



Incorporated Tri Premana Philosophy on Learning Science in Elementary School Culture

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Abstract: The current study aims to incorporate the Tri Premana principles into science learning by conducting a descriptive qualitative methodology, including a literature review, observation, interviews, and documentation. The results demonstrated the high relevance and effectiveness of Tri Premana in science learning in elementary schools by incorporating the Upadesa and Whraspati principles Kalpa in Widhi Tatwa. Specifically, the three Tri Premana elements were significantly interrelated to facilitate elementary students' science learning.

Keywords: Science Learning, Elementary Student, Tri Premana, Educational culture.

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1. Introduction

Learning comprises two processes, which are analogous to conceptual change, namely assimilation and accommodation (Maulita, Sitompul, & Mursyid, 2018). During the assimilation process, an individual would apply the concepts in responding to emerging symptoms with necessary adjustments. Meanwhile, accommodation requires an individual to replace or alter existing ideas due to incompatibility with alternative phenomena. As such, an efficient science learning process involves continuous conceptual alterations to expand existing notions while rectifying misconceptions for accurate scientific conceptions. The conceptual change also occurs through the transformation and refinement of the initial ideas to increase the realistic relevance and compatibility. As the transformation is gradual, the process is relatively stable to develop a distinctive concept thoroughly (Santayasa, 2006). At the elementary school level, science learning or acquisition occupies an important educational aspect as science could provide students with pertinent skillsets in resolving various global challenges. Based on the Programme for International Student Assessment (PISA) data (Ananiadou & Claro, 2009; Bybee, McCrae, & Laurie, 2009; Fensham, 2009; Focosi Azzara, Kast, Carulli, & Petrini, 2009; Pisa, Cozzolino, Gargiulo, Ottone, Piccioni, Monti, Gigliotti, Talamo, Graziani, Pucci, & Verrotti 2009; Sadler & Zeidler, 2009), Indonesian students' scientific literacy and ability remain below average when compared to the international average score, which is generally at the lowest PISA measurement stage (Yuliati, 2017). Similarly, the Organization for Economic Cooperation and Development (OECD) Newby et al., (2009) revealed that Indonesia's 2009 PISA ranked 57th of 65 countries with a score of 383. In 2012, this ranking further declined to 64 out of 65 countries with a score of 382. Elementary-level science learning activities are imperative in supporting the comprehensive understanding of concepts, principles, and procedures concerning quotidian and realistic environments instead of being theoretical, which allows science learning to be meaningful and entertaining. Concurrently, the educational goals stipulated in various subject units, including science, are intended to develop intelligent students in mastering the inculcated knowledge and directed to the complete formation of human beings with comprehensive non-formal capabilities, such as social skills and emotional intelligence. Bobby De Porter also conveyed that It's not just graded that are beneficial to students. The value of A is not the most important value. Enjoying learning and self-motivation are equally

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important (Huang, Lu, & Yang, 2022). Enjoying full learning can be characterized if the teacher can present learning that is in accordance with all student learning zones (Suranata, Rangka, Ifdil, Ardi, Susiani, Prasetyaningtyas, Daharnis, Alizamar, Erlinda, & Rahim, 2018). Simultaneously, opined that general intelligence (IQ) is not only a success determinant but also different intelligence aspects, including emotional intelligence (EQ), social intelligence (SQ), and other non-intellectual abilities, which play a significant role in personal development and growth (Zeyer, Çetin-Dindar, Md Zain, Jurišević, Devetak, & Odermatt, 2013; Hussain, Akhter, Qureshi, & Khan, 2021).

By corresponding to contemporary educational goals, the present study sought to improve elementary science learning to effectively develop knowledge and master skills via the *Tri Premana* implementation. The *Tri Premana* philosophy is vital to Balinese life owing to children receiving constant *Tri Premana* inculcation from their parents (Paramartha, Sustiwati, Sukrawati, & Sugiharni, 2022). *Tri Premana* originates from Sanskrit and is composed of two constituents: *Tri* and *Pramana*. *Tri* signifies three, and *Pramana* symbolises the knowledge acquisition method, which collectively denotes three ways of acquiring knowledge. In *Bhuwana Alit* (small world), *Tri Premana* is divided into three components, namely *Sabda*, *Bayu*, and *Idep*, while in *Widhi Tatwa*, *Tri Premana* is categorised into *Praktyaksa Pramana*, *Anumana Pramana*, and *Agama Pramana (Sabda Pramana)*. Previous scholars (Paramartha et al., 2022) discovered that the *Tri Premana* application in learning could assist in thoroughly understanding material concepts) and enhance education quality. Based on the two-day observation conducted in the current study, numerous elementary students retained minimal educational activities due to the lack of direct experiences (Paramartha et al., 2022).

In addition, based on observations made in elementary schools in Bali, teachers in the learning process are still conventional. Conventional learning meant, in this case, is learning that still focuses on teacher-centered activities, which view that the learning process can only take place if there is a teacher, while if there is no teacher, then the learning process will not take place. This causes students to only become passive learning objects.

The above opinion is supported by which states that some of the characteristics of conventional learning are (1) the role of students as educational objects, not as educational subjects, (2) the principles of reaction are focused on forming passive behavior or just accepting what the teacher says without any objections or protests, (3) the delivery of material in conventional learning is mostly done by lectures, questions and answers, ongoing assignments, and the teacher continues to act as a source of information. Activities like this can be boring and weaken student activities in learning, (4) conventional learning model support systems focus on utilizing the available facilities, which are still very limited, for example, textbooks (Mynbayeva Sadvakassova, & BakhytkulAkshalova, 2017). One conventional method that teachers use in the learning process, especially in science learning, is the lecture, question-and-answer, and assignment method (Hidayat, Rakhmat, Fattah, Rochyadi, Bayu, Nandiyanto, & Maryanti, 2020; Puspitarini & Hanif, 2019; Susiani, 2022). In these methods, the role of the teacher is very large. In this learning process, the teacher explains the learning material, while students only listen and occasionally record the teacher's explanation. This causes very low student activity, which of course, will also have an impact on student learning outcomes.

Based on these problems, it is necessary to carry out reforms in science learning activities that initially adhered to behavioristic understandings of science learning and that adhere to constructivism. Understanding constructivism holds that in the learning process, it is students who explore and build their own knowledge. Thus, the learning activities will emphasize more on student activities (student-centered). This opinion is supported by (Agarkar, 2019), which states that the concept of learning according to constructivism learning theory is new knowledge built by students themselves actively based on the student experience. However, the role of the teacher in constructivism does not completely disappear but instead becomes a facilitator, mediator, and motivator.

Accordingly, the researcher proposed that direct experience through *Tri Premana* would empower students to be active in the respective learning process. Nonetheless, the results derived from the current study interviews demonstrated that students and teachers possessed misconceptions regarding science materials, which would increase the difficulty level of adopting *Tri Premana* principles in science learning.

2. Methods

The present study employed the qualitative methodology, namely literature review, observation, interviews, and documentation. The documentation technique was executed as the researcher examined existing teaching materials and lesson plans before relating the materials to the *Tri Premana* approach. Simultaneously, observation was implemented to collect the *Tri Premana* implementation data regarding relevant science subjects through respective teacher and student observation guidelines. The participants in this study were elementary school teachers who teach science subjects and 61 students in total. The research procedure starts with; (1) searching for articles on Google

Scholar, (2) filtering articles related to this paper, (3) making observations at schools, (4) conducting interviews at schools, and (5) taking data from plans for implementing learning at schools. Data analysis in this qualitative research was carried out using the percentage of stages of science learning with the help of *Tri Premana's* Balinese local wisdom.

3. Results and Discussion

3.1. *Tri Premana* Philosophy in Hinduism and Learning

In Upadesa, which was composed by Rai Sudharta and Punia Atmaja (in Seken & Badra, 2019), delineates the *Tri Premana* approach as follows: “My child, religion we teach that there are three ways to know something (*Tri Premana*), namely by *Pratyaksa Pramana*, *Anumana Pramana*, and *Agama Pramana*, which means by seeing directly, by drawing conclusions from analysis, and by believing in the notifications of holy people who have never known anything. Likewise, about *Sang Hyang Widhi*, only very holy people may know *Sang Hyang Widhi* by seeing directly, by means of *Pratyaksa*. And now, the Master will try to explain through *Anumana Pramana*, which is an easy analysis. My son, we believe that we, the whole universe, exist. Of course, someone created it, namely *Sang Hyang Widhi*. And we believe that we will die. Of course, a place for our atman has been separated from the body. This too is *Sang Hyang Widhi*. There are many other examples. Have you ever seen a beetle? The beetle landed on a flower and from there on another flower. Her hairy legs caught the stamens of the flowers. So, who made the beetle's legs hairy, which is used precisely for the attachment of the flower's stamens? Of course, *Sang Hyang Widhi*. Many more examples, my son! *The Agama Pramana* way is only by believing the contents of our sacred literature. For example, the Upanisads state that *Sang Hyang Widhi* is *the ear of all ears, the mind of all thoughts, the speech of all speech, the breath of all breaths, and the eyes of all eyes* (Kena 1,2). *O Partha, know that I am the eternal seed of all living things. I am the intelligence of all that is intelligent and the hero of all that is strong. I am the soul that resides in the heart of every creature. I am the beginning, the middle, and the end of all that exists.* And *Sang Hyang Widhi* is everywhere and also in the heart of every being, inside and outside the world, but not affected by the world (*wyapi-wyapaka nirwikara*), just as a lotus is in water but not wet by it; *Wyapi wyapaka* means always and everywhere, *Nirvikara* means unaffected, unchanging”.

Based on the original quote from Upadesa (Seken & Badra, 2019), *Tri Premana* consists of three ways to discover an unfamiliarity via *Pratyaksa Pramana* (direct observation), *Anumana Pramana* (inferences derived from the relevant analysis process), and *Agama Pramana* (faith in devout individuals' utterances). In addition, the *Tri Premana* approach to knowledge acquisition is discussed in *Whraspati Kalpa*, which inculcates that knowledge acquisition could be performed through *Gurutah*, *Sastratah*, and *Swatah*. Specifically, *Gurutah* is knowledge learning or discovery via educators or experts in respective fields, while *Sastratah* is knowledge study or discovery from library sources or scriptures in the form of books or other written documents. Meanwhile, *Swatah* involves the process of self-study derived from personal experiences. In *Whraspati Tattwa*, the *Tri Premana* principles are enlightened in the following quote. “As for *Sang Yogiswara*, he follows *Sang Hyang Prayogasandhi* because *Sang Hyang Wisesa* is characterless, cannot be imagined in real form; it is difficult to say, that is why there are three *Pramanas*, namely, *Gurutah*, *Sastratah*, and *Swatah*. *Gurutah* is the teaching given by the teacher. Literature is a teaching that is obtained through literary tools (the Holy Scriptures). *Swatah* means through oneself to find *Sang Hyang Wisesa* (Linggih, 2019)”. Based on the translated quote from *Whraspati Tatwa*, science was considered a sacrosanct subject to be acquired through the three *Tri Premana* approaches. Contrarily, the *Tri Premana* concept in Upadesa delineates *Gurutah* and *Sastratah* in terms of *Agama Pramana*, which is the learning process from devout individuals and sacred books.

3.2. The *Tri Premana* Implementation in Science Learning

The *Tri Premana* implementation process in elementary science learning was analysed through observation activities, in which the findings manifested that the *Tri Premana* approach was applied through *Pratyaksa Pramana*, *Anumana Pramana*, and *Agama Pramana*, the principles stipulated in Upadesa and *Sastratah*, and the methods of *Gurutah* and *Swatah* as delineated in *Whraspati Kalpa*. The observation results discovered that the *Tri Premana* implementation in elementary scientific knowledge acquisition was more emphasised in the *Agama Pramana* process. Contrarily, *Whraspati Kalpa* propounded the *Tri Premana* approach in elementary schools and was more predisposed towards *Swatah*, which focused the learning process on students' activities to prepare for self-dependent learning. Table 4.1 depicts the composition percentage of each *Tri Premana* aspect applied in elementary science learning.

Table 1. Composition Percentages of Each *Tri Premana* Aspect in Elementary Science Learning

<i>Tri Premana</i> According to Upadesa			<i>Tri Premana</i> According to Whraspati Kalpa		
Aspect	Amount	Percentage	Aspect	Amount	Percentage
Agama Pramana	25	45.76%	Gurutah	19	35.59%
Pratyaksa Pramana	17	23.73%	Sastratah	4	10.17%
Anumana Pramana	19	30.51%	Swatah	38	54.24%
Amount	61	100.00%		61	100.00%

Source: (Seken & Badra, 2019)

In both *Upadesa* and *Whraspati Kalpa*, 61 activities were observed in science learning, with *Agama Pramana* and *Swatah* as the predominant methods. The *Agama Pramana* in *Upadesa* is applied by acquiring knowledge from the prophet or educator and sacred literature, which process is also recognised as *Gurutah* (learning from the teacher and literature or sourcebooks) in *Whraspati Kalpa*. Meanwhile, *Swatah* was the primary approach in *Whraspati Kalpa* to facilitate students in learning from personal experiences and referring to their counterparts' experiences. Similarly, learning from personal experience could be identified as observation, or *Pratyaksa Pramana*, and analysis, or *Anumana Pramana*, through discovering interrelationships between different knowledge sources in *Upadesa*. Essentially, both *Tri Premana* aspects in *Upadesa* and *Whraspati Kalpa* possess high correspondence levels, albeit recognised in different terms.

Science is a collection of systematic theories; its application in general is limited to natural phenomena, born and developed through scientific methods such as observation and experimentation, and requires a scientific attitude such as curiosity, openness, honesty, and so on (Hanifah & Subiyantoro, 2020). Based on the above opinion, it can be concluded that the essence of natural science is a science that studies natural events arranged systematically through scientific methods based on theories, facts, and evidence. Science taught in elementary schools provides opportunities for students to work and think regularly and systematically according to the scientific method. Students at the elementary school level are not taught to make complete research but are introduced gradually, for example making careful observations and communicating the reports they have obtained. This can support developing students to explore their knowledge from the nature (Elbaz, 2018).

Another finding in this study is that teachers dominate learning activities more. Students act as passive listeners and do what the teacher tells them to do, and do it according to the example. Contextual science problems are usually used to test students' understanding of the concepts they have learned and are usually given at the end of the material discussion. Interaction between students is very rare. In addition, in this conventional learning model, students are rarely allowed to explore a problem with their own way of thinking. Learning like this makes students untrained to investigate and will only wait for the teacher's orders or assignments. The understanding obtained is of course temporary because the knowledge obtained by students is only based on teacher information. With the concept of *Tri Premana* with the words of *Premana*, *prakyasa premana*, and *Anumana Premana* will help teachers and students understand the true nature of science. With the percentages above, through interviews and direct follow-up observations, the application of *Tri Premana* in Science Learning in elementary schools shows a fairly high percentage. Teachers at school also said that test scores and quizzes held by the teacher every time they reflected on learning showed a significant increase. So that this becomes a new finding in learning; namely, by applying *Tri Premana* in elementary science learning, students were observed to be highly enthusiastic in equipping themselves with scientific knowledge and skills, which could be perceived from active participation in various learning activities, such as proactive involvement without teachers' directives and referring to pertinent knowledge in books and relevant materials to discover the principles behind light propagation in a straight line. Furthermore, proactive involvement is an implementation of the *Pratyaksa Pramana* aspect, in which students would listen to experimental directions while referring to books through the application of the *Anumana Pramana* and *Agama Pramana* dimensions. Particularly, *Pratyaksa Pramana* included the observation process before correspondingly inquiring about relevant questions from other students, whereas *Agama Pramana* incorporated the exploration process by collecting pertinent data or information, either via library resources or consulting with educators. Meanwhile, *Anumana Pramana* is corresponding with the process of associating and communicating, which allows students to investigate the interconnections between knowledge through illustrations before communicating the key learnings to other students. Summarily, the *Tri Premana* application in science learning could be deduced as a highly effective approach to generating students' interest and motivation in learning activities (Seken & Badra, 2019).

The *Tri Premana* application in learning Hindu religious elementary education was discovered to be closely relevant to the scientific approach when implementing the 2013 curriculum (Marutama Marutama, Adi, Wulandari,

& Herlambang, 2018). The finding was in line with past findings (Arjaya & Puspawati, 2017) exhibiting a significant difference in students' critical thinking and learning motivation after applying the *Tri Premana* SPA model (Darmayanti, 2018), as the model ably increased students' learning activities and subsequent achievements in Class VIII G SMP Negeri 2 Sidemen. For instance, the application improved science learning outcomes amongst fifth-grade students of the SD Negeri 2 Duda Timur, Selat District, Karangasem Regency (Paramartha et al., 2022). Concurrently, past scholars also demonstrated a significantly increased student performance in other relevant science subjects after applying the *Tri Premana* approach in the learning process (Muderawan, Budiawan, Giri, & Atmaja, 2020; Prasedari, Pudjawan, & Suranata, 2019; Doqaruni, 2022; Seken & Badra, 2019; Clara et al., 2022). Relevant local parties could incorporate the *Tri Premana* model in different sectors, such as improving the results of digital simulations in tourism schools (Szczepaniak-Kozak, Wąsikiewicz-Firlej, & Lankiewicz, 2022), as student learning motivation was also consequentially enhanced through the *Tri Premana*-oriented AIR model (Dewi & Rati, 2020).

4. Conclusion

The *Tri Premana* philosophy in elementary scientific knowledge acquisition emphasises three aspects contained in both Upadesa (*Pratyaksa Pramana*, *Anumana Pramana*, and *Agama Pramana*) and *Whraspati Kalpa* (*Gurutah*, *Sastratah*, and *Swatah*). Although the three aspects contributed to different composition percentages in elementary science learning through the *Tri Premana* implementation, the principles and processes in Upadesa are highly corresponding to the equivalents with different denominations in *Whraspati Kalpa*. Specifically, in Upadesa, *Pratyaksa Pramana* is the students' observation process involving subsequent inquiries to probe relevant queries from peers. *Pramana* religion is the exploration process that encompasses pertinent data or information collected from library sources or consultations with relevant educators. Meanwhile, *Anumana Pramana* incorporates the association and communication processes, wherein students seek knowledge associations through illustrations before communicating inferences derived from the discovery to other students.

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