Profile of users of the Pion Portal for scientific dissemination in Physics from Google Analytics data on time, space and content

Leonardo Sioufi Fagundes dos Santos
Assistant Professor III, UNIFESP at Diadema, Department of Physics. Professor of Physics, Universidade Federal de São Paulo (UNIFESP), campus of Diadema. Doctor in Physics at the Universidade de São Paulo.
E-mail: leosioufi@gmail.com

Flamínio de Oliveira Rangel
Assistant Professor IV, UNIFESP at Diadema, Department of Physics.
E-mail: flaminio.rangel@unifesp.br

Marcio de Araujo Mendes
IT Analyst, Brazilian Society of Physics; Jbox Solutions' Full-Stack Web Developer.
E-mail: marcio@sbfisica.org.br

Abstract: We performed a quantitative research based on data from the Google Analytics platform on the Pion Portal for scientific dissemination of the Brazilian Society of Physics in search of patterns that indicate a user profile. We studied the views by year, month and day, users by year and region of Brazil and the ten most viewed contents in the Portal from January 01, 2013 to December 31, 2017. We observed that the views increased by year and oscillated over days and months, presenting drops on weekends and in January, July and December; the number of Pion users increased five times more than the Brazilian internet users; the geographical distribution of Pion users and residences with internet practically coincide; the most accessed contents were articles of scientific dissemination in Physics with content of basic education. The data indicate that the profile of the Pion user is of the student or the professor from all over Brazil.

Keywords: scientific dissemination; Physics; Google Analytics; distribution; content.

Resumo: Realizamos uma pesquisa quantitativa a partir de dados da plataforma Google Analytics sobre o Portal Píon de divulgação científica da Sociedade Brasileira de Física em busca de padrões que indiquem um perfil do usuário. Estudamos as visualizações por ano, mês e dia, usuários por ano e por região do Brasil e os dez conteúdos mais visualizados no Portal no período de 01 de janeiro de 2013 a 31 de dezembro de 2017. Observamos que as visualizações aumentaram ano a ano e oscilaram aos longos dos dias e meses, apresentando quedas nos finais de semana e nos meses de janeiro, julho e dezembro; o número de usuários do Píon aumentou cinco vezes mais do que os internautas do Brasil; a distribuição geográfica dos usuários do Píon e dos domicílios com internet praticamente coincidem; os conteúdos mais acessados são os artigos de divulgação científica em Física com conteúdo de ensino básico. Os dados apontam que o perfil do usuário do Píon é do estudante ou do professor de todo o Brasil.

Palavras-chave: divulgação científica; Física; Google Analytics; distribuição; conteúdo.

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1. INTRODUCTION

The internet has facilitated the access to scientific knowledge through a gigantic collection of educational resources and multimedia materials, from scientific dissemination on rudimentary concepts to the latest advances of science. For example, the Brazilian Ministry of Education (MEC) provides for free on the *Portal do Professor* (Portal of the Professor) 13,898 multimedia educational resources[1] and features hyperlinks to 126 portals on the theme[2]. Portals and websites of scientific dissemination combine texts, audiovisual materials, and even interactivity, being characterized as "informal" or "nonformal" education[3]. Schools and universities use the internet for "science teaching" in Distance Education (EaD), an education of formal character, duly recognized by the Law on Brazilian Education Guidelines and Bases (LDB)[4]. Even in face-to-face courses, professors from formal education use internet supplementary educational materials of scientific dissemination in the classroom[5,6,7].

In this study, we will perform a quantitative research of an electronic page of scientific dissemination in Physics, the Pion Portal of the Brazilian Physical Society (SBF)[8]. Hosted on the SBF page, the Pion was created in 2008 in a different format from the current one by the journalist Francisco Rolfsen Belda and by the physicist Nelson Studart with the financial support of the National Council for Scientific and Technological Development (CNPQ)[9]. The name "Pion" comes from the particle proposed and detected by the Brazilian physicist César Lattes.

In 2012, a new team assumed the Pion Portal and remains to date (2018). The new team has no financial support from CNPQ or any other funding agency. All team members are physicists, professors in Brazilian public universities. The coordinator is Leonardo S. F. dos Santos (UNIFESP); the editor-in-chief, Élcio Abdalla (USP); and the collaborators, Flamínio de Oliveira Rangel (UNIFESP), Maria Tereza Thomas (UFRJ), José Sartorelli (USP) and Cláudio de Conti (UNESP). The information technology analyst of the SBF, Márcio Mendes, performed the implementation, adaptation and use of the content management system Joomla, making the Pion safer, more powerful and similar to SBF pages. In addition, Márcio Mendes installed a hit counter in the Pion Portal on August 24, 2012.

The first Pion version was presented as a page for "dissemination and education of Physics". The new team restricted the proposal of the Pion, considering the distinctions between formal education and scientific dissemination[10,11]. Currently, it only appears as a portal of "scientific dissemination in Physics". The target audience became the student of any age group that not necessarily masters mathematical concepts.

The data source of this research is the Google Analytics Platform. Any website registered in the Google Analytics is now tracked by cookies[12]. The Pion Portal is associated with Google Analytics since August 24, 2012. Since then the platform provides several information on website navigation as time,

1. Portal do Professor do Ministério da Educação. Available from: http://portaldoprofessor.mec.gov.br/index.html.

2. Links do Portal do Professor: http://portaldoprofessor.mec.gov.br/links.html.

3. CASCAIS, Maria da Graça; TERÁN, Augusto Fachín. Educação formal, informal e não formal na educação em ciências. **Ciência em Tela**, Rio de Janeiro, v. 7, n. 2, pp. 1-10, Dec. 2014. Biannual. Available from: <http://www.cienciaemtela.nutes.ufrj.br/artigos/0702enf.pdf>. Access on: Sep. 17, 2018.

4. BRASIL, Ministério da Educação. Legislação de Educação à Distância. Available from: http://portal.mec.gov.br/expansao-da-rede-federal/193-secretarias-112877938/seed-educacao-a-distancia-96734370/12778-legislacao-de-educacao-a-distancia.

5. FERREIRA, Luciana Nobre de Abreu; QUEIROZ, Salete Linhares. Textos de divulgação científica no ensino de ciências: uma revisão. **Alexandria**, Florianópolis, v. 5, n. 1, pp. 3-31, Jun. 2012. Available from: <https://periodicos.ufsc.br/index.php/alexandria/article/view/37695>. Access on: Sep. 17, 2018.

6. ENCONTRO INTERNACIONAL DE PRODUÇÃO CIENTÍFICA, n. 8, 2013, Maringá. **Anais Eletrônico**. Maringá: Cesumar, 2013. 9 p. Available from: <http://www.cesumar.br/prppge/pesquisa/epcc2013/oit_mostra/Denise_Fontanella.pdf>. Access on: Sep. 17, 2018.

7. STRACK, Ricardo; LOGUÉRCIO, Rochele; PINO, José Claudio del. Percepções de professores de ensino superior sobre a literatura de divulgação científica. **Ciência & Educação**, Bauru, [s. l.], v. 15, n. 2, pp. 425-442, 2009. FapUNIFESP (SciELO). Available from: <https://dx.doi.org/10.1590/s1516-73132009000200012>. Access on: Sep. 17, 2018.

geographical location, visited content, type of the device of internet access (computer, mobile phone, table etc.), age and sex of the user etc.

The Analytics distinguishes the numbers of views and users[13,14]. The counting process of the number of sessions is very complex[13] and such datum will not be used in our study. Each view corresponds to a visited page[14]. For example, if an internet user opens a page with a news and then another with an article, the Analytics calculates two views. The number of users is recorded by the device (computer, mobile phone, tablet etc.) with which the user accesses the page. For example, if from the same computer two views are performed, the Analytics will count only a single user[14].

What the Analytics names "view", the hit counter of the Pion Portal names "visit". There is a difference between the number of views reported by Analytics and the hit counter of the Portal. From August 24, 2012 to May 20, 2018, the Google Analytics calculated 622,742 views, as the hit counter recorded 1,000,063 visits. This means that the Analytics counted 62% of views. The explanation for this difference is in the counting method. According to the website *Código Fonte* (Source Code)[13], data collection is lost when a Google search uses "https" instead of "http". In addition, the same website and the blog "Internet Innovation"[14] show that problems in enabling cookies and JavaScript language prevent any counting mechanism. The site Search Engine Land[15], cited by *Código Fonte* indicates a counting loss of approximately 39% due to the aforementioned problems, which accounts for 61% of views, practically the same relative difference between data from Analytics and data from the hit counter of the page.

The problems of counting the views of the Analytics do not depend on the moment that the internet is accessed, nor on the geographic location, nor on the sex or the age etc. Thus, the unaccounted views are random, not affecting statistical distributions of access by time, geographical position, sex, age or any other variable. In short, unregistered views do not jeopardize statistical data from Analytics.

The main objective of this research is to seek patterns in accesses to the Pion Portal that indicate any profile of Pion audience. For example, an increase in the number of accesses on weekends shows that the Portal serves as entertainment. On the other hand, a website more visited on weekdays indicates the Pion use for educational or professional purposes. Another example of pattern is the disproportionate concentration of accesses in a particular region of Brazil. If this concentration occurs, the website is with the specific language of a given geographical area. Another pattern is the visit to contents. The most accessed contents show what the audience of the Portal is searching.

The data explored in this study are: distribution of views by time (year, month, and day); distribution of users by year; distribution of users by Brazilian region; and distribution of views by content. The inspiration of these issues comes from Physics itself, since the dynamics of a particle depends on its mass (content) and position (space) in successive instants of time.

8. SANTOS, Leonardo Sioufi Fagundes dos et al (org.). **Portal Píon**. Available from: <http://www.sbfisica.org.br/v1/novopion/>. Access on: Sep. 17, 2018.

9. ESCANHOELA, Felipe Moron; STUDART, Nelson. O que os professores pensam sobre o Píon, o Portal SBF de Ensino e Divulgação da Física. **Caderno Brasileiro de Ensino de Física**, [s. l.], v. 29, n. 8, pp. 327-345, Oct. 8, 2012. Universidade Federal de Santa Catarina (UFSC). Available from: <http://dx.doi.org/10.5007/2175-7941.2012v29nesp1p390>. Access on: Sep. 17, 2018.

10. ENCONTRO NACIONAL DE PESQUISA EM EDUCAÇÃO EM CIÊNCIAS, 2003.

11. VIEIRA, Cássio Leite. **Pequeno Manual de Divulgação Científica**: dicas para cientistas e divulgadores da Ciência. Rio de Janeiro: Instituto Ciência Hoje, 2006.

12. Google Analytics: Cookies e identificação do usuário. Available from: <https://developers.google.com/analytics/devguides/collection/analyticsjs/cookies-user-id?hl=pt-br>. Access on: Sep. 17, 2018.

13. SILVA, Carlos L. A. da. **16 falhas do Google Analytics e o que você pode fazer a respeito**. Available from: <https://www.codigofonte.com.br/artigos/16-falhas-do-google-analytics-e-o-que-voce-pode-fazer-a-respeito>. Access on: Sep. 17, 2018.

14. INTERNET INNOVATION: **Seria bom se fosse verdade, mas é um mito**. O Google Analytics nem sempre consegue contabilizar 100% dos acessos em seu site e vamos explicar o porquê. Available from: <https://www.internetinnovation.com.br/blog/mito-ou-verdade-o-google-analytics-contabiliza-todas-as-visitas-de-um-site/>. Access on: Sep. 17, 2018.

We consider that the number of views reflects the user's interest on Pion better than the counting of users. This is the reason for studying the number of views by time and by content. However, the data about users are also very important because they can be compared with studies on the distribution of internet users in Brazil and their expansion over the years. For this reason, we research data regarding the distribution of users by year and by Brazilian region.

Despite their importance, data related to users' age and sex will not be use because the user who visits the Pion is not necessarily the owner of the device from where the Analytics collects its data. In addition, information about users under 18 years are omitted by Analytics[16], which camouflages valuable data about internet users from basic education. Other data from Analytics will be discarded, as the number of sessions, page per session, time per session, bounce rate, conclusions of goal, new users, conversion rate of goal etc. These data are important, but the numbers of views and users are enough for a study of the profile of the Pion internet user.

The data collected are, as already mentioned, from January 01, 2013 until December 31, 2017. We chose this interval because it contains five full years, allowing the assessment of the evolution of the number of views and users by year.

We justify this research by the necessity of planning the Pion Portal and the electronic pages of scientific dissemination, in general. A scientific dissemination targeted to a very restricted audience is meaningless in a country that lacks the most basic scientific concepts.

The article is organized as follows: the second section shows the distribution data of annual, monthly, and daily views; the third, the distribution of users by year; the fourth, the number of users in the five regions of Brazil; the fifth, a list of the ten most viewed contents on the Pion Portal; and finally, the study ends with the sections for data discussion and conclusion.

2. DISTRIBUTION OF VIEWS BY TIME

The Analytics displays the number of views by hour, day, week and month over any period, but there is not the same option for year. However, it calculates the total number of views in a given period. Therefore, one can also calculate the number of views by year. The Analytics displays graphs and allows data generation in "pdf" or "xlsx" files, in which the latter can be read by Excel.

Figure 1 shows the number of views by year in the period studied.

The number of views by month in the period is shown in Figure 2.

The graph in Figure 2 indicates an oscillation in the number of views throughout the year. To confirm whether there is a relationship between the month of the year and the number of views, one must compare months in different years.

15. SCHWARTZ, Barry. **Search Engine Land:** Study: 39% Of Google Search Referrers Now "Not Provided". Available from: <http://searchengineland.com/google-search-referrers-not-provided-139416>. Access on: Sep. 17, 2018.

16. GOOGLE Analytics: sobre a segmentação demográfica. Available from: <https://support.google.com/adwords/answer/2580383?hl=pt-BR&utm_id=ad>. Access on: Sep. 17, 2018.

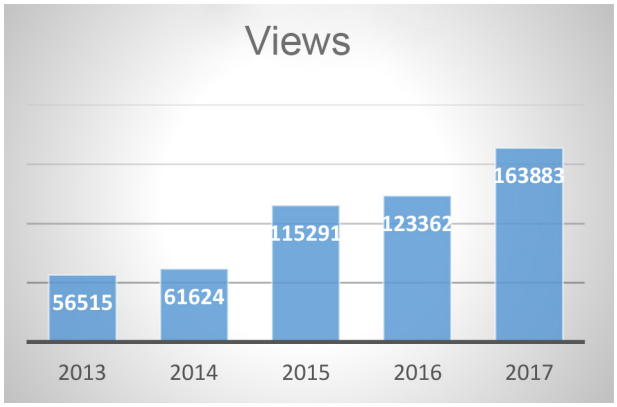

Figure 1: Number of views by year between January 01, 2013 and December 31, 2017

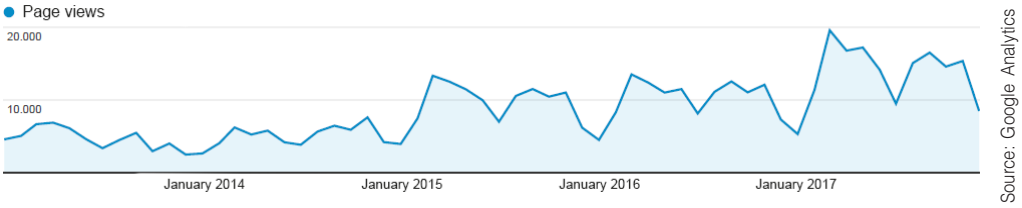

Figure 2: Number of sessions by month between January 01, 2013 and December 31, 2017

With data in Figure 1 exported to a xlsx file, opened in Excel program, we can sum the views of each particular month over the years. For example, the months of January in 2013, 2014, 2015, 2016, and 2017 correspond respectively to the numbers of views 4,564, 2,629, 3,926, 4,488 and 5,295. Therefore, the months of January resulted in 20,092 views. With an analogous procedure one can obtain the number of views of each of the other eleven months. The division of the number of views a month over five different years divided by the total number of views in the period studied, 520,675, results in a fraction. For example, the months of January covered 20,092 views of 520,675, which represents a fraction of 20,092/520,6750.0401=4.01%. Figure 3 shows a graph generated by Excel with the fractions of views of each month over the five years in percentage form.

The number of daily views in the period is in Figure 4.

The graph in Figure 4 shows an oscillation in the scale of days regardless of the variation over the months. Similarly to what was conducted for the distribution of views by month, one must sum the views of each of the 7 days of the week in the studied period. Figure 5 shows the percentage of views by day of the week in the interval covered.

The only reservation that could be done for Figure 4 is the asymmetry in the days of the week in the interval mentioned. There are 261 Tuesdays, Wednesdays, Thursdays, Fridays, Saturdays and Sundays, but the number of Mondays is 260. This objection can be rejected because a difference of 1 day in sets of 5 years is approximately 0.055%.

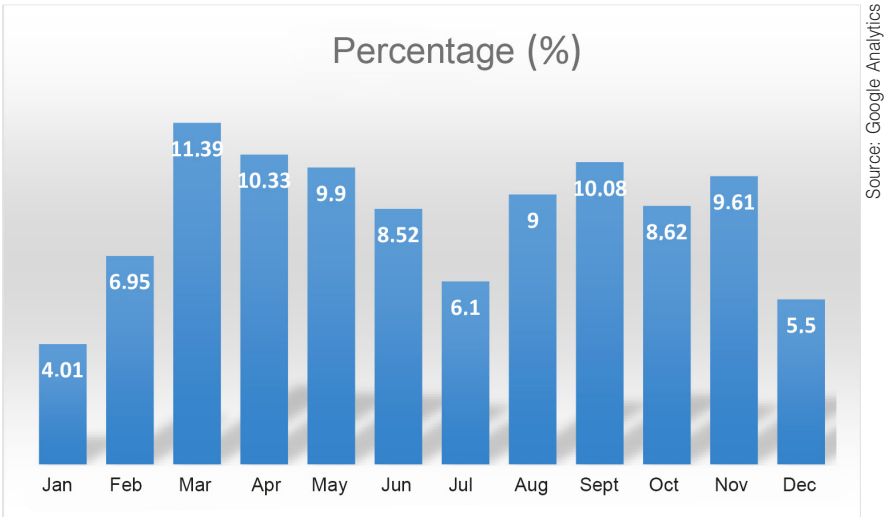

Figure 3: Number of views of each month between January 01, 2013 and December 31, 2017

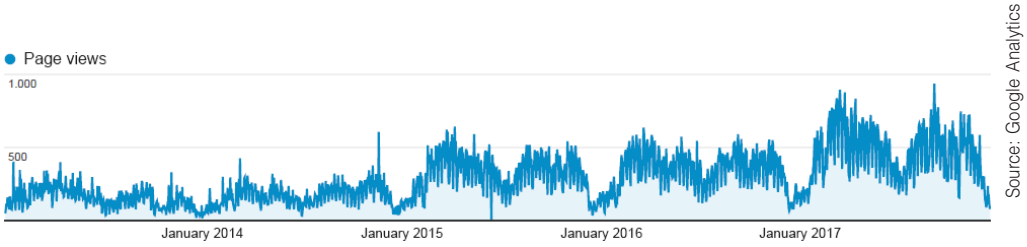

Figure 4: Number of daily views between January 01, 2013 and December 31, 2017

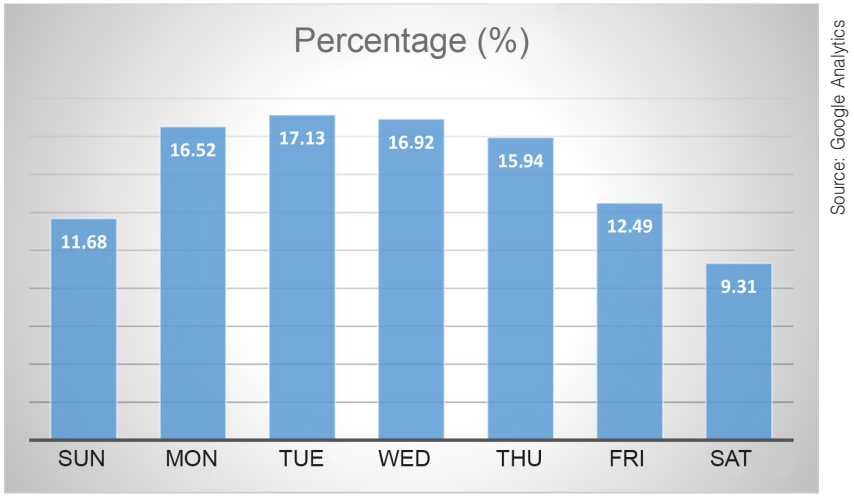

Figure 5: Number of views on each day of the week between January 01, 2013 and December 31, 2017

3. DISTRIBUTION OF USERS BY YEAR

The obtainment of data on the number of users by year is analogous to the number of views by year. Figure 6 shows the annual number of users from 2013 to 2017.

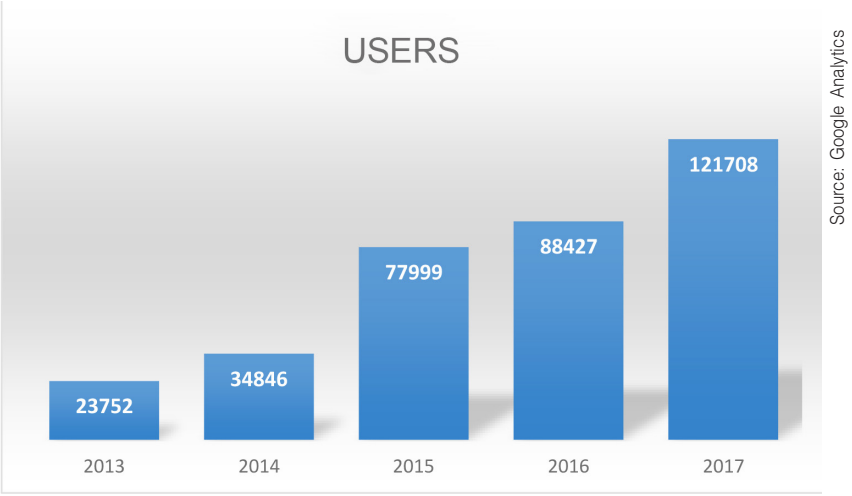

Figure 6: Number of users by year between January 01, 2013 and December 31, 2017

4. DISTRIBUTION OF USERS BY REGION OF BRAZIL

Data on users' geographical distribution provided by the Analytics are very rich, identifying the number of users by city, state and country.

According to the Analytics, in the interval studied, the Pion had 340,448 users. Brazilian users constitute 94.68% of the world's total. There is a group of 0.58% of users that Analytics cannot trace the origin, appearing as "not set".

Although the number of users by city, state and country is detailed in Analytics, only the distribution by the five regions of Brazil will be shown in this study. The number of users by region divided by the total users of Brazil is the fraction of users in each region (see Figure 7). An insignificant fraction of Brazilian users, 0.26%, was not located by Analytics in any state in particular, receiving the same classification "not set". This group was excluded from our analysis.

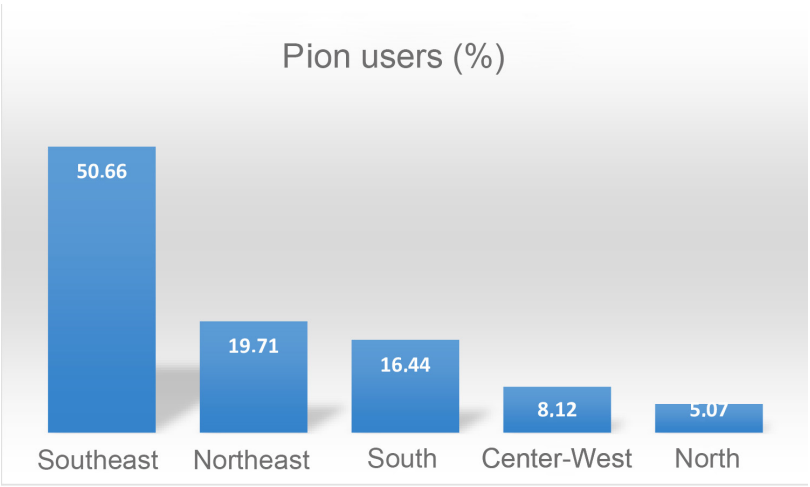

Figure 7: Percentage of the number of users by region of Brazil between January 01, 2013 and December 31, 2017

5. LIST OF THE TEN MOST VIEWED CONTENTS

The Analytics discriminates the number of views that each particular page of Pion received in a given period. For example, it can count the views of each article, each news, each educational material etc. In addition, for each page, it reports the percentage of views, the average time of each view, the number of sessions with the respective percentage etc.

The Analytics distinguishes the views made by different addresses. For example, the Analytics counts separately the views on the article at Pion "3.6" directly on the website[17] (154,926 views), by a search[18] (ten views), by a hyperlink[19] (two views). In total, article "3.6" was viewed by 54 different addresses.

We selected the ten most viewed contents of the Pion in the period under analysis with the respective numbers of views, percentages and viewing time, taking care to consider each page through all possible addresses (see Table 1). Still in Table 1 we added a column with the number of views by day, an information that is not given directly by Analytics.

The average viewing time is especially important for the articles. If the average time of stay is not enough for reading the article, the internet user did not read the entire text.

The number of views by day of a given page may correct a distortion from the day in which a content was made available. For example, a content posted 100 days ago with 200 views had two views by day. On the other hand, another content published in the website 300 days ago with 450 views obtained 1.5 views by day. This would demonstrate a higher degree of interest for a content that had a smaller number of views.

17.http://www.sbfisica.org.br/v1/novopion/index.php/publicacoes/artigos/479-3-6.

18. http://www.sbfisica.org.br/v1/novopion/index.php/publicacoes/artigos/479-3-6+&cd=1&hl=pt-BR&ct=clnk&gl=br.

19. http://www.sbfisica.org.br/v1/novopion/index.php/publicacoes/artigos/479-3-6&gws_rd=cr&ei=rvcnVr-wDcKxwATFtoLADQ.

Table 1: Number of views by content between August 24, 2012 and August 23, 2017

Page	Number of views in descending order	Percentage of views in relation to total	Average time on page	Number of views by day
Article of scientific dissemination: "3.6".	155,009	29.77	6min44s	102.72
Simulations and animations.	56,467	10.84	2min26s	30.92
Pion portal (homepage).	34,896	6.71	1min28s	19.11
Article of scientific dissemination: "60+60=63?".	21,556	4.14	6min58s	14.19
Article of scientific dissemination: "Galileo, messenger of stars".	18,451	3.54	5min48s	10.26
Article of scientific dissemination: "Body temperature during physical activities".	17,677	3.40	5min55s	9.68
Solved kinematic exercise about calculation of average speed	12,984	2.49	4min30s	13.78
Solved kinematic exercise about calculation of distance travelled	10,087	1.94	4min40s	11.57
Article of scientific dissemination: To understand radioactive irradiation and contamination	8,337	1.60	6min37s	4.57
Biography: Mario Schenberg	8,107	1.56	6min14s	4.44

Source: Google Analytics

DISCUSSION

Figure 1 showed that the number of annual views has increased year by year from 2013 to 2017, rising from 56,515 in 2013 to 163,883 in 2017, the equivalent of a 190% increase. In the same period, the number of users shown in Figure 6 had a more significant increase, starting with 23,752 and ending with 121,708, a multiplication of 5.12 in 5 years, an expansion of 412%. Parallel to the increase in the Pion views, the number of internet users in Brazil has increased from 80.9 million in 2012[20] to 137.1 million in 2017 (66% of the Brazilian population[21] of 207.7 million[22]), an increase of almost 69%. The increase of Pion in percentage terms, 412%, is almost 6 times the expansion in the number of internet users in Brazil, 69%.

In the monthly scale, according to Figures 2 and 3, the number of views presents a cyclical character. January, July and December cover respectively 4.01%, 6.10% and 5.50% of the views, the three lowest percentages of the months of

20. AVELLAR E DUARTE, Internet no Brasil, 2012. Available from: <http://www.avellareduarte.com.br/fases-projetos/conceituacao/demandas-do-publico/pesquisas-de-usuarios-atividades-2/internet-no-brasil-2015-dados-e-fontes/internet-no-brasil-2012-dados-e-fontes/>. Access on: Sep. 17, 2018.

21. WEARE SOCIAL: Digital in 2017: Global Interview, 2017, p. 28. Available from: <https://wearesocial.com/special-reports/digital-in-2017-global-overview>. Access on: Sep. 17, 2018.

22. BRASIL. **População brasileira passa de 207,7 milhões em 2017**. Available from: <http://www.brasil.gov.br/cidadania-e-justica/2017/08/populacao-brasileira-passa-de-207-7-milhoes-em-2017>. Access on: Sep. 17, 2018.

the year. In short, three months of the year (25% of the year) receive together only 15.7% of views.

In the daily scale, Figure 4 indicates abrupt changes, as Figure 5 confirms a weekly oscillation. The two days with smallest fractions of views are Saturday and Sunday, respectively with 9.31% and 11.68%. Saturday and Sunday correspond to 28.57% of weekly time, but cover 20.99% of views.

We found no data for a comparison between annual oscillation of Pion views and the general movement of the internet. However, we could make an indirect comparison in relation to the corresponding weekly oscillation. According to the *Relatório Final da Pesquisa Brasileira de Mídias* (Final Report of the Brazilian Research of Medias) held by IBOPE in service for the Federal Government in 2016, on page 27[23], the average time spent by Brazilians with internet by day on weekdays (Monday to Friday) and on weekends is 283.8 minutes and 217.7 minutes, respectively. According to these data, the fraction of time on the internet on weekends of a typical internet user is of 26.79%. In contrast to the typical Brazilian internet user, the Pion user spends only 20.99% of the same period.

The geographical distribution of Pion users can be compared with data from the "ICT Households 2015 Survey on the use of information and communication technologies in Brazilian households", held by the Center of Studies on Information and Communication Technologies (CETIC) under the auspices of UNESCO[24] about the number of households with internet by region. This research[23] does not report directly the percentage of households with internet by region, but such information can be obtained from data in Table 1 on page 133 of the cited reference[23]. The comparison of the percentages of households with network access in Brazil and users in each region practically coincide (see Figure 8). The difference in percentage of distribution of Pion users and of Brazilian internet users is less than 1% in each of the five regions of Brazil.

Data related to content show that the ten most posted pages totaled 65.99% of views (see Table 1). Thus, this particular sample of Pion Portal is sufficient for understanding the content sought by internet users. The information of the next seven paragraphs are in Table 1.

The most viewed content in the Pion, both in number of total accesses as in daily views, was the article "3,6 (3.6)" published in November 14, 2015. The percentage of views is almost 30% of the total, slightly less than triple of the second most viewed content, the page "*Simulações e animações* (Simulations and animations)". In addition, the daily average of views is almost 103 by day, more than the triple of the daily views of the second place. The average viewing time of article "3.6" is of 6 minutes and 44 seconds, enough for the full reading of the text. In terms of curiosity, when the term "3.6" was typed into Google in May 21, 2018, 25.270.000.000 results appeared with the article "3.6" in the first place.

Such article describes why the factor "3.6" converts the speed unit m/s to km/h. The theme is relevant to students from basic education and those aspiring to higher education. To understand the article, the reader needs to know only the four elementary operations, with no formula being used.

23. CETIC, **Pesquisa sobre usos de tecnologia de informação e comunicação em domicílios brasileiros – TIC Domicílios**, 2015. Available from: <http://cetic.br/media/docs/publicacoes/2/TIC_Dom_2015_LIVRO_ELETRONICO.pdf>. Access on: Sep. 17, 2018.

24. BRASIL, Secretaria Especial de Comunicação Social. **Pesquisa Brasileira de Mídia** – 2016, Relatório Final, 2017. Available from: <http://www.secom.gov.br/atuacao/pesquisa/lista-de-pesquisas-quantitativas-e-qualitativas-de-contratos-atuais/pesquisa-brasileira-de-midia-pbm-2016.pdf/view>. Access on: Sep. 17, 2018.

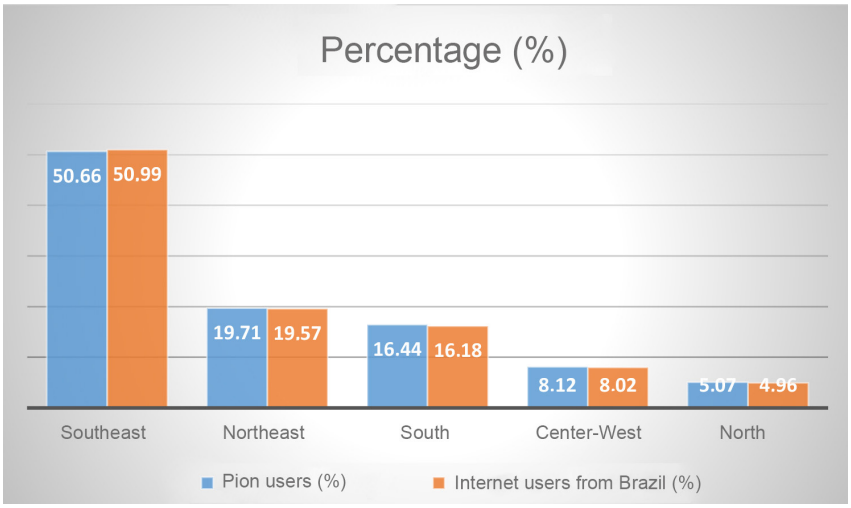

Figure 8: Percentages of Pion Portal users between January 01, 2013 and December 31, 2017 in the five regions of Brazil (blue) compared with households with internet (orange)

The second most accessed content and with greater number of daily views is the section "Simulations and animations", with little more than 10% of the views. This section contains websites with free software for simulations of experiments or physical phenomena. The third largest number of views of internet users is the Pion homepage with 6.71%.

The fourth, fifth, sixth and ninth most viewed content and on each particular day were also articles of scientific dissemination: "60+60=63?", "*Galileu, mensageiro das estrelas* (Galileo, messenger of stars)", "*Temperatura do corpo durante atividades físicas* (Body temperature during physical activities)" and "*Para entender a irradiação e a contaminação radioativa* (To understand irradiation and radioactive contamination)". Viewing times of these articles are between 5 and 7 minutes, enough for a complete reading of the texts. The five articles of scientific dissemination cited totaled 12.68% of Pion views, a sum that exceeds the second most viewed content.

The seventh and eighth places in views are the two solved kinematic exercises for basic education. In number of daily views, these contents reached the fifth and sixth places in daily view. The tenth most viewed content was the biography of Brazilian physicist Mário Schenberg with viewing time of just over 6 minutes, enough for a full reading.

7. CONCLUSION

We conclude that the behavior of Pion views over time is different from the websites of Brazil in general. The number of views as a function of time can be described as a superposition of three movements, a weekly oscillation with drops on weekends, an annual oscillation with drops in the months of school vacation and a very significant increase over the years.

Different from temporal distribution, the geographical diffusion of the Portal is not particularized, practically coinciding with the distribution of households with internet in Brazil – it was not regionalized. To make a portal for scientific dissemination accessed by internet users of all over Brazil in a homogenous manner was a major challenge given the extension of the country, its immense population and all of its cultural diversity.

Considering the content, the Pion was consecrated more as a portal for articles of scientific dissemination than a repository of audiovisual materials. Among the most visited contents, there are no views for the latest scientific news, as detection of the Higgs boson, gravitational waves or landing of a space probe on a comet. The Pion internet user seeks simple and practical contents, more a scientific literacy than a science journalism itself.

From data on space, time and content, we can formulate some hypotheses about the profile of the Pion internet user.

Firstly, the results are compatible with the current target audience, students. The days of the week and the months that students have class coincide with the largest numbers of views.

The student audience is quite wide and heterogeneous, but the contents viewed correspond more to basic education than at the higher one. For example, article "3.6" is very useful for students from basic education, but it is very easy for those in higher education. Another example of material more suitable for basic education than for the higher one is the article "60+60=63?". On the other hand, the solved exercise "*Movimento harmônico simples* (Simple harmonic motion)"[25], directed to higher education, received only 0.06% of the views in the Pion, a total of 336 views from January 01, 2013 to December 31, 2017.

Another audience that may be present in the Pion Portal are the professors. The same contents sought by students can be used by professors as supplementary materials. In addition, the drop in views on weekends and school vacations is also compatible with an audience of professors.

According to the results of our study, the profile of the Pion user is that of a student or professor of any region of Brazil in search of articles of scientific dissemination with content of basic education, in periods associated with work and study. The Pion expansion above the increase in the number of internet users in Brazil and in the midst of an explosive growth in the availability of audiovisual materials is an encouragement to scientific dissemination directed to students with basic concepts.

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