

Visibility, impact and knowledge transfer in scientific education journals: The experience of Aula Magna 2.0

Visibilidad, impacto y transferencia del conocimiento en revistas científicas de educación: la experiencia de Aula Magna 2.0

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Abstract

The value to society of the transfer of scientific knowledge is indisputable, however, it is essential to uncover effective transfer strategies in order to generate social and educational impact. This article aims to analyse the relevance and impact of the dissemination of scientific articles on the science development process and its transfer to society. This study also reflects on the use of new dissemination channels to increase the visibility and transfer of scientific developments. Specifically, it explores the analytics of the blog used by the Aula Magna 2.0 consortium as a science dissemination resource to generate impact.

The article follows a descriptive quantitative methodology that is based on an empirical analysis of data collective from the collaborative academic blog of the aforementioned consortium. It examines the potential of this blog to promote visibility, impact and knowledge transfer in the context of scientific education journals.

The main findings highlight the relevance of new scientific communication channels, as well as the need for new indicators and criteria for assessing academic and social impact. These new channels increase research visibility and provide opportunities to transfer produced knowledge by adapting the communicative approach, format and style to different target groups. In the case of the Aula Magna 2.0 blog, the data presented allows us to conclude that it is a valuable tool for disseminating knowledge through a collaboration strategy, while also generating social and educational impact.

Keywords: Scholarly communication; Information dissemination; Social media; Knowledge transfer; Impact; Blogging.

Resumen

El valor de la ciencia para la sociedad es indiscutible, pero para generar un impacto social y educativo, es indispensable saber transferir el conocimiento científico. El objetivo de este artículo es analizar la relevancia y el impacto de la difusión de un artículo científico en el proceso de construcción de la ciencia y su transferencia a la sociedad. También pretende valorar la irrupción de nuevos canales de difusión para el aumento de la visibilidad y la transferencia de los avances científicos, y explorar las analíticas del blog académico colaborativo propio del consorcio Aula Magna 2.0 como recurso de difusión de la ciencia para generar impacto.

El artículo analiza, mediante metodología cuantitativa descriptiva, a partir del análisis empírico de los datos extraídos del blog utilizado por dicho consorcio, su capacidad para propiciar visibilidad, impacto y transferencia del conocimiento en el contexto de las revistas científicas de educación.

Los principales resultados destacan el valor de los nuevos canales de comunicación de la ciencia, así como la necesidad de nuevos indicadores y criterios para evaluar su impacto. Estos nuevos canales aportan visibilidad a la investigación y capacidad de transferir ese conocimiento, adecuando lenguaje, formato y estilo a los diferentes colectivos receptores del mismo. En el caso del blog Aula Magna 2.0, los datos presentados permiten

concluir que es un medio valioso de difusión del conocimiento a través de un espacio de colaboración, a la vez que permite generar impacto social y educativo.

Palabras clave: Comunicación científica; Difusión; Redes sociales; Transferencia del conocimiento; Impacto académico; Impacto social; Blog académico.

Received/Recibido	2020 june 12	Approved /Aprobado	2020 october 20	Published/Publicado	2020 december 8
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The publication of research results is key for the scientific development. Over the last four or more decades, scientific journals have increasingly provided channels to excellence. This is especially the case for the areas of science and engineering, although it is also true in the fields of social sciences and humanities (Fuentes, Luque & López-Gómez, 2012). Precisely for this reason, scientific articles are more essential references than other formats, such as books or book chapters, for the evaluation systems implied in the hiring and promotion of university researchers and lecturers (Niles, Schimansji, McKiernan & Alperin, 2020).

One of the key reasons for which scientific journals have reached the point of being considered to offer the best diffusion channel for research resides in their potential for measuring impact. Such impact is calculated as a function of the frequency with which articles are cited in specific journals within a determined timeframe. Now, this approach to measuring the impact of a publication has been questioned for two main reasons. The first reason relates to the limit of this as a metric in itself. The second reason, —which is not limited to the scientific community— relates to limitations in understanding the real impact of results in society. In other words, it fails to capture whether the research achieved a positive effect in society (Flecha, 2018). As indicated by Green (2019), the impact factor alone is not enough. New diffusion channels should be considered which are also directed towards achieving social impact from the outcomes our research. As a result of this, perceptions are starting to emerge which suggest that the classic measure of impact factor has its days numbered as other scientific dissemination models are starting to emerge which measure impact on both society and science (Ruiz-Corbella, 2018).

In this context, the scientific community is starting to move closer towards considering the publication of research outcomes as a part of the dissemination process, which should not only be directed towards the scientific community but also reach the citizenry (European Commission, 2018). To this end, other formats are required that bring research results and other sectors of society closer together. Logically, this requires a language, format and style that is differentiated from the purely academic. The purpose of this is no other than “(...) to get science and technology onto the streets, away from the laboratory, classroom or research centre, out of canonical communication and diffusion forums, in other words, academia and athenaeums” (Chaparro, 2018, p. 5). In this way, dissemination is approached as a citizen’s right, especially when it is considered that research is ultimately funded via public resources.

Although the academic dimension of scientific communication is now well established in STEM subjects, social sciences and humanities and, specifically, in education, there is still a long way to go to bring research outcomes closer to society (Santos Rego, 2020). In this sense, a number of issues emerge for researchers and the editors of scientific journals. The following questions are posed: What should be understood by dissemination in science? What should be considered in order to disseminate our findings effectively? Will other formats and publication channels emerge which are different to the classic IF but value the academic community in the same way? Do we know how to generate impact from research and publications? Are we able to discuss different types of impact?

In order to develop responses to such questions, the present article poses three objectives with which to deepen understanding

about the knowledge dissemination generated within the scientific community, in addition to evaluating research impact in emerging settings through web 3.0. Specifically, the objectives are as follows:

1. To analyse the relevance and impact of the dissemination of scientific articles in the process of constructing scientific knowledge and transferring it to society.
2. To rate the penetration of new dissemination channels which target increased visibility and transfer of scientific advances.
3. To explore the analytics of the collaborative academic blog of the Aula Magna 2.0 consortium as a scientific dissemination resource for generating impact.

In order to meet the first two objectives, a critical review will be performed of the state of the research issue. The third objective will be approached through empirical analysis of the data extracted from the blog under examination.

What is understood by scientific dissemination: Disseminating beyond publishing

The role played by dissemination in the scientific sphere is more than understood. The purpose of transferring advances and outcomes to the very community from which they were derived, in addition to broader groups through conferences and publications, has always existed. Indeed, guilds have existed since the Middle Ages and scientific communities from the 18th century. In order to analyse the effectiveness of dissemination, we should consider that both experts (researchers, university lecturers) and target populations (diverse audiences) present heterogenous realities that are in a permanent state of evolution. Scientific dissemination has always demanded a differentiated consideration that is appropriate for different groups, including those pertaining to communities with specific interests, needs and perspectives. In other words,

(...) questions about what should be said can only be resolved if, at the same time, it is understood how, where, when and to whom we are speaking. It is these circumstances regarding mode and place that enable better understanding to be reached in the transition of knowledge from one context to another, and in this way, achieve better comprehension regarding concrete scientific dissemination cases (Escobar-Ortiz & Rincón-Álvarez, 2019, p. 143).

From this standpoint, it is understood that all researchers should, at the start of their projects plan how and where they will disseminate the advances and outcomes of their work. A good example of this is shown in templates for competitive research grants. For example, in the case of R+D+R research projects funded by the Ministry of Science and Innovation of the Spanish Government, or those derived from the 6th Framework Program for research, technological development and demonstration activities of the European Union. These templates include a designated section to outline the specifications and funding of dissemination efforts.

Now, we cannot ignore the fact that decisions around the evaluation policies pertaining to scientific production have significantly influenced change and standardisation of the behaviours of researchers and academic regarding research dissemination. In Spain, over the last thirty years (concretely through the Royal Decree 1086/1989 that established evaluation as an aspect of research), the evaluation of scientific production has been imposed in all knowledge fields through the impact factor. This has turned articles into the main exponent of this production. For this reason, since the end of the 1990's, the number of scientific education journals in Spain has increased exponentially (Ruiz-Corbella, Galán & Diestro, 2014), in addition to the number of published articles. At the same time, other channels and formats of communication have also emerged. This reality has, without a doubt, modified the way

in which we conduct research and communicate.

Prior to this, an author's involvement in the dissemination of their work finished once it was published in one of the few existing journals. These, in turn, mostly received recognition as a function of their history, director, number of subscribers and their presence in libraries and journal registries. In the best of cases, authors distributed article off-prints to researchers and colleagues within their social or work circle. From this moment, the importance of scientific production was focused on the impact factor of the journals in which researcher's published (received citations). Undoubtedly, this led to advances in the academic dissemination of research but also resulted in some poor practices (Pfleegor, Katz & Bowers, 2019). Given this situation, new modalities emerge for interpreting research and carrying out its dissemination. In this sense, we refer to the transfer of knowledge, given than

(...) it vindicates not only the generation of scientific knowledge and its publication, but also its impact on and influence in society. Thus, the evaluation of publications in within the academic curriculum is not enough and it is necessary to attend to other facets of research activity (Giménez, 2018, p. 2).

If the value of science as a motor for societal development is recognised (Santos Rego, 2020), it is necessary to transfer the knowledge produced in order to boost economic competition, innovation and the consolidation of democratic societies (achieve a participatory citizenry and facilitate transparent oversight). This must occur not only through the scientific community but through society as a whole, with the aim of generating social and educational impact "in various directions, and not only in one direction, in accordance with the mode and place that have been identified" (Escobar-Ortiz & Rincón-Álvarez, 2019, p. 145). Amongst the new dissemination opportunities offered online, social networks stand out as they are capable of giving a degree of visibility that

would a previously been unimaginable (Abadal, 2017).

Thus, it is important for society to be able to make well-informed decisions about the issues that affect it. For this, it is necessary for the information derived from scientific research to be clear and understandable. This will ensure the participation of the citizenry in science and technology in its broadest sense. Further, on this point, it makes sense for researchers to make use of the wide array of channels open to them in order to disseminate their results (Weller, 2018).

The Internet, social networks and new channels for scientific dissemination

The emergence and rapid expansion of the Internet has provided a new interactive setting that affects the very essence of what it is to be a human being. Specifically, communicative structures through a multimodal, hypertextual and non-linear language (Arcila-Calderón, Calderín-Cruz & Sánchez-Holgado, 2019).

The significance of this new communicative structure is that it enables anybody to be able to connect with everybody else, without spatial or temporal limits, with a clear pretence of collective intelligence based on participation and collaboration (...) In summary, it is not only concerning with transmitting and sharing information but reusing it and transforming it into knowledge. Further, it will be technology that facilitates the artefacts and supports to achieve this quickly and with an unimaginable volume of data (Ruiz-Corbella & García-Gutiérrez, 2019, p. 33).

Through the creation of web 2.0, transformation of all aspects can be examined within the ambit of scientific journals as it not only makes it possible to enrichen the content on offer, for example through hypertext, but also enables interaction between editors, authors and readers. Access to these publications is growing exponentially. This will continue as long as visibility is facilitated through metadata, and publications are

incorporated into prestigious databases and have an online presence, especially through social networks. Undoubtedly, “this does not concern a change but a radical transformation of the way in which scientific journals are understood, published and disseminated, and their impact is measured” (Ruiz-Corbella, 2018, p. 506). New practices are starting to be proposed such as the open publication of research data, *preprints* as a first taste prior to final publication, and impact evaluation through open sources (social networks). It can be seen that these practices are not limited to closed databases, nor are they exclusively related to the academic context (Dinu & Baiget, 2019; Giménez, 2018).

In this sense, social networks are starting to be considered by editors and authors as basic elements for improving the dissemination and impact of journals and their content. For this, authors publish content online that is associated with their articles. Different communication channels are used such as blogs, Facebook, Twitter, YouTube and Instagram. In this way, they can also promote the option for content to be reused, shared, commented on, etc. This permits the shelf-life of each article to be quickly extended so they are of interest for a longer period of time.

From now on, dissemination could also be measured via alternative indicators to the number of citations received in determined source journals. Potential alternatives include the number of followers, links, shared content, etc. This enables a degree of visibility to content that was invisible up until now in the majority of cases. At the same time, it encourages fluid communication and collaboration (Giménez, 2018; Robinson-García, Delgado & Torres-Salinas, 2011). In this way, networks such as Facebook, Twitter, Mendeley and ResearchGate are converted into access routes which grant access to content, occasionally the access granted may be even more than that offered by the journal in which the same content is published. Although it may appear that such networks have reached their peak in the areas of the sciences, engineering or health sciences, in other areas such as humanities, social sciences

and, particularly, education, capacity continues to grow significantly (Gardner & Inger, 2018).

Scientific publications in education are opening up, little by little, to online spaces as a clear scientific communication strategy. If we only consider education journals published in our country, this incorporation into online networks continues to be minor (Sánchez-Santamaría & Aliaga, 2019). In a recent study, Arcila-Calderón, Calderín-Cruz and Sánchez-Holgado (2019) concluded that the actual rate of social network uptake did not exceed 39%. This indicates that the incorporation of these dissemination routes in the context of our scientific publications remains scarce. These same authors also indicated significant individual level differences, with Twitter being the network with the greatest uptake (69.60%), followed by a 57.14% uptake of Facebook, LinkedIn with 26.80% and ResearchGate with 21.40%. However, it is also true that the metrics offered by these networks (number of followers, downloads, mentions etc.) is still of questionable value and meaning.

(...) The options offered by systems such as Twitter, Facebook, ResearchGate, Academia or Mendeley are huge but ‘*evidence on whether and how these may relate to research quality is very limited*’. The availability of information and potential indicators is not synonymous, however, with their ripeness for use in evaluation processes (Giménez, 2018, p. 10).

Nonetheless, nobody argues that these systems collaborate in the consolidation of the reputation of journals and authors, whilst also collected another type of impact measure through views, downloads, derived citations from different sources (such as Google Scholar or ResearchGate), etc. In any case, a direct association between greater online presence in social networks and article citations has not been verified. Social networks enable content to be uncovered that is most relevant to the research of users. Further, they invite access to the websites where the work being referred to is published. However, in reality only a few users will ever access the reference article,

whilst even fewer will ever end up citing the work. At the moment, it can be concluded that social networks are key to digital marketing strategies which help bring scientific publications closer to the different populational sectors to which we direct our work (Arroyo & Guallar, 2019). As a consequence, one of the most important changes that will affect editors and authors relates to

(...) control over knowledge production and its dissemination, which is now being passed from institutions to individuals, and from official sources and platforms to other more informal options such as digital social networks, providing greater opportunities to make one's own work more accessible to a wider and more diverse audience (Salinas & Marín Juarros, 2019, p. 99).

Social networks have also taken on an important role in relation to the interaction habits found within academic and scientific settings and used to share results and research collaborations, interests and opinions. Nevertheless, the following key questions emerge: Is sharing research outcomes with millions of users synonymous with achieving social impact? Is everything shared by researchers' evidence of social impact? Is this shared information useful for non-academic users?

The concept of *impact* is not new and has always been a pursuit of science. It presents a term with different connotations depending on the context in which it is used. Impact in health sciences is not the same as in education, nor can the impact measure produce evidence in the same timeframe. The increasing importance given to impact, in addition to its close relationship with research funding, justifies the complexity and controversy around its definition, especially within the scientific community (Terama, Smallman, Lock, Johnson & Zaltz, 2016). Through current twists on the concept of impact, researchers and evaluators seek to identify the changes and improvements generated by research in educational and social

organisations. Such changes can relate to educational processes, training and the citizenry. If all research must contribute substantial elements to the improvement of society, research should also be evaluated from this same perspective. Nonetheless, there is still a lack of consensus around desired procedures and metrics for evaluation. The first trials conducted to establish categories and indicators were based on case studies (Giménez, 2018), however, a focus emerged that was centred on evaluating the impact of academic publications. This advanced transparency in relation to science and related outcomes, at the same time presenting clear consequences at a political, economic and social level (Giménez, 2018; Pulido, Redondo-Sama, Sordé-Martí & Flecha, 2018). Further, policy considerations regarding perspectives on evaluation could change rankings of the influence of journals and authors.

Of all of the possible options, we centre the present work on an academic blog. Whilst this remains a minority resource amongst scientific education journals, it stands out for its potential capacity to generate visibility, impact, horizontal collaboration and immediacy, whilst, at the same time, being a simple instrument to use that is characterized by dynamic language. It generates open spaces that are capable of providing both scientific and non-scientific knowledge. Without a doubt, this turns it into an excellent channel of dissemination for our research.

The Case of Aula Magna 2.0. Online Scientific Education Journals

From the groundwork laid above and in accordance with the third objective of the present article, the aim of the present examination was to advance considerations of evaluation indicators of social impact in education. This consideration strives to demonstrate the importance of the collaborative initiative of a group of scientific education journals, organised into a consortium denominated Aula Magna 2.0. Scientific Education Journals Online (from now on referred to as Aula Magna 2.0).

These types of alliances and collaborations between scientific journals are an emerging reality, in which some interesting initiatives stand out, with all of which having diverse objectives. In the ambit of social sciences, we find the Uruguayan Association of Academic Journals (AURA), the Network of Journals of the Latin American Association of Sociology (ALAS), the Scientific Journals of Social Sciences and the Network of Scientific Journals from Latin America and the Caribbean, Spain and Portugal (Redalyc, México). The latter has the clear aim of disseminating science through open access.

The aforementioned associations and networks respond to one of the aims of the Aula Magna 2.0 consortium, this being the collaboration between scientific journals within the same ambit. Other than Aula Magna, within the educational setting, only the Mexican Consortium of Educational Research journals (CRIE) can be identified. This comes endorsed by five Mexican journals (Márquez, Ordorika, Díaz Barriga, Cantoral & de Vries, 2016).

Aula Magna 2.0 was conceived in 2015 as a union of educational journals found to be present in, at least, two of three *selective* databases. These databases were *Social Science Citation Index* from *Web of Science* (*Claryvate Analytics*), SCOPUS, from Elsevier, and the Seal of Quality of Scientific Journals granted by the Spanish Foundation for Science and Technology (FECYT). 7 journals started this initiative, which currently comprises 15 relevant publications in the educational research setting in Spain. This consortium declares that it is a meeting point for collaboration between editors of scientific journals in education. In this way, it supports them to propose joint actions that are of common interest and acts as a reference for communication with the bodies responsible for establishing evaluation policies relating to scientific production. From its outset, this initiative has maintained two interrelated social networks active as communication channels. Namely, these are an academic blog (Table 1) that bears the same name as the initiative and is housed within the platform *Hypotheses*, and the @AulaMagna2_0 Twitter account.

Table 1. Aula Magna 2.0 blog information

Start of the Blog activity	October 2015
Periodicity	Regular, through two types of <i>posts</i> published in an uninterrupted way: Entries (Fridays) and News (Tuesdays)
Interaction with users	Low, comments are scarce. Greater interaction is achieved by linking with Twitter (@AulaMagna2_0; 1142 followers in April 2020).
Visits and traffic	Clearly increasing trends (Figure 3)
Content	Research outcomes derived from published articles in journals pertaining to the consortium; information related with the journal's or editor's publishing or participation events; training content for educational researchers that is related with academic publication
Location	It is located in <i>Hypotheses</i> , a multilingual open access platform, integrated in <i>OpenEdition</i> which gathers blogs from all fields of social sciences and humanities.
ISSN	2386-6705
URL	http://cuedespyd.hypotheses.org/

From this perspective, the Aula Magna 2.0 blog is converted into an online communication and collaboration channel for scientific journals relating to education. It is useful for placing topics at the centre of debate which determine the quality, excellence and editorial prestige of scientific journals from

this field. It seeks new formulas and ideas directed towards the improvement, development and innovation of the diverse editorial projects of the journals within the scope of Science 2.0 (Jamali & Alimohammadi, 2015; Shema, Bar-Ilan & Thelwall, 2012).

Further, we should mention that researchers are increasingly using blogs to discover and read scientific content, in this way performing an important role in generating enthusiasm for published articles (Salinas & Marín Juarros, 2019). Effectively, as indicated by Mewburn & Thomson (2013), there is a growing tendency towards increasing encouragement of academics to create a blog with the aim of reaching a broader public, creating networks and employing a form of writing that is easier to follow. In this way, blogs provide research with a mode of scientific dissemination that complements research articles (Hargreaves & Sugrue, 2016; Zou & Hyland, 2019). It is, therefore, characterised as a communication channel that has great personal weight (Pieris, 2019).

Nonetheless, when considering the journal-blog binomial, blogs are scarce in social sciences that are promoted from the scientific journals themselves. Exceptions to this are the *Communicate Journal* [la Revista Comunicar], *Latin American Journal of Distance Learning* [Revista Iberoamericana de Educación] and the *Distance Learning Journal* [Revista de Educación a Distancia], together with the focus of the present work, *Aula Magna 2.0*. Indeed, Guallar (2009) highlighted a number of years ago now the scarcity with which journals linked with blogs. The examples presented above are therefore exceptions to the rule, as is the journal *Nature*, which brings together blogs about widely varied topics, and blogs posted to the “Notes” area of the *Information Professional* journal. The latter was identified by this author as the first weblog of a scientific journal in Spain, this demonstrates that the use of this medium is still scarce amongst scientific publications (Torres-Salinas & Cabezas-Clavijo, 2008).

To another extent, a Twitter account started to be used with the aim of disseminating content published in the blogs of this consortium and other relevant content, whilst also achieving a more dynamic interaction with followers. Twitter complements and completes blog content as it is a much more agile and immediate network with regards to publication, although it can also be more

volatile. Twitter permits less flexibility with regards to format and content, although the type of language it uses -280 characters- and its structure have seen it become one of the most used social networks for *microblogging* in the academic setting (Ke, Ahn & Sugimoto, 2017). Recent research results point to the important role being played by Twitter in the search for and dissemination of academic information (Mohammadi, Thelwall, Kwasny & Holmes, 2018). Researchers and teachers/lecturers use Twitter in a mixed way, both at a professional and personal level. These uses are focused on collaborative note taking, resource exchange, the creation of professional networks and requests for collaboration (Kimmons & Veletsianos, 2016).

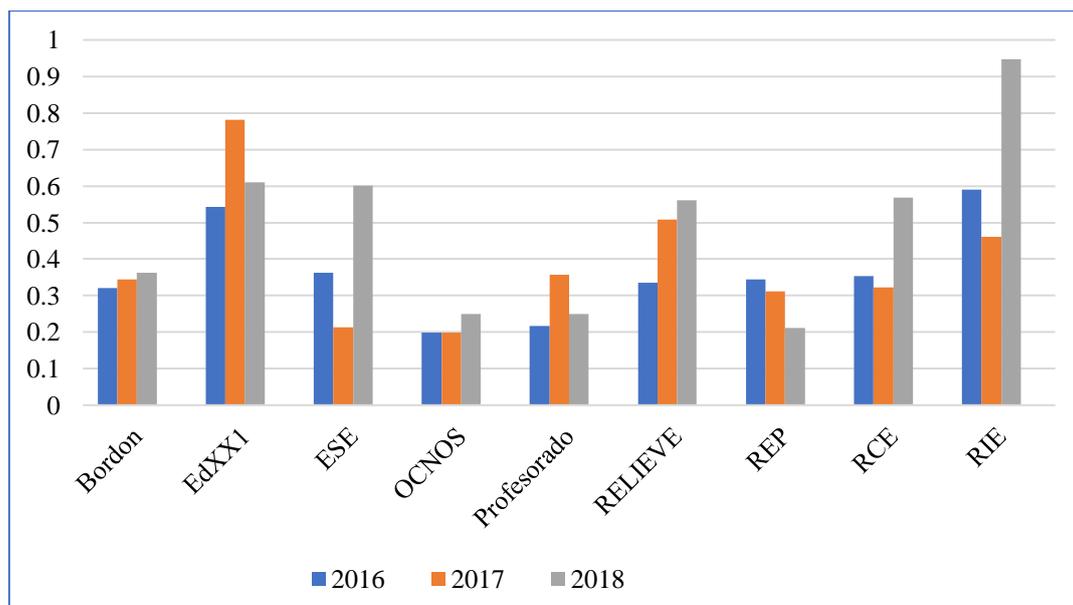
Blog and Twitter, as resources employed by the *Aula Magna 2.0* consortium, comprise a key binomial for making work and authors known both prior to and following its publication in a scientific journal. Besides, their coordinated use offers a privileged means for capturing attention and collaborating in building the reputation of a journal. Each one of these mediums meets a different objective. The blog, as a content editor, enables the edited article to be complete, commented on and presented in the journal, whilst also publishing entries and news. On the other hand, Twitter presents a more direct means of promotion and dissemination (Collins, Shiffman, & Rock, 2016; Marauri-Castillo, Cantalapiedra-González & Álvarez-Fernández, 2018).

If we relate both blogs and Twitter with scientific journals, we find very few relevant examples. Such a relationship is more frequently found in the ambit of journalism and marketing. In these settings, one strives to create a professional framework and a process in which content is co-produced. This contributes to an emotional connection between content and target consumers, making them feel like active participants in a community. This multiplies content visibility, acceptance and follow-up as a reference (Marauri-Castillo et al., 2018). This interaction has still not been achieved between scientific education journals, and its authors and users.

In addition, we must not forget that a topic of concern to editors is the number of journal citations. From this, its impact factor (IF) is derived, in addition to its prestige and power of attraction. It is not easy to identify all of the variables that impact upon the achievement of citations (article quality, reputation of both the journal itself and the author, pertinence of the study topic and whether it is ‘in fashion’, dissemination, etc.). In this complex analysis, we question whether belonging to this consortium, given the dissemination this brings with it through its blog and Twitter, favours the obtainment of citations. As has already been indicated, findings of existing literature suggest that it probably does not provide such a benefit.

Nonetheless, although we cannot establish a causal relationship, it is interesting to review the impact factor calculated by SCIMAGO for the journals pertaining to the consortium which are indexed in SCOPUS (Figure 1). We chose this selective database as all of the journals belonging to Aula Magna 2.0 are indexed by it. We extracted data from the last 3 available years for the 9 journals incorporated in this consortium between 2015 and 2016. Data shows a clear rising trend in SJR for all journals apart from one. Peaks in the monographic numbers are occasionally derived in relation to themes that are more greatly received, although they do not detract from the general rising trend.

Figure 1. SJR Factor (2016-2018) of the journals' consortium



Method

In order to respond to the third aim of the article, a descriptive study was carried out which was centred on an analysis of the Aula Magna 2.0 blog. The timeframe under study comprised the data on which the blog was created, the 23rd of October 2015, up until the 20th of December 2019, which coincides with the last entry published in the year of 2019. Blog data were extracted during the last week of March 2020. from which various indicators were established. These indicators are defined

in Table 2 with the aim of clarifying the analytical framework of the study.

Indicators 1, 2, 3, 4 and 6 were analysed through a descriptive examination of the data extracted from the platform *Hypotheses*. For the thematic analysis of the entries published in the blog (indicator 5), a deductive-inductive categorisation process was carried out which integrated expected categories in-line with the blog's own objectives. This was done via open coding of 170 published entries. With the aim of establishing a reliable process (Gibbs, 2012), analysis was conducted by four

researchers arranged into two pairs. Following discussion, these researchers agreed on four thematic categories which emerged from this process:

- (a) “From the journal to dissemination”, which included entries whose content focused on dissemination of published articles in the consortium’s journals.
- (b) “Journals 2.0”, which grouped together entries that approached relevant aspects of scientific journals in the current context (metrics, databases, open access, dissemination and social networks, scientific editions, editorial management and quality, etc.).
- (c) “Research evaluation policies”, whose entries consider strategies and proposals regarding research evaluation and its implications for professional development (ANECA, CNEAI, ‘sexenios’ [six-year professional awards], etc.).
- (d) “Training of researchers”, which integrates entries whose content is focused on aspects relevant to the training of education researchers (elaboration of articles, methodology, research ethics, peer review, etc.).

Table 2. Indicators and definitions pertaining to the analysis of the Aula Magna 2.0 blog

Indicators	Definition
1 Publications (entries)	Number of blog publications (entries) in the studied time period
2 Distribution according to year of publication	Year of publication of the entry
3 Authorship of entries	Authors that participated in the entries during the studied analysis period (number of authors, sex and institutional affiliation)
4 Visits, visitors and traffic	Number of visits, different visitors and the distribution of these over time
5 Topics	Content considered in the entries
6 Content visibility	Thematic categories and most viewed entries

Next, results are presented that pertain to analysis of indicators relating to the aforementioned blog.

Outcome analysis

The number of entries published in the studied period amounted to 170 publications, with the yearly distribution of this entries presented in Table 3.

Table 3. Number of published entries

Year	Frequency	valid %	accumulated %
2015	10	5.88	5.88
2016	31	18.24	24.12
2017	41	24.12	48.24
2018	43	25.29	73.53
2019	45	26.47	100.00
<i>Total</i>	<i>170</i>	<i>100.00</i>	

As seen in the table, the blog has sustained a steady publication rate over the five studied years, with the exception of 2015 which covered a shorter period (October-December). A very slight increase in publications over time is seen, with this pointed towards a consolidated reputation.

These 170 entries were made by a total of 239 authors. The majority (71%) are entries written by a single author (Table 4), whilst collaborative works, when they occur, more commonly include two authors. The five authors to most participate in the blog published 67 entries between them during this period, in other words, 39.18% of all entries. Logically, the most prolific authors are also editors of some of the journals associated with Aula Magna 2.0. Participation of these authors was also greatest during the months in which this tool was being setup.

Table 4. Number of contributing authors of examined entries

Number of authors	Frequency	valid %	accumulate d %
1	121	71.18	71.18
2	35	20.59	91.77
3	10	5.88	97.65
4	3	1.76	99.41
6	1	.59	100.00
<i>Total</i>	<i>170</i>	<i>100.00</i>	

In consideration of the sex variable, a greater presence of males is outlined in relation to single-author entries (63.64%). In contrast, entries with contributions from various authors presented majority female involvement, with 71.43% of such entries having female authors. On the other hand, 31.18% of entries were written by females only (Table 5).

These data collaborate previously conducted studies in the different areas of

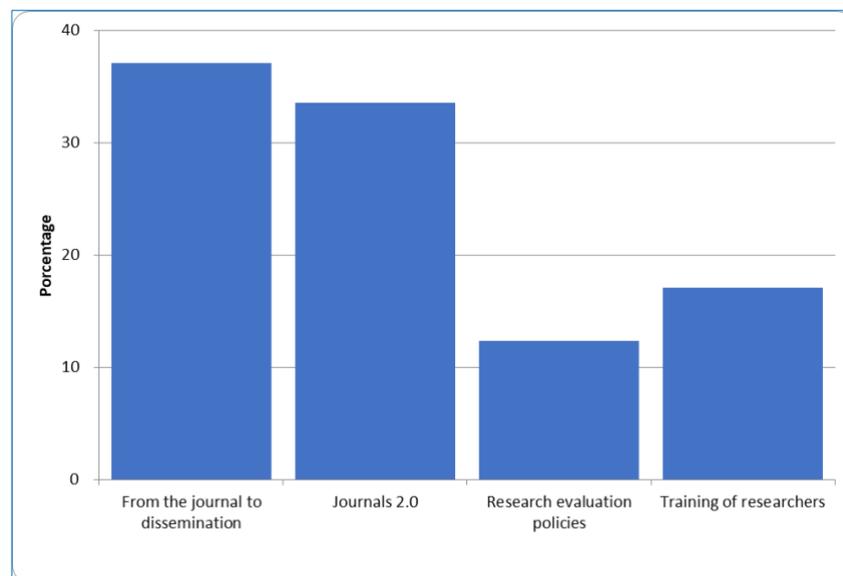
social sciences, with male authors having also emerged in these studies as majority contributors (Maz-Machado et al., 2011).

Table 5. Sex distribution of the authors of entries

Sex	Frequency	valid %
Only females	53	31.18
Only males	91	53.53
Mixed	26	15.29
<i>Total</i>	<i>170</i>	<i>100.00</i>

With regards to the distribution of entries according to categories (Figure 2), the majority (71 %) were centred on “*From journal to dissemination*” and “*Journals 2.0*”. This outcome is logical given that it speaks to two of the main aims of this type of medium, namely, dissemination of articles published in the consortium’s journals and debate on relevant aspects affecting scientific journals in the current context.

Figure 2. Distribution of entries according to category



In order to analyse variables describing the “sex” of authors and the “thematic category” of entries, the non-parametric Kruskal-Wallis test was used. This was relevant as data for these variables did not meet assumptions of normality. Results show that categories differ as a function of the sex of authors ($H=9.559$;

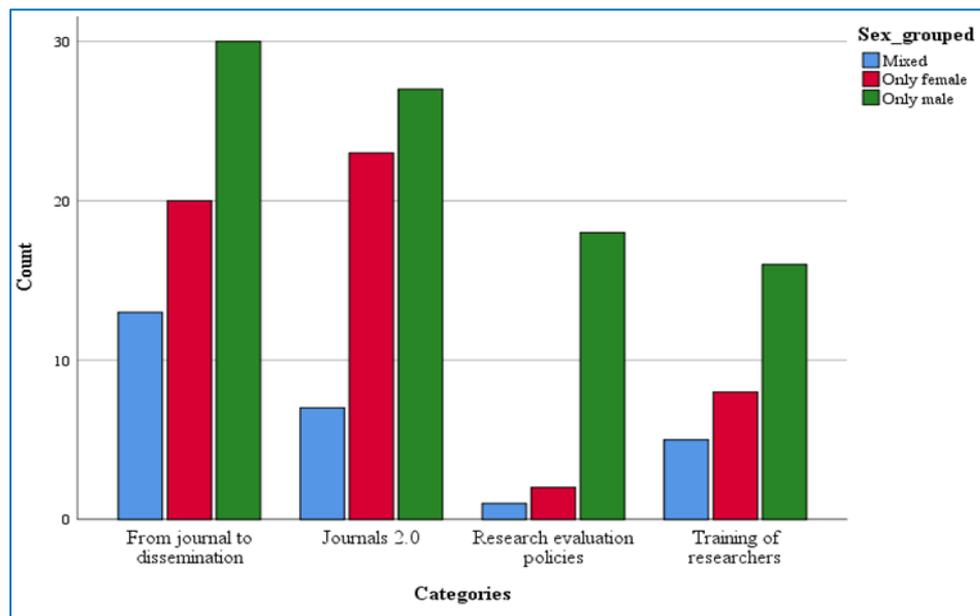
$df=3$; $p = .023$). Females (Figure 3) have a greater presence in the category pertaining to “*Journals 2.0*”, whilst entries authored by males more often focused on “*From the journal to dissemination*”. These results can be referred to confirm outcomes of previously conducted studies which indicated “the

possibility that there exists and, in some cases, being sustained a degree of sexual division of scientific work in research” (Gómez-Ferri & González-Alcaide, 2018, p. 12). This may have a certain association with the higher numbers of male authors seen in journals, as found in the present work for this category.

Considering the next category, “*policies for research evaluation*”, we find that it is mostly

occupied by males. This fact may also be corroborated by data that identifies that, despite the fact that universities have a greater number of female lecturers, males take up the vast majority of higher-ranking positions. Individuals occupying superior positions are probably more aptly placed to write articles relevant to this category.

Figure 3. Distribution of entries according to category and the sex of authors



A heterogenous distribution of author affiliations was found, representing 41 different institutions. The majority of institutions were universities (95%), with these largely being Spanish universities (97.8%) and publicly ran (Table 6). This result is coherent with the nature of the Aula Magna 2.0 consortium.

Table 6. Type of ownership of institutions attended by entry authors

Ownership	Frequency	valid %
Mixed (public-private)	2	1.18
Private	17	10.00
Public	151	88.82
<i>Total</i>	<i>170</i>	<i>100.00</i>

It is also of interest to not that the majority of entries were signed off by authors from the same institution (Table 7), whilst 18% of

entries represented collaborations between authors of various institutions.

A total of 647,246 visits were made to the blog during the studied time-period, with an average of 12,447 monthly visits. The number of different monthly visitors increased over time (Figure 4). This is consistent with the very development of the blog, which comprised two main landmarks in its evolution. The first of these constitutes an *initiation* period, which comprises inception of the blog in October 2015 up until December 2017. The second constitutes a *consolidation* period which runs from the start of 2018 up until the present day. These data provide evidence of a positive trend with regards to the use of academic blogs as a communication channel (Salinas & Marín Juarros, 2019).

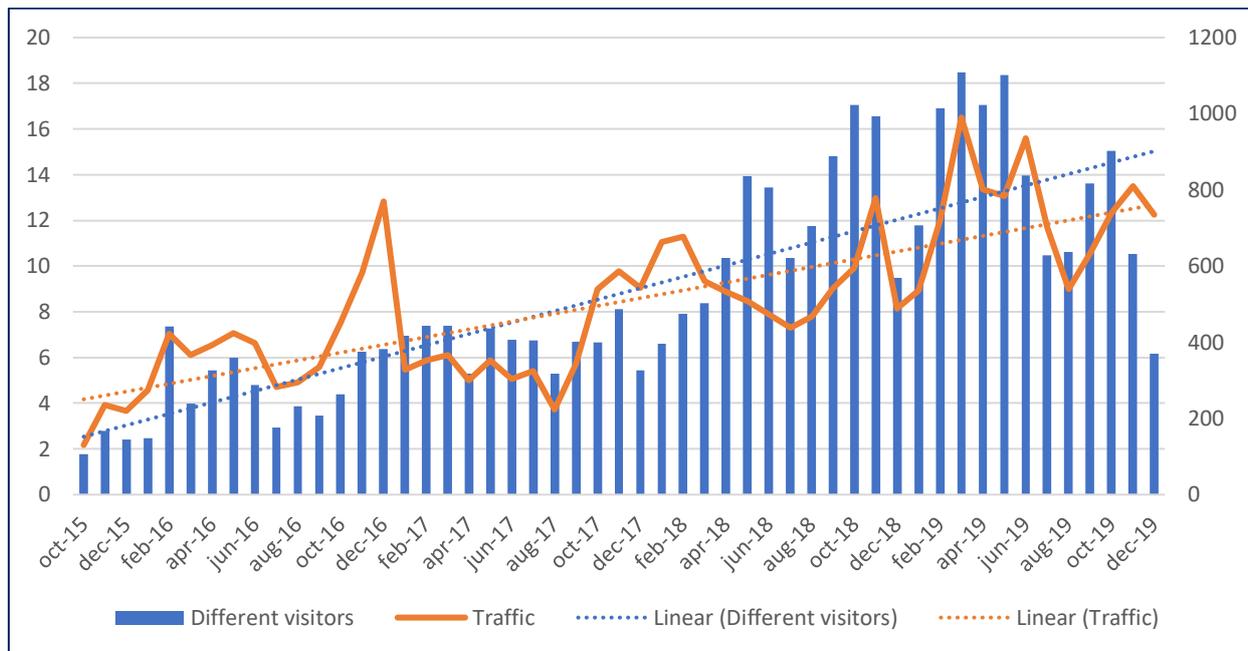
Table 7. Collaboration between institutions in relation to published entries

Institutional collaboration	Frequency	valid %
Authors from a single institution	139	81.77
Collaboration between 2 institutions	26	15.23
Collaboration between 3 institutions	3	1.77
Collaboration between 4 institutions	1	.59
Collaboration between 5 institutions	1	.59
<i>Total</i>	<i>170</i>	<i>100.00</i>

March and May of 2019 were the months with the highest number of unique visitors, amounting to more than 18,000. On the other hand, the months of July, August and

December, in general, showed reduced blog traffic. This decrease can be partly explained by the fact that they coincide with no-lecture periods or holidays.

Figura 4. Timeline of visitors (thousands) and traffic (MB) during the study period



In summary, data show growing trends. Further, data confirm the absence of a seasonality component from associations with all variables. This provides evidence of both the attraction capacity of readers and, as measured according to the traffic generated over the years, the impact achievement of this

channel. At the same time, this has provided greater visibility of the consortium's journals.

Following the categorisation process, the thematic categories described above in the methodological design section were established. A word cloud composed of 1,878 words was elaborated from the textual basis of entries (Figure 5).

In the construction of Figure 6 and in order to facilitate interpretation of the scale, entries were eliminated (n=13) that had a ratio (>5.9) indicating atypical behaviour (values that were either 1.5 times greater or smaller than the interquartile range).

Results show that the entries to generate most interest pertained to the category of “*training of researchers*”, followed by the category of “*policies of research evaluation*”

(Table 8). In contrast, from this descriptive viewpoint it can be seen that the category of least interest to the target audience of the blog pertained to “*from the journal to dissemination*”. This was the case despite this category including a greater number of entries than the first two categories. In other words, the two categories to generate most interest represented 29.41% of all blog publications (Table 8).

Table 8. Distribution of categories as a function of median visits and the number of published entries in each category

Institutional collaboration	Frequency	valid %	Median
From the journal to dissemination	63	37.06	1.40
Journals 2.0	57	33.53	1.53
Training of researchers	29	17.06	2.06
Policies of research evaluation	21	12.35	1.68
<i>Total</i>	<i>170</i>	<i>100.00</i>	

Finally, entries that were of great interest to the target audience and whose data behaved in an atypical way with abnormally high distribution ratios, presented heterogeneous

topics and were best represented by the category “*Journals 2.0*” (Table 9).

Table 9. Atypical entries to have generated most interest according to their visit ratio

Entry title	Category
Self-regulation and learning processes	From the journal to dissemination
Priorities for pedagogical research methods	Training of researchers
Evolution of scientific publishing in Spain: Two decades communicating research	Journals 2.0
The APA releases a new scientific edition of its manual	Journals 2.0
In relation to the population and sample of empirical research	Training of researchers
Measurement of attitudes in higher education studies	From the journal to dissemination
Spanish education journals classified as excellent by the FECYT and ordered according to the ICDS of MIAR	Journals 2.0

In conclusion: pertinence, opportunity and benefits of this experience

It is indisputable that Web 2.0 has radically changed the scope of scientific communication. This is even more the case thanks to the immense possibilities offered by networks to include photographs, video

abstracts, podcasts and other formats for the dissemination of content incorporating text, audio or video (Mengual, 2018). This fact provides an important endorsement of the pertinence and timeliness of the present study. Increasing importance is being given to the need to disseminate research outcomes and the present article represents one means for achieving par excellence in this task. This

being said, the present article is not the only resource for the communication of results, nor is it unanimously agreed upon that scientific production should be evaluated according to the impact factor of the journal in which it is published. In this sense, opening of a call in 2018 for periodic professional awards relating to knowledge transfer represented a first move to address this in Spain.

In the same way, it is necessary to find a way to value new scientific communication channels (web, blog, Twitter, Facebook, etc.). This implies the development of new criteria and reliable indicators to be able to evaluate this new form of impact. It is not a simple matter of choosing between one or another dissemination channel but, instead, of analysing the audiences that can be reached by each one and the weight that should be given to the diverse available indicators, in order to evaluate impact in a more global and integrative sense. Whether academics, researchers or editors, it is of interest to all of us to increase research visibility and the capacity to transfer our scientific productions to the greatest possible audiences. This, however, brings with it the need to use an appropriate language, format and style for each communication channel and every type of audience.

Given this scenario, it makes sense for scientific journals to collaborate, firstly, in order to guarantee better results in their efforts to achieve greater visibility and, secondly, in order to test the effects of new formats on scientific dissemination. Alliances and consortiums led by scientific journals help to develop better quality practice in comparison to when journals operate in isolation. It is necessary to take on shared challenges together in the context of scientific publishing 2.0, in which new trends and opportunities emerge. In this case, analysis of the 50 months of activity of the Aula Magna 2.0 blog, has permitted verification of its evolution, sustainability and consolidation. In can be inferred from the results that the creation of collaborative spaces (in the form of a consortium of scientific education

journals) that seek to take on common challenges, pool efforts and knowledge, and promote strategies directed towards strengthening participating journals, is a valuable and attractive means of knowledge dissemination.

The descriptive analysis, particularly the emergence of growing visit traffic, showed that the blog is an appealing format of communication. It brings research outcomes closer to target audiences which are also broader in nature. This assumes an increase in visibility of the journal. Blog content enables researchers to be better informed and trained in relation to the continuous novel topics considered by Science 2.0. This is a help to editors as it approaches aspects that are relevant for scientific journals such as impact measures, open access, scientific publishing or management and editorial quality, amongst others. In the same way, the blog has provided an important channel for presenting reflections, arguments and proposals regarding research evaluation and its implications for professional and career development. Specifically, these aforementioned contents, included in the present study within the categories of “*training of researchers*” and “*policies of research evaluation*”, were of greatest interest to blog audiences. This leads us to suggest that entries covering these topics should be given priority for inclusion. Effectively, the act of identifying what is published in the blog (most represented categories) and uncovering where the interest of readers lies regarding topics, provides significant data for making editorial decisions.

With regards to participating authors, we confirmed the existence of certain parameters in relation to scientific journals. Indeed, male authors predominated over female authors, whilst between-university collaboration was also seen to be low, with authorship generally being limited to Spain. Although, a large number of visitors from Latin America was uncovered by the search engines, greater collaboration is urged with researchers from this region. At the same time, a greater

presence of Latin American researchers and authors should be achieved in our field of research. This finding offers a novel perspective of the blog which could also have impact upon changes to current editorial policies.

A number of future perspectives open up as a result of the present study. On the one hand, it would be interesting to explore blog audiences with the aim of uncovering relevant profiles and examining whether blog content really does reach beyond academia and the university. At the same time, it is necessary to develop a line of research to confirm whether blog and Twitter activity increases access, number of subscribers, receipt of original work or article downloads in its journals. This is required as the consortium experience presented here is highly specific and no research exists on the concurrent use of these two means or the number of citations they produce. From the experience garnered over the last years, we can only infer that collaboration between editors promotes use of these dissemination channels and establishes better communication practices.

In conclusion, it can be concluded that the scientific blog is a pertinent tool for initiating collaboration between journals. The data presented permit us to conclude that there is a growing impact with regards to the number of visits to the blog and, consequently, an increased visibility of the journals held within it. In this paper, we have argued that the blog presents an advancement in disseminating and securing support for research through shared communication. At the same time, it takes advantage of the opportunities on offer by the Web 2.0 setting to the editorial ambit, in general, and the academic and scientific ambits, specifically. This being said, the present study adds to the call of Guallar (2009, p. 85): “When will we see more blogs in scientific publications in Spain? In summary, we find ourselves faced with the challenges of “publish or perish” and “get visible or vanish” (Barton & Merolli, 2019), or further still, “share or perish” (McNamara & Usher, 2019). This urges the importance of

social media for sharing and communicating research results.

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Revista ELectrónica de Investigación y EValuación Educativa
E-Journal of Educational Research, Assessment and Evaluation

[ISSN: 1134-4032]



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