channels?

On the basis of Figure 4, it can be observed that the number of views is the metric that most strongly influences the popularity of Brazilian Mathematics-teaching YouTube channels. This parameter shows a strong correlation with the PI, with $R^2=0.77$.

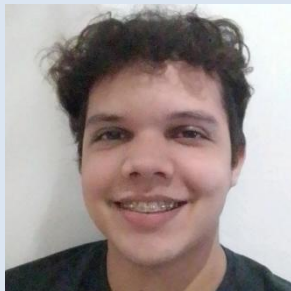
Which Mathematics topics generate the greatest audience engagement on the channels with the best performance metrics?

The analysis of the top-ranked channels by PI value reveals that the topics generating the greatest engagement are those addressing elementary Mathematics subjects, especially those related to recurring student difficulties and to external examinations such as ENEM, SAEB, and public-service entrance exams. Among the topics most frequently appearing in the videos with the largest number of likes, the following stand out: division, exponentiation, square root, first-degree equation, percentage, fraction, rule of three, LCM, GCD, multiplication table, and basic arithmetic operations.

It is emphasized that channel engagement may be influenced by uncontrolled factors, such as the teachers' teaching style, the videos' quality, or latent suggestions from YouTube's recommendation algorithm. It is also worth highlighting that the channel best positioned in terms of PI is led by a woman. This finding represents an important advance in the representation of women in the exact sciences.

As future work, the authors intend to investigate foreign Mathematics-teaching channels; to group channels using clustering techniques from machine learning; and to analyze the characteristics of each group. In addition, alternative ways of evaluating educational effectiveness will be considered, analyzing the most-watched videos with qualitative metrics via artificial intelligence tools capable of converting audio to text and tracking the teacher's face.

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Data availability

The source code developed and the data extracted from YouTube, used to generate the results reported in this study, are available in the following repository: <https://github.com/savio-nfialho/brazilian-math-youtube-channels>

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