

Consumption of Scientific Information on Television and Internet

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This paper consists of a brief overview of studies related to the consumption of scientific information both on television and on the Internet by the general public, as well as by young people in particular. The preferences of the Internet are clear nowadays, even though television continues to have a place in multiple media. Particular cases are presented to follow a line over time and observe how the consumption of scientific information has been transforming, and how television has adapted to the new forms of production, dissemination, and consumption brought about by innovations, specifically information and communication technologies.

PRESENTATION

Nowadays, young people, but mainly those studying a professional career, use diverse media to obtain information about a subject that concerns them. According to several studies that we will see below, it has been found that one of the media to which a vast majority of people have been exposed as children, young people, and adults, is what has been called the “fifth power” (Delarbre, 1985), that is television. This medium continues to be today a very accessible medium for the majority of the population, since it is everywhere and in every space, mainly due to media convergence. Likewise, some television programs deal with science-related topics, although not in the desirable quantity and at the desirable times. On the other hand, with the advent of new technologies, the use of the Internet has proliferated among the population in general, but in particular, it is among young people that it has a huge boom and this medium is emerging as the favorite for almost any type of search.

In the following lines, we outline an overview of the use or consumption of both sources of communication, focusing on the search for scientific information, which is what we are interested in emphasizing, as well as some data on the general consumption of these two media, by way of contextualization. We clarify that the empirical studies presented below come from the American continent, since they are the most similar to the Mexican reality, even when certain differences are kept.

THE FIRST DECADE OF THE 21ST CENTURY

To begin with, we should consider what was happening in the first years of this century, since these data show what people’s preferences were about scientific consumption on television and the Internet, and to see in some way whether they contribute to current predictions. Horrigan (2006) in research conducted in association with the Pew Internet & American Life Project and the Exploratorium (science museum located in San Francisco, California, USA), tried to answer several questions, among them the location of the Internet about people’s knowledge of science topics, compared to other sources used, and the possible

connection between obtaining scientific information on the Internet and attitudes about science and scientific research. Telephone interviews were conducted between January and February 2006 with 2,000 people over the age of 18. When asked about the main source of scientific information, 41% cited television, 20% the Internet, 14% magazines, 14% newspapers, 4% radio, and the remaining percentage mentioned other sources.

But the picture changes when the analysis focuses on the population under 30 years of age since 36% of the 18-29 age group indicated that they obtain more scientific and general information from television, followed by 34% who cited the Internet; these last two figures reveal that there is no difference, that is, television loses popularity among this age group, and even the Internet is the first source to turn to when information on a specific topic is needed, and libraries are the second option, instead of television.

Regarding the relationship between scientific searches and knowledge and attitudes towards science on the part of Americans, according to Horrigan (2006), there is such a connection since the people who indicated having searched for scientific information online are those who have higher levels of knowledge and understanding of science. The author adds that according to the demographic profiles of the sample, people who used the Internet for their scientific searches, as well as general information, tended to be younger and more educated, while those who relied on television tended to be older and less educated.

Ibope Zogby International (2009) conducted a survey of 3,030 U.S. residents in various cities to find out through which media they get their information. The report shows that 56% stated that if they had to choose only one source of information, they would choose the Internet, while 21% would prefer television; newspapers and radio would be the choice of 10% of the respondents. The net was also preferred by 40% as the most reliable source of news, while only 17% said they trusted television, 16% newspapers, 13% radio, and the remaining 14% said they were not sure. When asked how they saw the future, a large number of people (82%) said that the Internet was going to become the main source of information for any topic - including scientific topics- in the next five years, although 13% maintained that it would be television and 0.5% favored newspapers. In other words, the study places the Internet in a privileged position in terms of information search and reflects a considerable increase in the credibility of the Internet.

Márquez and Tirado (2009) conducted research with 1,808 students between 14 and 18 years of age in Mexico City from different schools and reported that 85.8% considered the Internet “an indispensable tool in the current era” and 85.2% believe that it is “a true revolution for everyday life”. Their learning about science was explored in the various spaces (school, social communication, or entertainment) to which the adolescents reported that they have learned more about science at school (97.7%), in interactive science and technology museums (96.2%), in books (92.8%), on the Internet (87.3%), in magazines and newspapers (85.6%), and on television (83.4%). The authors point out that the Internet is slightly better positioned than television as a learning medium, although paradoxically, they further point out that students recall having seen more science topics on TV than on the Internet.

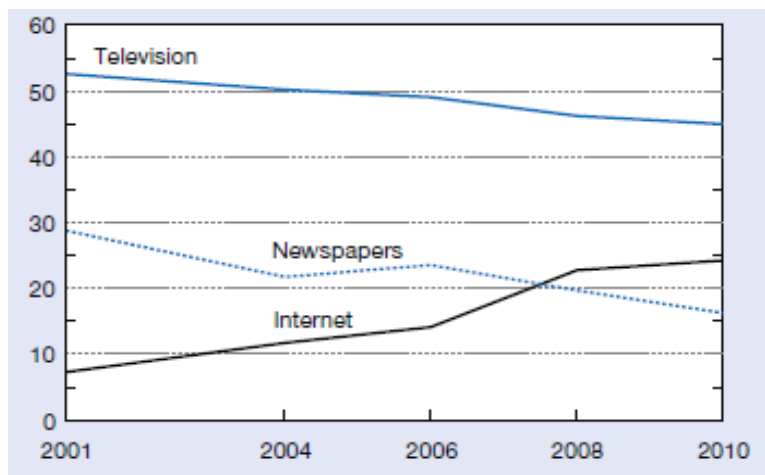
The National Council of Science and Technology (Conacyt, 2011) presented data from the “Survey on the Public Perception of Science and Technology” in Mexico in 2010, conducted on 2,936 Mexicans from different states, over 18 years old, from which data related to scientific consumption on television, Internet, radio, newspapers, and magazines are taken; emphasis will be made on the first two. Of the 96.4% of the people interviewed watched television an average of 3 hours a day, 42.5% watched science and technology programs; that is, a little more than a third watched programs with some scientific or technological content. Science consumption on the network was low: searches on topics related to technology such as new developments, its dissemination, and commercialization were in sixth place, and science was in eleventh place -out of fifteen-, that is, in the last places. It should be noted that the report provided general information; nevertheless, it is a glimpse of what was happening around the first decade of this century, a time when television was still the most watched and searched source among Mexicans.

In another context, Vogt, Morales, Righetti, and Caldas (2011) report on a study carried out in several Latin American cities (Asunción, Bogotá, Buenos Aires, Lima, Madrid, Montevideo, and São Paulo) in which 8,832 young people were interviewed in 2010, confirming that young people’s consumption of science and technology topics is low since their answers coincided with the options “never” or “rarely”. The vast majority of young people reported that when they had to turn to certain media to obtain such

information, television was indicated as the main source of information on science and technology topics, except for young people from Asunción and Bogotá, who said that they obtained more information on scientific issues on the Internet.

A study by the National Science Foundation (NSF, 2012), it is referred that the media environment has been changing in the first decade of this century; although a plurality of Americans still agreed that television was their main source for obtaining news on current issues, few mentioned that this source was reliable in obtaining scientific and technological information, being for a large majority the Internet their main source. Figure 1 shows the changes that occurred in the first decade of this century about the sources from which the U.S. population obtained the most information on current events.

FIGURE 1
PRIMARY SOURCES FOR OBTAINING INFORMATION ON CURRENT AFFAIRS (PERCENTAGES)

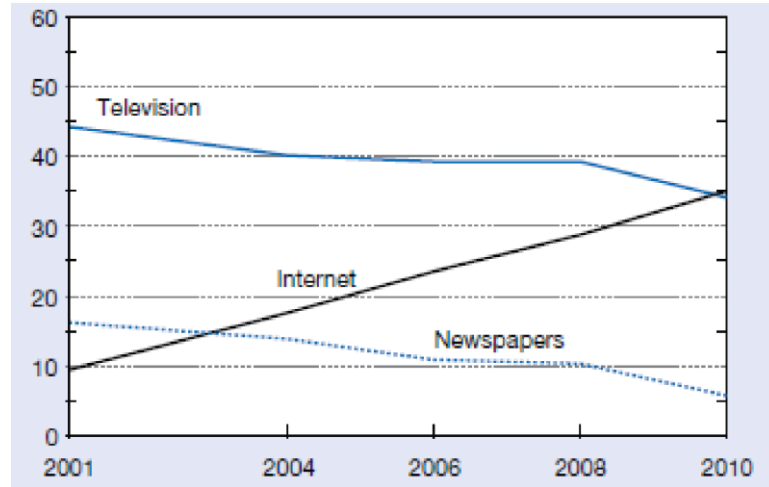


Source: NSF, 2012.

Contrasting 2001 with 2010, we see on the one hand a percentage decline in television and newspapers, and on the other hand a considerable increase of the Internet in the consumption of news. For 45% of those surveyed, television was still the favorite medium, even though it had lost popularity, since 24% of those who preferred the Internet ranked it as the most reliable medium, compared to 2001 when only 8% went to it. It is worth noting that printed newspapers are also losing readers: 16% in 2010, in contrast to 29% in 2001.

Figure 2 shows the media to which the respondents turn for information, not in general, but on science and technology in particular.

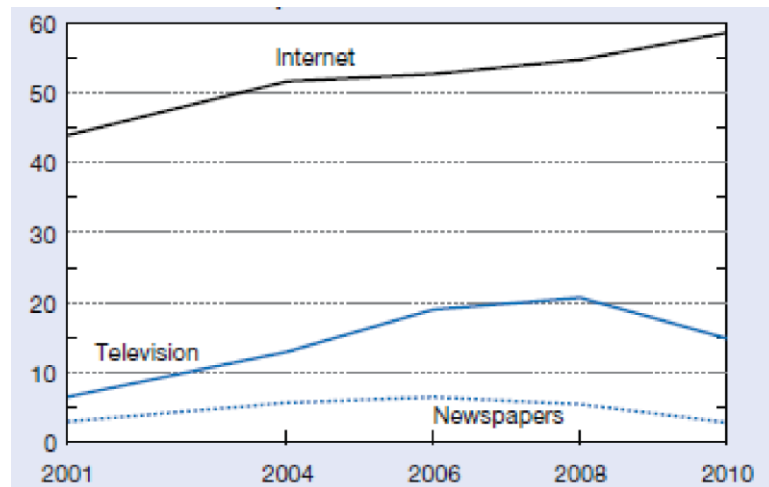
FIGURE 2
PRIMARY SOURCES FOR OBTAINING INFORMATION ON SCIENCE AND TECHNOLOGY TOPICS (PERCENTAGES)



Source: NSF, 2012.

In 2010, the Internet was slightly ahead of television in obtaining scientific and technological information in general, compared to 2008, when 29% of Americans relied more on the Internet, while 39% of Americans relied more on television. We see that the trend is gradually reversing, partly due to the increase in computers at home, work, and school, and Internet access in the same places, in addition to the range of portals and options found on the World Wide Web (www). The differences are more noticeable when looking for very concrete and specific information, as shown in Figure 3 below.

FIGURE 3
PRIMARY SOURCES FOR OBTAINING SPECIFIC INFORMATION ON SCIENTIFIC TOPICS (PERCENTAGES)



Source: NSF, 2012.

The picture changes completely when looking for a specific aspect within the field of science. For example, to the question, “If you want to know a specific aspect about global warming or biotechnology, where would you get the information from?” 59% of informants cited the Internet, up slightly from 55% of

those who had answered the same in 2008. Conversely, we see that television, instead of increasing its rating for this type of search, dropped in 2010 with only 15% of responses, placing it a distant second to the first. Curiously, printed newspapers as a means of searching for information on a specific topic in science remained practically unchanged from 2001 to 2010, although in 2006 there was a slight increase in the number of readers interested in these topics.

In general terms, the report concludes, the use of and trust in the Internet in the search for news and information, including science and technology, is higher among young people and increases according to educational level and economic income, unlike adults who search and trust more in television, an analysis that coincides with that of Horrigan (2006)

THE SECOND DECADE OF THE 21ST CENTURY

In the 2016 report -there has not been a more recent one- of the then Conacyt, now National Council of Humanities, Science and Technology (Conahcyt) entitled “General Report on the State of Science and Technology, Mexico 2015”, data from the eighth Survey on the Public Perception of Science and Technology in Mexico (ENPECYT) conducted to approximately 3,000 Mexicans from different states, over 18 years old about science and technology, about scientific consumption on television, Internet, radio, newspapers and magazines are presented. Concerning television, the report indicates that 93.13% of the people interviewed watch television several hours a day, and of that percentage only 35.26% watch science and technology programs; that is, a little more than a third watch programs with some scientific or technological content (this has not changed concerning the first decade of the present century in the Mexican population).

According to this report, one of the most common uses of computers is Internet access, 82.96% knew what the Internet is and accessed the network with a certain frequency: 39.11% did so for an average of one hour a day, while 33.60% did so for more than two hours, and the rest connected to the network for more than two hours a day. The 84.99% consulted their e-mail, this being the main use, with social networks in second place. Science consumption on the web was low: topics related to engineering and technology ranked tenth, and even lower were agricultural sciences and others. It should be noted that the report provided general information; nevertheless, it is a glimpse of what was happening in 2015, a year in which television was still one of the most watched sources among Mexicans. In contrast, the Internet.mx Association report (2018), which is presented below, points out the increase in the use of the Internet, which we believe has also contributed to the continued use of television within the web, given digital convergence.

Funk, Gottfried, and Mitchell (2017), collaborators of the Pew Research Center, indicated that most users of virtual social networks (Facebook, YouTube, Instagram, Snapchat, among others) saw science-related publications on these platforms, although only a quarter saw many or certain science publications; only a third considered these avenues to be an important way to obtain science news. On the other hand, say the authors cited above, about a quarter of social network users followed science accounts or blogs, and it is quite possible - although studies on that are lacking - that these users could follow links to articles about science publications shown on these blogs and/or accounts, and social networks could be considered an important way to obtain specific news in any field of science; however, these are mere inferences given the trends.

The National Science Foundation (NSF) in its 2018 report regarding science and engineering indicators, makes several comparisons to see the evolution of media consumption and pointed out that in 2016 45% of Americans said that the Internet was their main source of information compared to 37% in 2014. It means that the Internet has overtaken television as Americans’ main source of news, as about 37%, in 2016 cited television as their main source of information, down from 43% in 2014. For news specifically about science and technology, 55% in 2016 cited the Internet as their primary source, up from 47% in 2014. This percentage has grown steadily since 2001, when the Internet was added to the survey.

Mentions NSF that different subgroups of Americans tend to rely on various sources of information depending on various factors; for example, higher levels of education and income are associated with relatively higher levels of Internet and newspaper use, while respondents with lower levels of education

and income rely on television. In 2016 almost no respondents under the age of 24 said that newspapers were their primary source of science and technology news, although this does not mean that they did not receive science news written for newspapers and published online. Television use was also less common among younger respondents.

The Asociación Internet.mx (Internet. mx Association), in its 2018 report exposes the habits of Internet users in Mexico, in which 79.1 million users are young people the ones who spend more time connected. According to the respondents (about 2,000), 64% of these perceived that they were connected to the Internet 24 hours a day, on average they spent at least 8 hours a day connected, and the Smartphone was the most used medium. The use given to the web was mainly for social networks (Facebook and WhatsApp, first and second places respectively) and checking emails. Not included in this report are searches related to science or similar aspects, among the uses of the Internet; it is mentioned, however, that 43% took online courses, but these can be any type of studies with their derived academic/scientific searches. The Association presented data on the general use of the Internet, which is very useful to compare the increase of the Web year after year in most of the Mexican population, besides gaining followers among the child population due to its easy access and use, so we do not doubt that scientific searches will also increase among the different age groups.

Similar data is provided a year later by the Pew Research Center, in the voice of Perrin and Anderson (2019) in which it is appreciated that Facebook celebrated its 15th anniversary (it was launched on February 04, 2004), and remains one of the most used social networking sites among adults in the US: approximately seven in ten adults said they used such a platform. YouTube is another online platform that matches Facebook's reach: 73% of adults reported using the site to share videos of any kind. In contrast, both Instagram and Snapchat have increased in use but more so among young people who track these social networks heavily for sharing different types of information. This center does not mention the consumption of scientific information, although it is known that both Facebook and YouTube are platforms where there is a large amount of all kinds of information, including scientific information.

In the National Survey on Availability and Use of Information Technologies in Households (ENDUTIH), conducted by INEGI (2022), mainly, a count is made on the use of ICTs in people from 6 years and older in Mexico. In 2021 there were already 88.6 million Internet users (4.1% more compared to 2017), and among those who connected to the network, the most were young people from 18 to 24 years of age (93.4%), with men slightly predominating. The main uses were to communicate (93.8%), search for information (89.9%) and access social networks (89.8%). Smartphone use has been increasing, being the most widely used technology among the population, including minors, although computer use has remained almost even between 2017 (30.9%) and 2021 (30.6%). It is worth highlighting that those who use computers for entertainment (23.7%), for work activities (18.4%), school work (17.4%) and as a means of training (10.1%). The survey does not mention searches on science and technology, but it could be that between searching for information and school activities, some of this is found, particularly among young people attending university, who are the ones who use the web the most.

A report with very similar results is the one conducted by Earthweb (Indah, 2023). The author mentions that in the United States (USA) more than 307 million people are using the Internet, one of the countries that use it the most, very close to China and India, and it was estimated that in 2022 about 92% would access the network regularly. Young people between 18 and 29 years old used the Internet the most (99%) for entertainment, communication, and information purposes, and the most used means to access the Internet were the different mobile devices. More generally, Americans used the web for instant messaging (93.3%), email (91.8%), and 74.6% used it for social networking. There is also no mention in this study of searches related to science, technology, and innovation, so it seems to be a forgotten topic or of little interest to those who do these types of surveys.

The above references cover the use and consumption of television and the Internet in general, with an emphasis on scientific searches. It seems that a large number of national and international studies coincide, especially in the second decade of this century, in that the web is one of the most searched media with a considerable increase among young people, particularly for specific searches on science and/or technology topics; although both media (television and Internet) have different purposes, they have had to adapt due to

the multiple economic, political, cultural, social, and not only technological needs of both media producers and consumers, or prosumers, that is, the active participation of the latter.

NOTES ON THE INTERNET, TELEVISION, AND DIGITAL CONVERGENCE

Studies on the use of the Internet have been increasing considerably in the present millennium, but like television, about the search for aspects of science on a particular topic, research is less numerous. For example, Ortiz (2012) and Kalmus, Realo, and Siibak (2011) made an extensive literature review from different parts of the world about the use of the network.

Ortiz (2012) concentrates the material reviewed into three groups according to the subject matter and focus: 1. Research on the negative effects that the Internet can have on young people. 2. Studies on the impact of the Internet on young people in the educational environment. 3. Research on the appropriation or cultural consumption of the Internet by young people. Kalmus, Realo, and Siibak (2011) point out that two main perspectives can be distinguished in the field of social sciences on the use of the Internet: 1. Psychological studies that have examined the involvement in various online activities related to personality characteristics, and 2. Studies on sociology, media, and communication, and research on gender.

Despite this growing interest in the uses, impacts, consumption, and consequences of Internet use, few studies refer to the specific use of the network for information on scientific topics both among the general population and among young students, especially in Mexico, as we have just seen. It should be noted, however, that the empirical studies in our country are somewhat descriptive; there is a lack of analysis of the possible relationships between schooling, economic situation, gender, geographical location, and age groups, for example, and the different uses given to the web.

Regarding television, there are changes that, due to a set of factors that partly started with technological innovations, have modified the offer and media access to television discourses. Vinton Cerf (Clarín.com, 2007), one of the inventors of the Internet, stated that television would continue to be needed for certain things (such as news, sporting events, and emergencies), but “it will be more and more like the iPod, where you can download content to watch it later”. Cerf predicted, then, that the majority would soon be watching television over the Internet, which could mean the end of traditional television in favor of new interactive services, which are being seen in the present day, 2023, with the use of streaming.

About the above, Scolari (2008) said, concerning television and media ecology, that the interfaces of media systems form a socio-technical network very similar to a hypertext; that is, at certain times some nodes of that network are activated and begin to relate to others, giving rise to new configurations. The appearance of new species or nodes modifies the ecology of the whole, causing the adaptation of various elements or the appearance of hybrids that combine the old and the new.

The author specifies the prefix hyper, hypertextual experience, in the following way:

If each text generates its reader (Eco, 1979) and, by extension, each interface constructs its user (Scolari, 2004), it may be pertinent to ask how the diffusion of new interactive media practices (such as surfing the web, living in Second Life or playing video games) affects traditional media. This experience of hypertextual fruition has built a type of reader accustomed to interactivity and networks, an expert user of fragmented textualities with a great capacity to adapt to new interaction environments. The media have had to adapt to these new viewers. This does not mean, it is worth repeating, that the previous television forms have disappeared, but rather that they have been relegated to the background or combined with the new ones to give rise to hybrid formats (Scolari, 2008, p. 5)

Several authors agree (Rigo, 2016; López and Ciuffoli, 2012; Morley, 2008; Jenkins, 2008, among others) that the most appropriate concept to explain the multimedia crossroads (Internet and TV, in our case) is that of “convergence”, a polysemous term that for a long time was associated with the idea of technological convergence, particularly in the nineties; in those years the idea of a “black box” that would integrate all the functionalities of the existing and future media was circulating. We know that Jenkins

(2008), based on Ithiel de Sola Pool, more specifically in his book “Technologies of Freedom” published in 1983, which is focused on the modes of convergence, associates this word not only with technological changes but also with industrial, cultural and social changes, including the new relationships that are woven between media, audiences and media products in contemporary society.

To conclude this essay, we will use the words of Jenkins (2008, p. 257), to see the conjunction of these two media that have played an important role in the entertainment and information industry:

Welcome to the culture of convergence, where old media collide with new, where popular and corporate media intersect, and where the power of the media producer and the power of the media consumer interact in unpredictable ways. Convergence culture is the future, but it is taking shape in our day. Consumers will become more powerful within the convergence culture, but only if they recognize and use that power as consumers and citizens, as full participants in our culture.

And that, we believe, will be achieved if scientific information is used critically, whether it comes from the Internet or from television itself, from any access platform.

BRIEF CONCLUSION

We observe that, at the beginning of this century, television was to a large extent the main source of access to information in general and scientific information in particular, in the second decade the Internet has taken over that space. This does not mean the disappearance of television, but due to the evolutions and economic, political, technological, cultural, and social changes of the media as well as of citizenship, this means of communication, once considered the fifth power, has been forced to change its strategies in order not to lose precisely that power.

On the other hand, we also saw the accelerated growth of the Internet, the ease of access for most young people, the rapid obtaining of information, the virtual interaction with greater reach to peers, friends, family, teachers, classes, and others, makes this ICT an essential and favorite tool that few could do without. Its use, particularly in the academic field, is essential, especially in searches on science, technology, and innovation, to carry out school and research activities.

However, both media -television and Internet- were essential in the years 2020-2022, years of national and international health contingency (COVID-19 case), both in everyday life in which information was necessary by any means, as well as its use in school and academic life. We will see what the trends, convergences, or divergences will be in the future, because the world, technologies, and the promising - although ambivalent- artificial intelligence, are not static, changes occur and will continue.

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