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Abstract

The notion of indigenous knowledge has mostly been constructed based on the assumption that knowledge is actually intertwined with any certain socio-cultural condition. In that assumption, the social somehow is considered determining how knowledge is produced and obtained in any society. In other words, the tenability of knowledge is not measured merely by individual reasoning but through the question of how some beliefs can be justified by social context. Hence, the main objective of this paper is to argue that indigenous knowledge is as valid as scientific knowledge with some conditions, that is its openness to be falsified. Therefore, the paper argues that the separation between indigenous knowledge and scientific knowledge is irrelevant.

Keywords

indigenous knowledge, scientific knowledge, social epistemology

1 Introduction

There is a debate among scholars about the value and legitimacy of indigenous knowledge (IK). Some scholars believe that IK is a valid and valuable form of knowledge that should be respected, preserved, and integrated with other established knowledge systems, such as scientific knowledge (SK) (Agrawal, 1995; Aikenhead & Ogawa, 2007; Drouin-Gagne, 2014; Foley, 2003). In contrast, IK is often viewed as unreliable since it is often based on anecdotal evidence and subjective, qualitative observations. The legitimacy of this knowledge is often determined by the person who holds it, such as an indigenous elder, rather than on the use of established protocols and procedures (Mazzocchi, 2018). Moreover, despite significant progress in research on indigenous knowledge systems, some researchers have expressed disappointment and frustration that the integration of these two knowledge systems has not reached its full potential due to the dominance of SK over IK (Gratani et al., 2011; Sillitoe, 2010).

One argument in favour of the legitimacy of IK is that it is based on the accumulated experiences and observations of people who have lived in a particular place for a long time. This means that it can provide valuable insights and understanding about the local environment and its unique challenges and opportunities (Chanza & Wit, 2013; Mapara, 2009). Chanza and Wit argue that IK can be considered scientific as long as it is approached in a scientifically sound way, including the use of appropriate epistemological and methodological frameworks. Furthermore, Gadgil (1993) argued that indigenous knowledge can be integrated with scientific knowledge to create a more holistic and comprehensive understanding of the world and particularly to conserve biodiversity.

To provide philosophical justifications for the epistemic status of IK, some scholars have tried to develop epistemological strategies such as participatory epistemology (Moodie, 2003), indigenous epistemology (Foley, 2003; Smith, 2005), and decolonialism (Macedo et al., 1999; Smith, 2021). Both are argued under the socio-epistemological paradigm which believe that any kind of knowledge is not something that is simply transmitted from one person to another, but rather something that is co-constructed and negotiated through social interaction and participation. According to participatory epistemology, knowledge is not a static entity that exists independently of the social and cultural contexts in which it is produced and used. Instead, it is seen as an ongoing process of negotiation and co-creation

that involves multiple perspectives and experiences. In a similar vein, indigenous epistemology helps to promote a more inclusive and equitable approach to knowledge-building, as it recognizes the value of the diverse experiences and perspectives of indigenous peoples.

Nevertheless, there are some skeptic views on the justifiability of indigenous knowledge that is worth to take into account. Anja Nygren (1999) has noted some arguments against the legitimacy of indigenous knowledge related to the constraint on progress and social development include conformism, fatalism, parasitism, irrationalism, and analphabetism. These representations in some cases are valid. For instance, if we ascribe any traditional belief as part of IK, consequently, we need to believe that paranormal knowledge is as justified as scientific knowledge. It is also applied to other traditional beliefs in, for example, possession, witchcraft, and seer. Moreover, practically, these kinds of knowledge are barely applicable to be introduced into public policy due to its lack of evidence-based reasons.

Thus, the main objective of this paper is to defend the later view by arguing that indigenous knowledge can only be justified if such knowledge holds general scientific criteria such as evidence-based, reproducible, and falsifiable. With this in mind, we argue that not all indigenous knowledge is justified due to the lack any of those criteria. However, we do not hold an argument the dominance SK over IK, but rather question the demarcation.

2 Why Indigenous Knowledge Matters?

Aikenhead and Ogawa (2007) have noted that indigenous knowledge (IK) is often referred to by various phrases, including "traditional knowledge", "traditional wisdom", "traditional ecological knowledge", "Native science", "Aboriginal science", "Mäori science", and "Yupiaq science". These different terms all refer to the diverse forms of knowledge and understanding that have been developed by indigenous peoples throughout history and continue to be passed down through generations. These forms of knowledge often encompass a wide range of subjects, including the natural environment, cultural practices, and spiritual beliefs, and can play an important role in shaping the way that indigenous communities interact with and understand the world around them.

However, IK for a long time is barely recognized by 'modern' society because of the domination of scientific knowledge (SK) as the most justified knowledge. The study and documentation of IK systems by non-indigenous researchers is a relatively recent phenomenon, with the first known research in this area dating back to the 19th century. One of the earliest examples of research on indigenous knowledge was the work of Franz Boas, a German-American anthropologist who is considered the "father of American anthropology." Boas conducted extensive fieldwork among indigenous communities in North America and documented their cultures, languages, and knowledge systems. His work, which was published in the late 19th and early 20th centuries, was influential in shaping the way that indigenous knowledge was studied and understood by researchers in the field of anthropology. Since Boas' time, there has been a growing body of research on indigenous knowledge systems, with scholars in a range of fields, including anthropology, sociology, and education, studying the ways in which indigenous knowledge is used and transmitted within communities and the role it plays in the survival and well-being of indigenous peoples (Briggs, 2022).

There are some issues why the discourse of indigenous knowledge needs for our concern. Some of theses issues include marginalization and discrimination (Smith, 2021), cultural and intellectual property rights (Brush, 1993), sustainability and environmental conservation (Berkes, 1999), social and environmental justice (Robyn, 2002), and complementary insights (Atleo, 2005).

In many cases, indigenous knowledge has been viewed as inferior or primitive by mainstream society, and has not been given the same recognition or respect as Western scientific knowledge. This has led to a devaluation of indigenous knowledge and a marginalization of indigenous communities, who have been seen as less knowledgeable or less capable than those in mainstream society. Thus, Smith (2021) argues that recognizing and valuing indigenous knowledge can help to promote the inclusion and empowerment of indigenous communities, by acknowledging the value and validity of their knowledge systems. It can also help to address the historical and ongoing injustices that have disadvantaged indigenous communities and contributed to their marginalization.

Such discrimination also leads to the problem of exploitation and intellectual property violation. One example of such violation is the patenting of traditional medicines and remedies by pharmaceutical companies without the consent or recognition of the indigenous communities who developed them. For example, in the 1990s, a pharmaceutical company obtained a patent on the use of an anti-inflammatory

agent derived from the rosy periwinkle plant, which had been used for centuries by indigenous communities in Madagascar as a traditional medicine. The company obtained the patent without consulting or compensating the indigenous communities, and the patent was later upheld by the courts. This case sparked widespread outrage and led to calls for greater recognition and protection of indigenous intellectual property rights (Huft, 1994).

In addition to that, the recognition of IK will also help us to develop and promote environmental justice. Traditional knowledge in all forms, as Robyn (2002) argued, is closely connected to the environment from which indigenous people emerged. The environment plays a central role in indigenous community and shapes their institutions and practices, including those related to criminal justice, education, religion, community relationships, resource use, and more. This holistic perspective influences many aspects of indigenous people. Moreover, the "Declaration on science and the use of scientific knowledge" and the "Science agenda: framework for action" documents, both produced at the World Conference on Science held in Budapest in 1999, stressed the importance of traditional knowledge for science. In particular, paragraph 26 of the Declaration noted that traditional and local knowledge systems, which are dynamic expressions of understanding the world, have made and can continue to make valuable contributions to science and technology. The Declaration also emphasized the need to preserve, protect, research, and promote this cultural heritage and empirical knowledge (Bala & Gheverghese Joseph, 2007).

3 Indigenous and Scientific Knowledge

There are at least three main differences between indigenous and western knowledge: the content and characteristics of the knowledge, the methods used to study and understand reality, and the context in which the knowledge is developed and used. Rose (2019) argued that a major difference between Western and Indigenous knowledge systems is the way knowledge is passed on. In Western systems, knowledge is often transferred through transactional methods, such as surveys or measurements. Indigenous knowledge systems, on the other hand, place a greater emphasis on the relationships between people and the knowledge being shared. In line with that, Agrawal (1995) also stated that indigenous and western knowledge often have different approaches to understanding and investigating reality, and may have different underlying epistemologies or world views.

In Eurocentric worldview, knowledge is considered to be a tangible, independent entity that can be transferred from one person to another and accumulated over time. This concept of knowledge is distinct from the knower, or the individual who possesses it. In other words, knowledge is seen as something that exists independently of the person who possesses it and can be shared or passed on to others. While in many Indigenous worldviews, such epistemic concept is not recognized. Instead, knowledge and the knower are seen as intimately connected and intertwined. As a result, there is often no equivalent word for "knowledge" in Indigenous languages, as this concept is fundamentally different from the way that knowledge is understood in these cultures. This difference in understanding reflects the diverse ways in which different cultures and communities approach the acquisition and dissemination of knowledge (Aikenhead, 2016).

This cross-cultural problem is commonly considered as the main reason why indigenous knowledge and modern science are in tension, as they can come into conflict when they offer different explanations for the same phenomenon. Western science relies on established principles, such as observation, deduction, and induction, to evaluate the accuracy of our beliefs and theories, which allow us to explain the natural world in a logical and mathematical way. In contrast, IK is often viewed with skepticism because it is often based on personal experiences and subjective, qualitative observations. The credibility of IK is often based on the authority of the person who possesses it, such as an indigenous elder, rather than on established protocols and procedures. Unlike Western science, IK is highly contextual and relies on data from specific locations and takes into account the interconnectedness of objects and their environment. Spiritual insight is also considered a valid source of knowledge in IK, and knowledge is often passed down through rituals that may be difficult for outsiders to understand. From a Western perspective, IK may be seen as a mix of empirical records, superstitious beliefs, and unconventional epistemic norms (Mazzocchi, 2018).

Nevertheless, Agrawal (1995) suggests that the attempt to create distinctions between indigenous and Western knowledge is potentially problematic or misguided. Instead, it may be more useful to recognize that there are multiple domains and types of knowledge with differing logics and epistemologies, rather than trying to fit all knowledge into the categories of indigenous or Western. Furthermore, he argues that the classification of knowledge as indigenous or Western can be somewhat arbitrary and can depend

on the interests it serves, the purposes for which it is harnessed, or the manner in which it is generated. In other words, the same knowledge might be classified as indigenous in one context and as Western in another, depending on how it is used or the perspective from which it is viewed. Furthermore, Agrawal (2009) argued that the question is not whether there are different ways of acquiring knowledge and understanding the world, because it is possible that there are as many ways of knowing as there are people who know. The real issue is whether the categories of IK and IK have common characteristics in terms of how they are acquired, how they are studied, and what they are about, and if they do not, then why do these categories continue to be used.

In a similar vein, Aikenhead and Ogawa (2007) argued that this categorical demarcation is a false dichotomy that has been imposed by colonial thinking. This means that the idea that traditional knowledge and modern science are fundamentally different and incompatible has been created and promoted by the colonial powers that have imposed their own ways of understanding the world on colonized peoples. In reality, both categories contain a great deal of diversity and have many similarities. For example, both traditional knowledge and modern science involve a focus on empirical evidence, logical reasoning, and the belief that knowledge and understanding are constantly evolving. These shared characteristics may be overlooked due to the use of labels that suggest a separation between the two categories, which is not necessarily accurate.

Thus, how should we assign IK systems within mainstream knowledge? Rose (2019) suggests that there are five different typologies that can be used as a framework. These are:

1. *Indigenous perspective:* This type of indigenous knowledge (IK) system focuses on understanding knowledge and practices from the perspective of the indigenous group that holds them. It is a way of looking at and interpreting the knowledge and practices of an indigenous group from within the group's own cultural framework and worldview.
2. *Oppositional approach:* This type of IK system views knowledge and practices as being in opposition to Western forms of knowledge and seeks to challenge and critique them. This approach may involve critiquing the ways in which Western forms of knowledge have been imposed on or have taken over indigenous knowledge systems, or it may involve pushing back against the dominant narratives and interpretations of Western knowledge.
3. *Integrative:* This type of IK system seeks to integrate indigenous and Western forms of knowledge, recognizing the value and validity of both. This approach seeks to find ways of bringing together different forms of knowledge and creating a more holistic understanding that includes both indigenous and Western perspectives.
4. *Contemporary:* This type of IK system looks at how indigenous knowledge and practices have evolved and changed over time, particularly in the face of modern challenges. This approach recognizes that indigenous knowledge and practices are not static and that they can change and adapt to new situations and contexts.
5. *Pure indigenous:* This type of IK system emphasizes the importance of preserving traditional indigenous knowledge and practices in their pure form, without outside influence. This approach may involve efforts to protect and preserve indigenous knowledge and practices in their traditional forms, as well as efforts to resist the influence of outside forces that may threaten the integrity of these systems.

4 Social Epistemology of Indigenous Knowledge: The Possibility and Its Limitations

In "Knowledge in a Social World" (1999), Alvin Goldman explores the ways in which knowledge is shaped by social and cultural factors. Goldman argues that knowledge is not simply an individual possession, but rather it is a collective enterprise that is shaped by the social and cultural practices of a community. He contends that the ways in which knowledge is produced, disseminated, and received are not neutral, but rather they are influenced by the social and cultural context in which they occur. This field of knowledge is then known as social epistemology.

Goldman believes that social epistemology is a form of real epistemology for several reasons. First, Goldman argues that social epistemology recognizes the important role that social factors play in the formation and dissemination of knowledge. In many cases, knowledge is not simply an individual achievement, but is produced and shared within social groups and communities. Second, he argues that social epistemology is a necessary extension of traditional epistemology, which focuses primarily on individual beliefs and knowledge. While traditional epistemology is concerned with questions about what constitutes justified belief and how we can acquire knowledge, social epistemology broadens the scope of these inquiries to consider the social context in which knowledge is produced and shared. Finally, he

suggests that social epistemology has the potential to address real-world problems and issues that traditional epistemology may not be equipped to handle (Goldman, 2010).

In line with this perspective, Aikenhead and Ogawa's argument that IK and SK are produced and disseminated within the same logical framework can be confirmed. In socio-epistemological approach, the ways in which IK and SK are generated and shared are similar, and that they are both influenced by the social and cultural contexts in which they are embedded. This argument can be supported by the fact that both IK and SK involve the collection and analysis of data, the formulation of hypotheses, and the testing of those hypotheses through observation and experimentation. Both also involve the communication of findings to a wider audience and the revision of ideas based on new evidence. Additionally, both IK and SK can be seen as being shaped by the values, beliefs, and power dynamics of the communities and cultures in which they are embedded. For example, the focus and priorities of scientific research may be influenced by the dominant values and beliefs of the funding agencies or institutions supporting the research, while the transmission and preservation of IK may be influenced by the cultural practices and values of the Indigenous community in which it is embedded.

It is a well-known concept that scientific knowledge is connected to the social and cultural context in which it is produced. Scientists understand that their research and discoveries are the result of the collective efforts and contributions of the scientific community. Isaac Newton famously stated, "If I have seen further, it is by standing on the shoulders of giants," illustrating the idea that individual scientific advancement is built upon the work of others. This highlights the fact that the process of producing scientific knowledge is inherently tied to the social and scientific community. For example, the development of the theory of evolution by natural selection, proposed by Charles Darwin and Alfred Russel Wallace, was influenced by the socio-cultural context of the time, including the intellectual and cultural climate of 19th century England and the scientific conversations and debates taking place within the scientific community. The theory was also shaped by the personal experiences and observations of Darwin and Wallace, as well as the work of other scientists who came before them, such as Jean-Baptiste Lamarck and Thomas Malthus. All of these factors contributed to the development of the theory of evolution, demonstrating how scientific knowledge is tied to the socio-cultural context in which it is produced.

Nevertheless, it is important to note that IK and SK have indeed some differences in some respects. While SK is certainly influenced by the social and cultural context in which it is produced, it is also subject to a rigorous process of testing, validation, and peer review. This process helps to ensure that scientific knowledge is reliable, accurate, and objective. In contrast, IK is often passed down through generations through oral traditions, and may not be subject to the same level of testing and validation as scientific knowledge. This does not mean that IK is any less valid or valuable than SK, but it does highlight some of the key differences between the two forms of knowledge. It is essential to acknowledge and respect the unique perspectives and ways of knowing of Indigenous peoples and communities, while also recognizing the strengths and limitations of different forms of knowledge.

With this in mind, we are of the opinion that not all types of indigenous knowledge can be said to be valid and justified, as well as scientific knowledge which also always presupposes counterexample and openness to be falsified so that not all decrees are also valid and justified. Borrowing Popper's thesis that science must be falsifiable, then both IK and SK can only be justified if and only if each opens the possibility to be disproved. In other words, closed types of IK, such as practices involving supernatural powers as the main cause, such as the practice of witchcraft, exorcism, and traditional healing through possession (Basangiang) among the Katingan Ngaju of southern Borneo (Arneld & Maiullari, 2015), cannot be justified as valid knowledge.

In the end, we argue that the strict separation between Indigenous Knowledge (IK) and Scientific Knowledge (SK) is irrelevant. First, in terms of social epistemology, the two do not have substantial differences; they are both produced in the same way, namely through continuous practice and also through disagreements in the context of their respective social communities. Second, above all, the durability of both types of knowledge also depends on evidence that is always reproduced and re-tested. Not only in the SK system, some IK is also being and will be abandoned if it is deemed no longer useful and effective in solving problems in society; for example, the practice of shamanism is starting to be abandoned. The only difference between the two is the testing methodology. The validity of SK is tested through deliberate experiments in laboratories or field research, while the validity of IK is tested through the historical development of the community itself..

5 Conclusions

In conclusion, this paper has argued that not all indigenous knowledge is necessarily justified due to a lack of evidence. While it is important to recognize and respect the cultural traditions and practices of indigenous communities, it is also necessary to critically examine the claims made by these communities in order to determine their validity. In some cases, indigenous knowledge may be supported by scientific evidence and can provide valuable insights and solutions to contemporary problems. However, in other cases, indigenous knowledge may be based on superstition or misinformation and may not be reliable. It is therefore important to approach indigenous knowledge with an open, but critical, mind and to carefully consider the evidence before accepting or rejecting any claims.

While social epistemology can be a useful framework for understanding the way that knowledge is shared and validated within a community, it has its limitations when it comes to providing a philosophical justification for indigenous knowledge. One of the main reasons for this is that some indigenous knowledge is transmitted and based only on unsupported beliefs and false testimony. In addition, certain indigenous knowledge is disputed in terms of its reliability, such as exorcism and scraping treatment. Therefore, it is important to further discuss the definition of indigenous knowledge and consider to what extent we can consider indigenous traditions and beliefs to be justified knowledge. It is crucial to approach indigenous knowledge with sensitivity and respect while also being aware of its potential limitations.

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