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Is the Scientific Literacy of the Philippines in the ICU?

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ABSTRACT

This paper seeks to examine scientific literacy in the Philippines. This paper further explores the current state of scientific literacy in the Philippines by conducting a commentary literature review of existing literature from both local and international sources. It aims to develop a better understanding of how individuals inside the country view science, how the media interacts with science-related topics, and if any indicators are pointing to a lack of overall scientific education among younger generations. The view of this paper is that there is an utmost need for the improvement of scientific literacy among the people. There should be a comprehensive, transdisciplinary, and multilateral plan to combat fake news. Schools should focus on critical thinking skills. The anti-fake news ordinances of different localities should be strengthened and implemented properly. Media outlets should add more content that fosters scientific literacy and remove posts that are fake news in nature. Finally, the home should be the sanctum of truth and honesty.

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1. INTRODUCTION

The current state of Philippine scientific literacy is like a patient in the Intensive Care Unit (ICU) of the hospital. There is a dire need for all solutions to this problem. This was manifested in the proliferation of internet trolls, anti-vaccine propaganda, and low ranking in science and maths international tests. It seems like the wrong information is flooding the net and people who are hooked on these are unstoppable. It feels like there is no more ceiling on the amount of misinformation generated and citizens who are scientifically illiterate.

This problem is not new. In fact, there has been a lot of literature on the country's deteriorating scientific literacy (Guevara, 2015; Cordon & Polong, 2020). This emerged as one of the main issues in the country as the COVID-19 pandemic exploded in the country in 2020. It was noticed by a lot of people that indeed there is an unending flood of misinformation on the internet and it feels like there is no government to police their production. In a survey, the COVID-19 vaccine ranked as the second hottest issue among the people as the election of May 2022 is about to happen. This only means that many people are still fearful and misinformed about the benefits of the vaccine. However, this occurrence is not limited to the Philippines alone. According to Lazarus *et al.* (2021), 14.2% of the 14 countries surveyed worldwide felt not sure to accept the vaccine even if it was widely accessible to the public. There was a myriad of reasons including uninformed advice and personal biases.

Science literacy as the ability of an individual to interact with issues related to science and use metacognition to filter information. Science literacy pertains to the literate practices and strategies that enable individuals to understand, synthesize and communicate Science content knowledge. Definitions of scientific literacy have one in common which is for a concerned citizen to discern correct information from incorrect one and spread this correct information to people like a gospel. However, this definition seems not true and not fitting in the Philippines. A recent report and survey by Pulse Asia conclude that 86% or 9 out of 10 adults surveyed cited fake news as a main problem in the country. Even the Department of Science and Technology raised this issue as a main threat to the country's competitiveness.

There was a promising moment for the Filipino youth. 93.27% of surveyed Filipinos aged 18 to 39 years old explained that they know and confidently identify fake news online. They mentioned that the signs of a misinformed article online are overly opinionated, incorrect grammar, no source credit, and the like. An online pop quiz revealed that 52.5% of the more than 20000 youths were able to spot fake news. This means that youths have averaged skills in truth finding.

This paper is a literature review of the current scientific literacy in the Philippines. The majority of the sources of information were coming from the Covid-19 pandemic. The purpose of a literature review on scientific literacy in the Philippines is to examine and assess the existing knowledge on the topic. It looks at both empirical researches as well as text that can provide insight into what is known about scientific literacy and how this affects individuals, groups, and society.

2. METHODS

A narrative literature review is a type of review article where the author summarizes and synthesizes specific research topics by discussing them in a story-like fashion (Lehnert *et al.*, 2016). It may involve summarizing or synthesizing multiple primary and secondary sources. Unlike other types of literature reviews, such as systematic reviews or meta-analyses, narrative literature reviews focus more on the "story" aspects of research topics and are written in a more informal, descriptive tone. Paré *et al.* (2015) added that a narrative

literature review can help to fill gaps in understanding and provide context for future studies. Narrative literature reviews are often used by researchers who are new to their field or are looking to gain a comprehensive overview of the current research or evidence base surrounding their topic area.

Moreover, this paper is a commentary narrative review. This type of literature review summarizes and analyses research on a particular subject area, giving an overview of the current state of knowledge (Harvey *et al.*, 2022). Typically written by experts in their field, these reviews provide an opportunity to assess the current knowledge base and identify new areas for research. Green *et al.* (2006) argued that commentary narrative reviews are widely used as a starting point for further research and exploration, helping researchers determine which topics or gaps that needed further investigation.

This research followed the guidelines of Green *et al.* (2006) on commentary narrative review. They argued that it is important for writers of narrative reviews to be as impartial as they can when delivering their work. Writers must bear in mind that the primary goals of a narrative review are to capture and assemble the existing literature on a certain topic, and ultimately reach a viable inference from it.

3. RESULTS AND DISCUSSION

The scientific literacy of the Philippines has been incrementally increasing over the years. With the influx of modern technology, more resources are available to make science education more accessible to the population. The current status of scientific literacy in the Philippines is still low compared to other countries, but if proper initiatives and investments are made, there is a possibility that it can improve significantly within a few years. It is also possible that making science education more available could bridge the gaps between both socioeconomic classes and strengthen national unity. Despite its current state, scientific literacy within the nation makes it an integral part of a progressive Filipino society.

How do we improve our current standing in scientific literacy? If people will remove their biases and be open-minded to reality and the truth this can help increase the level of scientific literacy. It might be easier said than done and acting and solving it is a long way. It needs a solution that will let the people grow from the grassroots level. This calls for a comprehensive, transdisciplinary, and multilateral plan. Braund (2021) argued that a complete Science, Technology, engineering, and Mathematics (STEM) literacy roadmap is vital in the war against fake news in society in the advent of the COVID-19 pandemic. He said STEM literacy is necessary for an individual to critique government policies toward the public.

The perfect start is in our schools where the children are developing and teachers are engaging students in their growth. The subject of scientific literacy should be impeded in every subject as part of an interdisciplinary curriculum. Examples in the books should comprise a part of this subject matter. Also, it should be part of every performance task in making it more authentic learning. By doing it, students become more aware of their actions and can be able to correct them, making it a process of their metacognition. As Stranton *et al.*, (2021) highlighted metacognition, a process of being aware and being able to control learning, can boost performance and social skills. Furthermore, teachers should undergo tests on scientific literacy by spotting fake news. The results will be vital in informing the Department of Education (DepEd) on the level of scientific literacy of the teachers and formulating programs to mend problems as they exist. Scientific literacy thrusts should also be part of teachers' training and congregations. Emphasized that schools should teach more critical thinking as part of every lesson plan for both primary school students and adults alike

rather than striving for memorization of facts. This allows people to be equipped with the skills they need to evaluate complex evidence-based arguments from multiple perspectives.

The anti-fake news ordinances of different Barangay in the country are a wonderful policy to combat its spread. However, this policy alone cannot be relied on. There were incidents that even the Barangay officials are sources of misinformation. As some government officials are political and trusty to their sponsors, the chance of being biased and unobjective is truly extensive. This problem requires people not to vote for these kinds of people. However, with illiteracy in science being rampant, only time and scientific education of the youth can erase this dark chapter in our history.

Media plays a big role in improving scientific literacy by providing educational materials on various topics from science to health (Höttecke & Allchin, 2020). The people of the Philippines recognize that traditional media and social media can have a positive effect on their lives if used appropriately (Chua & Luyun, 2019). A study among senior high school students in one of the provinces in the country revealed that students lacked the necessary skills to commence a research project, source appropriate references and other media, properly define the research subject and implement Boolean search operations. What is scary is that students recognize that social media like Facebook can affect their cognitive and social dimensions of learning positively (Magmanlac *et al.*, 2018). Many studies have recognized that Facebook contains a volumetric amount of fake news (Guess *et al.*, 2019).

Additionally, through documentaries, videos, podcasts, and radio shows, the media can help raise awareness of the importance of scientific literacy and provide a deeper understanding of science and its importance in society. Media can also help motivate people to learn more by highlighting stories where people have improved their lives through a greater knowledge of scientific concepts. Finally, the creative use of visual media such as diagrams, simulations, and animation can help to explain abstract concepts in an interesting way that appeals to different age groups. Media outlets should produce more content that explains scientific concepts in easy-to-understand language, making science accessible to the general public.

Positive attitudes start at home. Truly, the home is where all learning should start. Parents can check out online resources so you and your family can conduct experiments together or take virtual tours of scientific landmarks to learn more about the history and underlying concepts behind them (Shehade & Stylianou-Lambert, 2020). Parents could also bring the power of everyday objects into teaching children about science, from baking soda volcanoes at home when you cook dinner to observing animal habits in the yard. The problem again is if parents are not also scientifically literate. They spread this fake news during every discussion at home. As youths, being educated in the ways of science, they have the right to inform and teach their parents what they have learned in school. This should be done in a kind and culturally viable way as parents sometimes have a superiority complex.

All in all, scientific literacy in our country will leave the ICU in the decade to come as education becomes better and issues about misinformation are widely raised in social media and television. The debate is never-ending and people are aware of the problem. When people are aware and open-minded, they tend to come to their senses and go back to reality as they should.

4. CONCLUSION

It appears that scientific literacy in the Philippines needs to improve. Although there are some initiatives in place designed to help increase the level of science knowledge among Filipinos, a greater effort must be made to ensure that the country's population is equipped

with the necessary knowledge and skills to succeed in an increasingly science-driven world. A commitment on the part of the government, education ministries, and universities to equip Filipino youth with access to rigorous pre-university science courses will go a long way toward improving scientific literacy and ultimately helping drive progress and innovation within the Philippine economy. Additionally, collaborations with universities, businesses, and governments can help enhance science education and broaden access to reliable scientific resources. With concerted efforts from all sides, the Philippines will be one step closer to achieving a higher level of scientific literacy within its population and making the country a more scientifically literate nation.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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