Assessing 37 years of success of the IZE journal: a bibliometric approach

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Education is a very important aspect of zoo operation, it is even considered one of its substantial objectives and a core to their mission (WAZA, 2005). However, the educational value of these institutions may have been misunderstood, generating the false perception that the educational purposes equate its results (Moss and Esson, 2014). The evaluation of educational programs is the only way to identify the educational reaches of our institutions, know whether our programs are working, find what our visitors know and think, make the most of the educational resources, prove reliable information to make improvements and provide evidence of success (Esson, 2013). An adequate evaluation will lead us to understand the universe of factors which determine its impact.

A critical reflection on any formal discipline requires considering all the components of the scientific phenomenon, analyzing its dimensions and contexts, which do not conclude with the publishing of results on scientific articles but transcend the value of its impact not only on the scientific but on the social scope.

Science started to consider the process of ‘production of science’ since the second half of the twentieth century; in other words, the many ways in which science is developed and directed towards the understanding of methods and objectives of investigation. This date coincides with the development of technology which takes us to consider the importance of its contribution in the generation of science (Echeverria, 1998).

In this sense, it is important to highlight the use of new technology since 1950, when it started a swift development. The adoption of the use of computers and the access to the internet, influence all aspects of human life. Science is no exception and it relates especially to development of technology (Michán, 2011).

It is clear that science is not developed, produced, published, spread and used the same way as it was 50 years ago (Macías y Michán, 2009).

Bibliometrics is defined as the study of knowledge, based on the quantitative analysis of the production and impact of literature.

Bibliometric analyses were facilitated by the development and use of databases; they consist of a group of records of bibliographic publications with the objective of grouping them for storage, analysis, processing and consultation of the information they contain.

The resulting databases contain the data and metadata of the bibliographic publications, organized in a precise and standardized order, also offering the benefits of storing a great quantity of structured information in very little space, this information becomes accessible through the use of search engines and is adapted to the needs of the user, allowing the processing of data and easy update using the adequate software.

As an example, I present the bibliometric analysis performed with the records from the journal of the International Zoo Educators Association (IZE) - an excellent resource for articles on conservation, environmental interpretation, zoo education, methodology, techniques and evaluation. It issues a yearly edition generated by the IZE editor and one hard copy is sent to the members of the association while the electronic version is published on their website (IZE, 2015).

The articles that have been published in this journal were used as object of analysis, through which the data and metadata were constructed for each of the records. Note for this analysis, articles by the president, editor and secretary, as well as the reports or applications for membership were not included. For the creation of the records, the Dublin-Core scheme was used in order to ensure that they met with the international standards which allow to guarantee the interoperability of this database.

To carry out the bibliometric analysis, the bibliometric indicators were chosen which were also analyzed to obtain results and perspectives. The bibliometric indicators that were used were production, author, collaboration and impact (Fig. 1, right).

The collection consists of 777 records published in 50 numbers through 37 years (from 1977 to 2014).

The first indicator (production) was analyzed for the most frequently found words in the titles of the publications, with which a word cloud was built, showing that the articles are clearly oriented towards the topic of conservation education.
in zoos and aquariums. (Fig. 2 below) As an additional test, the same analysis was made using only the words referring to a biological taxa and the results were that most of the articles consider only the megafauna, i.e. mammals, birds and reptiles. The amphibians and fish are scarcely represented and there are few works which consider other taxa exhibited in zoos and aquariums, such as the invertebrates (Fig. 3).

In 1986, the magazine switched its name from Newsletter to Journal, in order to seek the professionalization of the publication, not only as a communication medium but also as a resource to share the results of investigation performed by zoo educators, as well as to put these results to the judgment of the community.

The second indicator that was analyzed were the authors, in which it was determined that the total of authors is 623; with 479 incidental authors, those who produced only one article; 104 core authors, those with two to three articles; and 40 primary core authors, with four or more articles. Note some authors use different versions of their name for articles. This makes their identification difficult and may generate inconsistencies in this result.

It was also determined that 86% of the articles are produced by a single author, and just 14% of the articles have multiple authors. The article with the most authors was 6.

The data was also analyzed to show the most productive, in terms of number of publications, institutions, countries and regions. The United States of America is the most productive country with 27.6% of the total of the articles, which makes the North American region the most productive. The second most productive country is Australia and it is the third most productive region. The third most productive country is the United
Kingdom, however Europe is the second most productive region due to the sum of production per country in this continent. While the most developed countries have a higher number of articles, the list of most productive countries does include some in development such as India, South Africa and Mexico.

Concerning the third indicator, which is collaboration, it was determined that there is collaboration between educators within the same institution, among institutions in the same country and between countries of the same region, but more importantly, though it represents a minimum of the publications, it was detected that there is collaboration among different regions which is significant due to the difficulty this involves.

The region with the most collaboration is North America, which has presented work with each of the other regions.

The fourth indicator is impact, for which the use of references was considered and it was determined that 68% of the articles do not have any references. However, in 2014 the highest number of references in one journal was registered, so the tendency to use references is on the rise.

The results of this work show that the IZE association is fulfilling its mission of improving the education programs in the facilities of its members and providing access to the latest thinking, techniques, and information in conservation education (IZE, 2015).

The generated bibliographic collection represents another resource which zoo and aquarium educators can access to obtain relevant information for the development of its programs and for their evaluation, considering the previous experiences from other similar institutions.

The perspectives for this work are: to continue the curatorial process of this collection and update it yearly with the issuing of each new number; create a how to cite section; promote the use of references in the publications; enrich the collection with hyperlinks to the full-text documents for all the records; consider the creation of an institutional repository to make this collection as well as the full-text documents accessible to all IZE members; and most importantly, to adopt international standards for the use of bibliographical data.

References
Moss, Andrew and Esson, Maggie. 2014. Zoo Education: Outputs, Outcomes and Measuring the Unexpected. WAZA Magazine. 15: 2-5

Note: This article has been edited. For more details and information on this analysis please contact the author.