



The Values and Role of Natural Science Education in Religious Moderation

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJESS/2024/v50i21264

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/112165>

Review Article

Received: 15/11/2023

Accepted: 23/01/2024

Published: 25/01/2024

ABSTRACT

The research aims to answer the question of how the role of values and natural science education in religious moderation. This research was conducted with a qualitative approach with a literature review method. The validity of the data is determined by triangulation and reduction and then presented descriptively. Research data shows that the values in natural science learning, especially in the aspect of scientific attitudes, are closely related to attitudes of religious moderation. The values of a scientific attitude in natural science learning are in line with the values of an attitude of religious moderation. Based on the data obtained and the discussion carried out, it can be concluded that science and its learning have great potential to develop an attitude of religious moderation. Thus, it is clear and unquestionable that science learning can be used as an alternative to developing an attitude of religious moderation in Indonesia. Another advantage of developing an attitude of religious moderation is that the values in science can be applied generally, anywhere, and anytime. Therefore, religious moderation developed through scientific learning does not only apply to certain religions but also applies in general. All religious adherents (regardless of religion and belief) can be moderated through systematically planned science learning.

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Keywords: Values of natural science; education; religious moderation.

1. INTRODUCTION

Religion is very important for human life [1]. Durkheim [2] and Pardini, et al. [3], mention that studying religion is a way to generate an understanding of human religious nature, by showing the essential and permanent aspects of humanity. Although there is no specific standard in religion (Stone, 1991), religion is believed to have a positive impact on human life [4]. Even Bloom [5] and Peoples, et al. [6], mention that religion plays a very important role in a person's morality and cooperation. Evidence shows that religion is an important driver of people's attitudes towards nature [7]. Thus, it can be understood that religion is "something" that is important to humans.

Because religion does not have a specific universal standard [8], and is accepted by all religions by acclamation, there are always differences between religions. Even the same religion often has different interpretations between its adherents. In a multicultural society like Indonesia, tensions and conflicts often occur between cultural and religious groups and have an impact on harmony in life [9]. Along with its existence, many people are too fanatical about their own culture or religion so the terms extremism, radicalism, and hate speech appear, which results in the fracture of inter-religious relations [10]. This is also reinforced by the results of research by Nurish [11] and Asrori [12], that the escalation of acts of extremism stems from religious phenomena that develop in society through religious doctrines which have implications for the character of fanaticism. Therefore, real efforts are needed to overcome these problems.

One of the efforts to reduce the potential for conflict between religious communities in a multicultural society is through the cultivation of moderate attitudes toward religion. This is also in line with Sutrisno's [13] opinion that religious moderation is very appropriate to be applied in the life of the nation and state, especially in a multicultural society. Kawangung [14] also mentions that religious moderation can be used as the basis for more acceptable social interactions between citizens and netizens. In addition, Shagan [15], also says that moderation has played a role in reducing the level of violence, religious conflict, and politics in early modern England.

Religious moderation is the process of understanding as well as practicing religious teaching in a fair and balanced manner, to avoid extreme or excessive behavior when implementing them. Religious moderation is closely related to a wise attitude towards religious plurality whose moderation is through mental revolution [16]. In addition, Futaqi [17] also wrote that moderation also means "the best thing". Something in the middle is usually somewhere between two bad things. An example is courage. Courage is considered good because it is between recklessness and fear. Generosity is also good because it is somewhere between extravagance and miserliness.

According to Mussafa [18], promoting a moderate attitude is very much in line with the recommendation of the verse in Q.S al-Baqarah verse 143. Religious moderation means the middle way of religion according to the understanding of moderation earlier. With religious moderation, a person is not extreme and does not go overboard when carrying out his religious teachings. People who practice it are called moderates. According to Fauzi [19], Islamic moderation for civilization and humanity is a unified whole through a flexible teaching system, especially instilling character values that can foster a tolerant attitude towards the plurality of the Indonesian nation.

According to Fahri & Zainuri [20], religious moderation can be demonstrated through the attitude of *tawazun* (balance), *i'tidal* (straight and firm), *tasamuh* (tolerance), *musawah* (egalitarian), *shura* (deliberation), *ishlah* (reform), *alawiyah* (put priority), *tathawur wa ibtikar* (dynamic and innovative). Therefore, it can be understood that in religious moderation some noble elements or values are generally accepted by all circles of society. This is also in line with the opinion of Akhmadi [9], that a moderate religious attitude is needed in the form of acknowledging the existence of other parties, being tolerant, respecting differences of opinion, and not forcing one's will through violence. Thus, to support for the achievement of religious moderation, it can be done by exploring, studying, and getting used to the values of moderation that grow in every community.

In the context of education, to implement religious moderation in a multicultural society, what needs to be done is to make educational

institutions the basis for religious moderation laboratories and to take a socio-religious approach in religion and the state [13]. Therefore, it can be understood that to implement and develop the concept of religious moderation, the field of education plays a very important and decisive role. In other words, religious moderation can be initiated, developed, and implemented from the start through educational institutions.

Educational institutions can be used as the main capital in mainstreaming religious moderation. This is understandable because these educational institutions are always taught not only about science in the form of science and technology but also related to human values. Human values (including religion) are the main basis for moderation (religion). Thus, religious moderation is increasingly being intensified to compensate for some groups who continue to make religious issues an object of conflict [21]. Futaqi [17] also said that the idea of mainstreaming Islamic moderation is an urgent need amid religious problems both locally, nationally, and globally. This means that educational institutions through each subject taught in schools must proactively develop values that support the implementation of religious moderation.

One of the important subjects that need to be taught at the primary and secondary education levels and even in higher education is the subject of Natural Sciences. Through science learning, students are introduced to various kinds of knowledge about nature and the values contained in it. This is because the values in science are general and apply anywhere and anytime. This is in line with the opinion of Allchin [22], that science also exports values to a wider culture, both asking new value questions based on discoveries and providing misleading models for rational decision-making. Likewise, according to Lederman [23], science is a way of knowing, or the values and beliefs inherent in scientific knowledge and its development.

In line with the above opinion, Hodson [24] also explains that to solve the various social and environmental problems that are currently being resolved, it takes a generation of scientifically literate citizens. In addition, Davson-Galle [25], says that the route to scientific understanding thus involves: (1) assessing that understanding, (2) assessing ways of doing things based on their support by methodological theory as a way

of producing findings that will shape that understanding and (3) assessing the use of certain epistemic criteria from the assessment of findings based on the support of the epistemological theory. In addition, Kosasih, et al. [26] stated that modern humans as users of social media amid the Covid-19 pandemic must be able to have a say or fair attitude in receiving the information contained in them. Likewise, Hefni [27] also mentions that digital media has a wide space in disseminating the concept of religious moderation. Therefore, it is clear that science education has an important role in the moderation process of religion, as mentioned by Ganzach, et al. [28] education has a positive influence on religiosity. Similarly, the statement of Reutter and Bigatti [29], that religiosity and spirituality an effective resources of resilience.

Referring to the description above, this research seeks to focus on answering the question what is the role of values and natural science education in religious moderation? Thus, through this research, it will be known what science values are relevant and play a role in the implementation of religious moderation, so that a concept can then be developed for how to optimize religious moderation through the implementation of learning in educational institutions.

2. METHODS

As previously mentioned, this research seeks to focus on answering the question of what is the role of values and natural science education in religious moderation. Thus, the most suitable approach to find answers to the questions asked is a qualitative approach. This is in line with the opinion Wijaya [29] that qualitative research is very suitable for research in the field of theology and social education. Thus, the data collected is not in the form of numbers, but the data comes from interview scripts, field notes, personal documents, notes, memos, and other official documents [30] which are then carried out descriptively and tend to use an inductive approach analysis [31]. The qualitative approach in this study was then carried out using a literature review method, namely using a literature study and comparative analysis [32]. Thus, this study contains various sources that are referred to and have been presented comprehensively [33].

The validity of the data is determined by a triangulation pattern. According to H. Mudjia [34],

Denzin [35], and Moran-Ellis et al. [36], triangulation is essentially a multi-method approach that researchers use when collecting and analyzing data. Thus, triangulation can also be said as an effort to ensure (validity) data or information that has been obtained previously. Furthermore, in the study, data reduction was also carried out so that the data obtained were truly by the research objectives. According to Rijali [37], and Bickle [38], data reduction is an attempt to conclude the data, and then sort the data into certain conceptual units, certain categories, and certain themes. After all the necessary data has been collected, it is then mixed with data analysis into a theory that is partially modified or fully modified and described descriptively.

3. RESULTS AND DISCUSSION

3.1 Concepts and Goals in Religious Moderation

Baines [39], says that in the public sphere, it is necessary to apply and protect the values of moderation, which include: politeness, dialogue, reflexivity, and tolerance for opposing points of view. Thus, it is clear that the values of moderation are a common need to create a public space that is peaceful, harmonious, and full of *teposeliro*, which is a condition and strength of the human heart to respect and respect each other. This is also in line with the opinion of Arifinsyah, et al. [40], that religious moderation is the most appropriate content and practice to prevent the emergence of violence and hostility and maintain harmony. Therefore, understanding the concept of citizen religious moderation needs to be improved.

The word "moderation" comes from the Latin *Moderatio*, which means moderation, which is an attitude that is neither excessive nor lacking [41]. In the Indonesian Dictionary, the word "moderation" means reducing violence or reducing extremism. As for in English the word "moderation" is known as "moderation" which means excessive or extreme avoidance, especially in one's political behavior or opinion. While in Arabic, the word "moderation" is known as "الاعتدال-*al-aietidal*" which means calmness, simplicity, gentleness, modesty, fairness, kindness, courtesy, gentleness, and friendliness. From the point of view of the terminology of the language, it can be understood that "moderation" contains universal values, namely a value that applies anywhere and to anyone.

The word "religious" in the Indonesian dictionary means to adhere to (embracing) religion or belief, or it can also be interpreted as an activity of worship; obedient to religion or his life is based on his religion. Thus, people are said to be "religious" if they have a belief, then they obey that belief, and they worship according to that belief. In English, the word "religious" is religious which can be interpreted as relating to or believing in a religion. In addition, the word "religious" is also synonymous with the word "believing" which means accepting (something) as truth or feeling sure of the truth in religion. People who are more committed to religion can express motivation to avoid uncertainty and change and have a more independent spirit in thinking and acting [42].

Referring to the explanation above, it can be understood that "religious moderation" can be understood as reducing violence or reducing extremes, or avoiding excessive or extreme behavior in religious behavior or in believing in something, or it can also be understood as a calmness of heart, simplicity, gentleness, courtesy, fairness, kindness, courtesy, gentleness, and friendliness in believing and applying a religious belief. Thus, religious moderation contains values that are universal and do not depend on a particular religion or particular ethnicity. Therefore, the concept of religious moderation must be understood correctly and precisely by all human beings who are religious or have a certain belief. This is clear because the main purpose of religious moderation is to maintain the harmony of human beings wherever they are to create world peace.

The creation of world peace through religious moderation is a strategic step. This is because, by nature or instinct, every human being tends to have faith or believe according to religion. This is in line with the opinion of Muhammadiyah [43] and Liswi [44] that instinctively, humans recognize the power in this life outside of themselves and this instinctively proves that humans need to be religious and need their God. Likewise, the opinion of Firdaus [45] also states that religion cannot be separated from human life. Likewise, Napitupulu [46] also mentions that *fitrah* is the human instinct for religion and monotheism, with human nature having been given the tendency to believe in God. Thus, it can be understood that instinctively or in nature every human being has a belief, whatever the form of that belief.

Religion is human nature and it is strongly influenced by various factors, such as heredity, environment, knowledge gained, and belief factors that arise naturally from within themselves. The main goal of religion is to get peace in life. Nurmadiyah [47], states that religion aims to protect humans from deviations, and mistakes and keep them away from negative behaviour. Hamid [48] mentions that religion is also beneficial for mental health. This is also reinforced by the opinion of Fuadi [49] that religion (Islam) is a religion that regulates all aspects of human life, as well as the order of life on earth to lead to happiness in the world and the hereafter. Thus, it is clear that the purpose of religion (Islam) is to create good for its adherents and the environment.

The religious objectives mentioned above have not been fully achieved. The strong relationship between religion and human life does not mean that they have arrived at a mutually recognized agreement on the nature and definition of religion [50]. This happens because humans are endowed with various potentials to know and implement the concept of truth and live their lives both in orientation in the world and the hereafter [51]. In addition, because there is not only one religion embraced by humans, then of course there will be conflicts that state the truth claims of each religion that is embraced by everyone [52]. Therefore, the difference in views in religion is the trigger for the emergence of excessive attitudes which harm the adherents of the religion itself. Thus, religious moderation is also intended to harmonize inter-ethnic harmony and religious adherents [53]. This can be done by developing a moderate, fair, and balanced mental attitude for all religious adherents on earth, and this is the main key to managing diversity.

3.2 Values in Science Learning

In the Indonesian dictionary, the word "value" can be interpreted as a trait that is useful for humans or perfecting humans according to their nature. As for in English the word "value" is known as "value" which means an assumption that something is considered appropriate, important, valuable, or something that has a certain use. The word "value" can also be matched with the word "moral" which means something that becomes a good or bad standard, which regulates a person's behavior and choices, it can come from the government, society, religion, or oneself. According to Parmono [54] values have a more complex scope when viewed

from the structure of human values, namely good and bad values (ethics), true and false values (logic), beautiful and ugly values (aesthetics), and noble and despicable values (theology). According to Yusuf [55], abstractly it can be compressed into three, namely the value of divinity, the value of humanity, and the value of vitality or life. Thus, values and morality will be able to reduce bullying attitudes towards others [56].

Science learning consists of the words "learning" and "science". The term "learning" can be interpreted as a process, method, or act of making learning. Because science learning can also be understood as a process designed in such a way that students can learn science systematically. Thus, in science learning, there are at least three elements, namely planners (teachers), planned (materials, media, tools, resources, and so on), and learning (students). The three elements in learning are interrelated and integrated and influence each other. The word "learning" is also closely related to "education", namely the process of changing the attitudes and behavior of a person or group of people to mature humans through teaching and training efforts; process, method, the act of educating. Thus, in the context of education, these three elements must be considered carefully.

Referring to the definitions of the words "learning" and "education" as described above, it can be understood that the purpose of the process is to change the attitudes and behavior of a particular person or group of people. This is also in line with Sujana's [57] opinion that the purpose of education is to create a nation that is capable, faithful, devoted to God, and has good knowledge and national insight. In addition, Sujana also mentions that education is a conscious and planned effort to create a learning atmosphere and learning process for students to actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and society. Thus, it is clear that the ultimate goal of a learning/education process is the maturity or mature personality of each student.

Natural Sciences or what is often called science is one of the sciences that study everything related to the universe. The word "science" according to the Indonesian dictionary can be written as general knowledge. It can also be

defined as systematic knowledge of nature and the physical world. In addition, the word "science" can also be understood as systematic knowledge obtained through observation, research, and testing activities. In the English dictionary, the word "science" is referred to as "science" which means intellectual and practical activity which includes the systematic study of the structure and behavior of the physical and natural world through observation and experimentation. As for in Arabic, the word "science" is referred to as "علم-ilm" which means knowledge or awareness of a particular topic. Referring to the terminological meaning, it can be understood that science is a systematic knowledge about nature, obtained through certain methods and its existence is realized by the owner. By referring to the description above, it can be understood that what is meant by the value of learning science is a useful and important trait for humans in the process of systematically studying nature. Thus, in the context of this research, the "value" in question is found in "learning" as a process and in "science" as content. Thus, the values of these two elements are used as a reference in this study.

Referring to the description above, it can be understood that science or science has many benefits in human life. This is as stated by Astalini et al. [58], that through science students' abilities can be obtained by conducting experiments, observations, and theories that provide explanations about the symptoms that exist in everyday life. In addition, Permanasari [59], also wrote that science/science education as part of education plays an important role in preparing students who have scientific literacy, namely those who can think critically, creatively, and logically, and take the initiative in responding to issues in society caused by the impact of science and technology developments. Cook [60], in his writings also mentions that science is one of the most important knowledge for humans and affects many areas of life, such as economics, engineering, administrators, and so on.

In addition, Fortunato et al. [61], mention that science is one of the most important knowledge and plays a role in developing policies to improve company efficiency, for example, through improved career paths for scientists, employee performance evaluations, the discovery of new funding that effective and even the identification of promising areas along the border. Thus, science learning is not only a place for mastering

knowledge but also must provide sufficient space to be able to apply it in everyday life Astalini et al [58].

According to Auliana and Sendjaja [62], Tursinawati [63] science has three main dimensions, namely: science as a process, science as a product, and science as a scientific attitude. Science as a process means that to know and understand the nature of the universe, it is necessary to carry out a series of systematic scientific processes correctly and accurately. Science as a product means that science has the end product of a scientific process that has been carried out, these products can be; several facts, concepts, principles, laws, and theories that have been documented in written form. As for science as an attitude, it means that there is a certain attitude that must be possessed by scientists to carry out the scientific process correctly and accurately. This attitude is known as the scientific attitude. In studying science, these three dimensions cannot be separated, because they are a unified whole, all three are closely related.

In this research, the intended science values are to focus on scientific attitudes. This is in line with the opinion of Surajiyo and Sriyono [64] that a scientific attitude is an attitude that is directed to achieve objective scientific knowledge. According to Nikmah [65], the scientific attitude in question is an attitude of curiosity, a critical attitude, an open attitude, an objective attitude, an attitude of being willing to respect the work of others, an attitude of daring to defend the truth, and an attitude of reaching out to the future. Meanwhile, according to Tursinawati [63], in learning science, there are at least nine aspects of scientific attitudes that can be developed in elementary/MI children, namely: Curiosity, wanting to get something new, not despairing, unprejudiced attitude, introspective attitude, responsible attitude, free-thinking attitude, self-discipline attitude.

Meanwhile, theoretically, there are six scientific attitudes that scientists need to have, namely: (1). There is no sense of disinterest (disinterestedness), meaning an attitude that is directed to achieve objective scientific knowledge by eliminating self-interest or personal pleasure, (2). Be selective, which is an attitude whose goal is that scientists can make choices about various things they face. For example, various hypotheses, and methodologies that each show their respective strengths, or, one way of inferring is quite different even though each

shows its accuracy (3). There is a proper sense of trust both in reality and in the senses and mind, (4). The existence of an attitude based on a belief (belief) and with certainty (conviction) that every previous opinion or theory has reached certainty, (5). There is a routine activity that a scientist must always be dissatisfied with the research that has been done so that there is always an impetus for research, and research is a prominent activity in his life, (6). A scientist must have an ethical attitude (morals) and always wants to develop a science for the advancement of science and human happiness, more specifically for the development of the nation and state.

3.3 The Role of Values in Science Learning in Religious Moderation

As described above, science learning contains high moral values, both in terms of the term "learning"/"education" and in terms of the nature of science itself. The values in education/learning to be achieved include being capable, faithful, devoted to God, and having good knowledge and national insight Sujana [57]. Sujana also mentions that the purpose of the educational process is for students to have an active attitude to develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and society. Therefore, the process of learning or education is believed to be closely related to the attitude of moderation in religion.

The scientific values or attitudes of science as content are objective attitude Surajiyo and Sriyono [64], curiosity, critical, open, objective, willing to respect the work of others, daring to defend the truth Nikmah [65], curiosity, attitude wanting to get something new, not easily discouraged, not prejudiced against others, introspective, responsible, free-thinking, self-discipline Tursinawati [63]. Thus, the values of scientific attitude in science also coincide with the attitude of religious moderation.

It has been mentioned earlier that religious moderation is a process of understanding and practicing religious teachings in a fair and balanced manner, to avoid extreme or excessive behavior when implementing them. The indicators of success in religious moderation as mentioned by Fahri and Zainuri [20] are the attitude of *tawazun* (balance), *i'tidal* (straight and firm), *tasamuh* (tolerance), *musawah*

(egalitarian), *shura* (deliberation), *ishlah* (reformation), *aulawiyah* (putting priority on priority), *tathawur wa ibtikar* (dynamic and innovative). Referring to Akhmadi's [9] opinion the indicator of religious moderation is a moderate religious attitude in the form of acknowledging the existence of other parties, being tolerant, respecting differences of opinion, and not imposing their will through violence.

Based on the description above, it can be understood that there is a close relationship and relationship between values in science learning and religious moderation. This can be seen from the objectives of learning and education, the value of scientific attitudes in science, and indicators in religious moderation. If the three element values, namely, learning, science, and religious moderation are linked, it will be seen clearly. To clarify the relationship between religious moderation and science learning, it can be presented as shown in the following Fig 1.

Referring to Fig. 1, it can be seen that science (content) and its learning have great potential in developing an attitude of religious moderation. It can be seen that an objective attitude (science value) can foster an attitude of *tawazun* or balance and an attitude of tolerance (religious moderation). Likewise, for example, an attitude of responsibility and respect for the work of others (the value of science) can encourage the birth of an attitude of *tasamuh* or tolerance and an attitude of *syuro* or deliberation (religious moderation). The critical and open attitude (science value) can also develop *i'tidal* and *auliyah* attitudes, similar to other science values. The potential of science values and developing an attitude of religious moderation will be more real if it is associated with learning objectives. For example, attitude, self-control, personality, intelligence, and noble character, are the essence of religious moderation. Thus, it is clear and unquestionable that science learning can be used as an alternative to developing an attitude of religious moderation in Indonesia.

Another advantage of developing an attitude of religious moderation is that the values in science can be applied generally, anywhere, and anytime. Therefore, religious moderation developed through scientific learning does not only apply to certain religions but also applies in general. All religious adherents (regardless of religion and belief) can be moderated through systematically planned science learning.

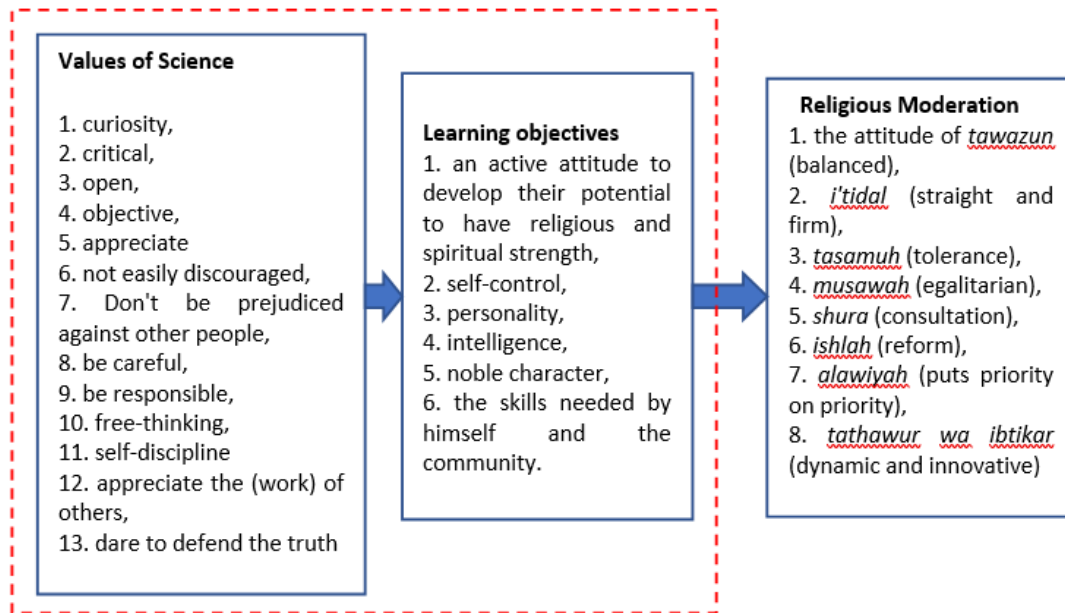


Fig. 1. Relation of science learning values and religious moderation

To develop an attitude of religious moderation through optimizing science values, an appropriate science learning model is needed. For this reason, it is necessary to develop a science learning model to ensure that the values contained in science learning encourage the growth and development of an attitude of religious moderation.

4. CONCLUSION

Based on the data obtained and the discussion carried out, it can be concluded that science (content) and its learning have great potential in developing an attitude of religious moderation. It can be seen that an objective attitude (science value) can foster an attitude of *tawazun* or balance and an attitude of tolerance (religious moderation). Likewise, for example, an attitude of responsibility and respect for the work of others (the value of science) can encourage the birth of an attitude of *tasamuh* or tolerance and an attitude of *syuro* or deliberation (religious moderation). The critical and open attitude (science value) can also develop *i'tidal* and *auliyah* attitudes, similar to other science values. The potential of science values and developing an attitude of religious moderation will be more real if it is associated with learning objectives. For example, attitude, self-control, personality, intelligence, and noble character, are the essence of religious moderation. Thus, it is clear and unquestionable that science learning can be

used as an alternative to developing an attitude of religious moderation in Indonesia. Another advantage of developing an attitude of religious moderation is that the values in science can be applied generally, anywhere, and anytime. Therefore, religious moderation developed through scientific learning does not only apply to certain religions but also applies in general. All religious adherents (regardless of religion and belief) can be moderated through systematically planned science learning.

5. SUGGESTION

To develop an attitude of religious moderation through optimizing science values, an appropriate science learning model is needed. For this reason, it is necessary to develop a science learning model to ensure that the values contained in science learning encourage the growth and development of an attitude of religious moderation. In addition, further research is needed to answer the question of how the relationship or influence of scientific attitudes on religious moderation attitudes is needed. With this research, it is hoped that religious moderation can be understood and implemented by all citizens.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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