RESEARCH ARTICLE

Spirituality-based action competence for sustainability among prospective biology teacher in Indonesia

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Abstract: As a form of implementing Education for Sustainable Development (ESD) in educational institutions, an appropriate learning model is needed, which also accommodates aspects of spirituality. Before developing a model, baseline data is needed, so a broad-scale or national needs analysis is needed. This research aims to determine the profile of spirituality-based action competence for sustainability (ACS) among prospective biology teacher students throughout Indonesia. This research is a cross-sectional survey. The target respondents are students of LPTK biology education study programs in Indonesia. The target population size is 650 people, so based on the Krejcie and Morgan table, the minimum sample size with a confidence level of 95% and a margin of error of 5% is 620 students. The data collection instrument used in this research is the action competence for sustainability instrument based on spirituality (ACSIS). Data on respondent characteristics were analyzed using frequencies and percentages. The mean and standard deviation of scores were calculated for each item. Comparisons of two groups of students were analyzed using the Mann-Whitney U Test, while comparisons of more than two groups used the Kruskal-Wallis H Test. We discuss interesting findings in this research, including the aspects of spirituality in ACS among prospective biology teacher in Indonesia.

Keywords: action competence for sustainability; education for sustainable development; prospective biology teacher

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Introduction

The United Nations Development Program established the Sustainable Development Goals (SDGs) program as an attitude towards the complexity of environmental problems (Gallopín, 2001; Lyytimäki et al., 2020; Tschentscher, 2016; WESS, 2013). Indonesia, as part of the global community, provides one of its commitments to the SDGs through Presidential Regulation no. 59/2017 which provides direction for implementing sustainable development in Indonesia (Kartodihardjo et al., 2020). The complexity of the SDGs and the importance of understanding the interconnectivity between these dimensions makes the SDGs a key issue. The researchers highlight the importance of a special approach to learning called Education for Sustainable Development (ESD) (Egana del Sol, 2019; Kioupi & Voulvoulis, 2019; Riess et al., 2022; Sasaki et al., 2023), which allows educators to teach the importance of SDGs in education (D. Olsson et al., 2016).

Various studies show that the issues of sustainability and education are closely interdependent (Al-Kuwari et al., 2022). ESD must also be understood and mastered by prospective biology teacher students (Bezeljak et al., 2020). Therefore, lectures in educational programs for prospective biology teachers

require well-planned integration to fulfill the SDGs concept (Desa et al., 2021). This is because these students will later become future teachers in primary and secondary schools. Teachers need to have competencies that can realize the SDGs (Novidsa et al., 2020). All levels of education, including biology education at primary, secondary and tertiary levels, need to be involved in taking part in education that enables the current generation to become responsible citizens and actively campaign for the SDGs (Eilks, 2015). Students should be brought closer to various environmental issues, especially through formal or learning channels (Cahyana, 2018), especially for those who have the status of prospective teachers (Çimen et al., 2011). Students will later become leaders in society, decision makers in public institutions, become role models for their students, and be considered as people who have an understanding, concern and environmental behavior in themselves (Zeng et al., 2020).

The embodiment of the expectations and competencies that prospective teacher students need to have been action competence (AC). AC denotes the possession of knowledge, volition, and self-efficacy to contribute to contentious matters such as sustainable development (Sass et al., 2021b). This concept has been construed diversely across various spheres of educational science (Jensen, 2013). The significance of AC lies in its potential to enhance the life prospects of socially marginalized children through learning and social integration (Sass et al., 2020). AC offers a mechanism for the transmission of knowledge, responsibility for action, self-awareness, and reflection, culminating in the cultivation of critical problem-solving abilities (Bergen & Santo, 2018). Additionally, AC is perceived as an educational ideal stemming from the notion of 'action' and intimately associated with education for sustainable development, competency, and quality criteria (Mogensen & Schnack, 2010). Consequently, the label Action Competence for Sustainability (ACS) is recognized. ACS pertains to an individual's aptitude to act and contribute to sustainable development. It encompasses knowledge, willingness, capacity expectations, and outcome expectations related to actions supporting sustainability (Husamah et al., 2022a; D. Olsson et al., 2022; D. S. Olsson et al., 2022; Sass et al., 2023; Schröder et al., 2022; Vesterinen & Ratinen, 2023).

Encouraging the adoption of ACS is critical to reducing environmental impacts and moving towards a more sustainable future (Silveira & Munford, 2020; Wardani et al., 2018). Universities play an important role in training professionals who have an important role in protecting the environment in the future (Heyl et al., 2013). For educational institutions to carry out their role efficiently, it is important to understand student understanding (Sousa et al., 2021). In this research, we study aspects of students' sustainable action competencies in higher education. We also aimed to analyze whether students' demographic characteristics influence these variables. Correspondingly, individuals' environmental attitudes, as well as their academic background knowledge, are potential factors that can help overcome these environmental challenges (Arshad et al., 2020).

One way to understand learning in ESD is through the development of action competencies (Eames, 2010; van Poeck & Vandenabeele, 2012). Action competency needs to be taught and developed in students (Hedefalk et al., 2014), especially for prospective biology teachers so that they have a pedagogical perspective as environmental educators (Nielsen et al., 2012). Strengthening ACS, it was emphasized that the current challenge is that biology/biology educators need to be consistent in developing their competencies and skills in an effort to develop students' potential. Educators who continuously and consistently develop self-action competencies will have the ability to adapt to developments and dynamic changes so that they can be actively involved in efforts to achieve SDGs (Ardhi, 2018). Educators who have action competence will be able to design various learning content, learning implementation plans, methods and models and learning media, including assessments based on sustainable development (Firdaus et al., 2016). If these steps are carried out consistently and in an orderly manner, they will actively promote a collective spirit of change to motivate community action on a broad scale (Nugroho et al., 2021), at least in creating a healthy environment in educational institutions (Silo & Mswela, 2016).

ACS needs to be owned by students. This is a new issue that has been developed in the world of education and is still being campaigned for in Europe (D. Olsson, 2019; D. Olsson et al., 2020; Sass et al., 2021a). No research has been found regarding sustainable action competency in Indonesia. Internationally, several studies have tried to link sustainable action competence with education, for example linking the focus of action competence with environmental education as part of education and as a contribution to democracy (Breiting et al., 1999). In other studies, critical thinking is considered a central element in developing action competence in environmental education (Mogensen, 1997). In study of Pedro and Pedro (2010), One possible cause of the gap between attitudes and behavior is that general interest in the environment is low in AC. In this regard, according to D. Olsson et al (2020) Self-acceptance to act is the strongest mediator of actual personal environmental and sustainable action. Innovation in learning so that students' ACS can be better must continue to be encouraged (Farwati et al., 2017).

ACS has so far not been explicitly mentioned in existing research related to spirituality. Developing ACS focuses on various approaches such as training programs (Schröder et al., 2022), educational initiatives

(Sass et al., 2021b), and research (Husamah et al., 2022a). However, ACS should not be separated from the spiritual aspect, especially in a country that believes in spirituality and religiosity as a way of life (Husamah, Rahardjanto, et al., 2023; Husamah, Suwono, et al., 2023)

Mainstreaming and enriching aspects of spiritual or religious values in relation to environmental problems is very necessary considering that currently there is a "search" and "awareness" effort to re-study aspects of spirituality in modern society (including students (Hidayaturrahman et al., 2021; Husamah et al., 2022c) in responding to the complexity of the problems faced (Kibert et al., 2012; Nambiar et al., 2019; UNESCO, 2018; Westerink, 2013), including how religion responds to environmental problems (Altmeyer, 2021; Husamah et al., 2022b). Environmental education must be accommodating to religious values (Kurniawan & Syifauddin, 2021; Ramírez & Fernández, 2018; Robina-Ramírez et al., 2020). This needs to be mainstreamed considering that current environmental education learning materials tend to only target cognitive or knowledge aspects, but do not offend and accommodate community values and norms. (Karyadi, 2016), including religious values (Parker, 2017).

Two previous studies have been carried out regarding the abilities of prospective biology teachers in universities in Indonesia, namely environmental attitude (Rahardjanto et al., 2022) and spirituality-based environmental literacy (Husamah, Rahardjanto, et al., 2023). Based on these studies, we conclude that research focused on student teachers is still rarely conducted, especially in Indonesia (as a whole). So far, there have been several studies that have focused on prospective biology teachers but on the scale of one campus/university or do not describe the environmental literacy of prospective biology teachers throughout Indonesia.

In this regard, this research aims to determine the competence profile of spirituality-based sustainable action among prospective biology teacher students throughout Indonesia. This research has theoretical benefits in studying spirituality-based sustainable action competencies in prospective biology teacher students so that it can become a baseline in producing appropriate policies and learning models to develop them. We review it from the aspects of gender, GPA, university accreditation status and study status (course history).

Method

Research Design and Participants

This cross-sectional survey research aims to collect data on spirituality-based sustainable action competencies of Indonesian students. The data collection process was carried out in September-December 2023. The target respondents were students of educational study programs in the field of biology who came from various institutions in Indonesia. Gender, GPA, university accreditation status, and study status (course history) are positioned as respondents' characteristics whose impact on spirituality-based sustainable action competence.

The target population size for this survey is 650 people. Therefore, based on the Krejcie and Morgan Table, the minimum sample size with a confidence level of 95% and a margin of error of 5% is 620 students. The inclusion criteria for respondents in this research were prospective biology teacher students, coming from universities in Indonesia, Indonesian citizens, still active students, and voluntarily willing to be involved as research respondents. They are students taking a degree in Biology Education who can come from the Faculty of Teacher Training and Education, the College of Education, or the Faculty of Mathematics and Natural Sciences. On the other hand, the exclusion criteria in this study were students from postgraduate programs, not from education study programs, had dropped out, and did not provide complete information on the characteristics of respondents.

Data Collection Instruments and Procedures

The data collection instrument used in this research was ACSIS. Determination or assessment of student ACS uses the action competency for sustainability instrument based on spirituality (ACSIS). ACSIS consists of knowledge of action possibilities, confidence in one's own influence, willingness to act, and personal spirituality, spirituality in professional practice, and eco-spirituality (Husamah, Suwono, et al., 2023). This questionnaire consists of 21 items using a 5-point Likert scale. The target respondents were very large and broad, covering all of Indonesia, so based on these conditions, the survey process was carried out online. Therefore, ACSIS was transformed into an online questionnaire via Google Form.

Data Processing and Analysis

Survey data was downloaded in comma separated value (csv) format and checked and labeled by the authors using Microsoft Excel before analysis was carried out. After checking and labeling the data was completed, the data was analyzed using SPSS software. Data on respondent characteristics were analyzed using frequencies and percentages. The mean and standard deviation of scores were calculated for each item. Comparisons of two groups of students were analyzed using the Mann-Whitney

U Test, while comparisons of more than two groups used the Kruskal-Wallis H Test. The alpha value set in this study was 5%.

Results and Discussion

Descriptive Statistics from ACS are presented in Table 1.

Table 1. Descriptive statistics from ACS

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Knowledge	613	16.2838	2.58028	6.00	20.00
Belief	613	8.5188	1.52487	2.00	10.00
Willingnes	613	21.7553	3.52148	5.00	25.00
Spiritual	613	43.3589	6.49925	10.00	50.00
Total	613	89.9168	12.37901	25.00	105.00
Accreditation	609	1.7176	.62752	1.00	3.00

In total, the score obtained by students was 89.91 (SD=12.37) or relatively high. Judging from the Belief component, the students' average score was 8.52 (SD= 1.52) or relatively high. The Willingness component has an average score of 21.75 (SD= 3.52) or is relatively high, and the Spiritual component is 43.35 (SD= 6.49) which is relatively high. Judging from the standard deviation of all components, it shows below 0.25SD, meaning that student scores are less diverse/less varied (tend to be uniform) and are more accurate with the mean. A low standard deviation indicates that the data tends to be close to the mean with low variation/little diversity. A high standard deviation means that the data is spread out from the mean value. This means that the scores are more varied or diverse (Ramachandran & Tsokos, 2021; A. F. Siegel, 2012).

Comparison Based on Accreditation Ranking

The test for the accreditation ranking aspect is carried out using the Kruskal-Wallis Test. The results of the Kruskal-Wallis Test for aspects of accreditation ranking are presented in Table 2 (Ranks) followed by Table 3 regarding Test Statistics.

Table 2. Kruskal-Wallis Tess (Ranks) aspects of accreditation ranking

Ranks			
	Accreditation	N	Mean Rank
Knowledge	A	230	297.29
	B	321	295.31
	C	58	389.16
	Total	609	
Belief	A	230	302.94
	B	321	305.00
	C	58	313.17
	Total	609	
Willingnes	A	230	297.42
	B	321	310.55
	C	58	304.35
	Total	609	
Spiritual	A	230	306.61
	B	321	303.27
	C	58	308.16
	Total	609	
Total	A	230	300.78
	B	321	304.06
	C	58	326.91
	Total	609	

Table 3. Test statistics for accreditation ranking aspects

Test Statistics[a,b]					
	Knowledge	Belief	Willingnes	Spiritual	Total
Kruskal-Wallis H	14.966	.168	.777	.069	1.043
df	2	2	2	2	2
Asymp. Sig.	<.001	.920	.678	.966	.594

a. Kruskal Wallis Test
b. Grouping Variable: Accreditation

The results of the comparative test show that there are only differences in abilities in the Knowledge component between students in study programs with different accreditations. Students with C-accredited study programs are higher than students in B and A-accredited study programs. Meanwhile, there are no significant differences in the Belief, Willingness, Spiritual and total components.
Although higher education accreditation assesses the quality of programs and facilities, its impact on students' sustainable action competency may be limited. Curriculum implementation, individual learning styles, learning environments outside the classroom, student involvement, and lack of comprehensive measurements in the accreditation process can affect the development of students' practical skills, including in this case ACS (Díez et al., 2020; Findler et al., 2019; Makhoul, 2019; Schomaker, 2015; Vare et al., 2019; Žalėnienė & Pereira, 2021). These factors highlight that, while accreditation ensures institutional quality standards, additional efforts in supporting holistic learning experiences and application of knowledge in practical contexts are also important to enhance students' ACS (AACTE, 2010; Education et al., 2003; Hassmiller & Wakefield, 2022).
The interesting thing is that the abilities in the Knowledge component of students with C accreditation are higher. The difference between the level of higher education accreditation and the level of student sustainable action competency can be caused by various factors. Colleges that have lower accreditation may experience financial or infrastructure challenges, forcing students to seek hands-on experiences and learning opportunities outside the classroom (Babu, 2017; Cachia et al., 2022; Goldschmidt et al., 2011; Klasik & Hutt, 2019). Students from such institutions may have to face challenges that encourage them to develop practical skills and ACS (Brusoni & Grifoll, 2014; Chaiya & Ahmad, 2021; Holland, 2005).
On the contrary, esteemed institutions of higher education may prioritize academic curricula and formal standards to a greater extent, while potentially diminishing the significance placed upon practical experience or direct engagement within the realms of industry or society. Scholars originating from such establishments may possess profound expertise in theoretical facets, yet may encounter a deficiency in the application of said knowledge within tangible real-life scenarios (Anjum, 2020; Jongbloed et al., 2008; Wrenn & Wrenn, 2009). Other variables that may have an impact on this particular circumstance encompass pedagogical methodology, assessment techniques, and the overarching ethos of the institution. Institutions with greater accreditation may place a greater emphasis on didactic instruction and scholarly assessments, whereas institutions with lower accreditation may opt for a more pragmatic approach (Bovill & Woolmer, 2019; Darling-Hammond et al., 2020; Gamage et al., 2021; Grassini, 2023; Hassel & Ridout, 2018).
The observed dissimilarities between high accreditation and ACS levels among students do not inherently imply that the former inevitably leads to the latter being lower. It is plausible that lower accredited colleges offer unique opportunities and obstacles that foster the cultivation of practical skills, which in turn contributes to the development of ACS. Conversely, higher accredited colleges may need to critically assess and reevaluate their educational approaches to ensure that they are effectively nurturing and supporting the enhancement of students' ACS.

Comparison Based on Semester

The test for the semester aspect is carried out using the Kruskal-Wallis Test. The results of the Kruskal-Wallis Test for semester aspects are presented in Table 4 (Ranks) followed by Table 5 regarding Test Statistics.
The comparison findings reveal that there is no significant disparity in the various components, including knowledge, belief, willingness, spiritual, and overall, among students in different semesters. Although the semester level provides additional time for the enhancement of practical skills in students, it does not consistently result in a linear progression in the level of action competence. Factors such as the caliber of the curriculum, teaching methodologies, and student engagement significantly influence this outcome. Educational programs that prioritize hands-on application and skill-based evaluation, along with proactive student involvement in practical activities, are more likely to foster heightened action competence, regardless of the duration of the semester (Adams & Blair, 2019; Chen & Liu, 2020; Delfino, 2019; Gholam, 2019). Therefore, the nature of the curriculum and learning approach has a significant impact in determining the extent to which students can integrate their knowledge in real-world situations (Drake & Reid, 2018; Issa & Khataibeh, 2021; Kelley & Knowles, 2016; Wale & Bishaw, 2020; Ye & Xu,

2023).

Table 4. Kruskal-Wallis Test (Ranks) semester aspects

Ranks			
	Semester	N	Mean Rank
Knowledge	1	85	280.19
	2	155	304.97
	3	161	315.22
	4	183	304.04
	5	25	330.72
	Total	609	
Belief	1	85	314.12
	2	155	292.41
	3	161	292.44
	4	183	321.10
	5	25	315.08
	Total	609	
Willingnes	1	85	303.29
	2	155	284.10
	3	161	306.13
	4	183	322.77
	5	25	302.98
	Total	609	
Spiritual	1	85	286.99
	2	155	297.67
	3	161	309.56
	4	183	314.14
	5	25	315.38
	Total	609	
Total	1	85	292.00
	2	155	291.49
	3	161	311.26
	4	183	315.90
	5	25	312.88
	Total	609	

Table 5. Test Statistics for semester aspects

Test Statistics[a,b]					
	Knowledge	Belief	Willingnes	Spiritual	Total
Kruskal-Wallis H	2.825	3.694	4.228	1.863	2.338
df	4	4	4	4	4
Asymp. Sig.	.587	.449	.376	.761	.674

a. Kruskal Wallis Test
b. Grouping Variable: Semester

Comparison by Region

Tests for regional aspects were carried out using the Kruskal-Wallis Test. The results of the Kruskal-Wallis Test for regional aspects are presented in Table 6 (Ranks) followed by Table 7 regarding Test Statistics.

The results of the comparative test show that only the ability in the belief component is not significantly different in different areas. Meanwhile, in the knowledge, Willingnes, Spiritual, and total components, there are significant differences between students in different regions. Where, students in the Java region have the highest mean rank in the willingness and spiritual components, while students in the Bali/NTT/NTB region achieve the highest mean rank compared to other regions in the knowledge and total components. Kalimantan has the lowest scores in all aspects.

Based on the test results, it is known that in several aspects students from Java and Bali/NTT/NTB each have advantages in certain aspects. However, students from Kalimantan tend to have low action competency scores. The statement that students from a region, such as Kalimantan, tend to have low action competence needs to be seen in careful context. Some factors that may be related to this perception involve limited access to education, lack of infrastructure and facilities, difficult economic conditions, and an educational culture that may not fully support the practical application of knowledge (Barrett et al., 2019; Gkrimpizi et al., 2023; Mupa & Chinooneka, 2015; Pitsillidou et al., 2021).

Nonetheless, it is crucial to underscore the significance of avoiding sweeping generalizations and recognizing the distinctiveness of each student as an autonomous entity with distinctive encounters and capabilities. The assistance offered to cultivate proficiencies for taking action ought to concentrate on ensuring equitable access to opportunities and endorsing all students, irrespective of their geographical background, with the objective of ameliorating the comprehensive standard of education (Haug, 2017; Winter & O'Raw, 2010).

Table 6. Kruskal-Wallis Test (Ranks) for regional aspects

Ranks

	Region	N	Mean Rank
Knowledge	Java	223	295.03
	Bali NTT NTB	118	351.46
	Sulawesi	78	281.56
	Kalimantan	29	234.43
	Sumatera	143	311.41
	Maluku/Papua	18	288.31
	Total	609	
Belief	Java	223	314.27
	Bali NTT NTB	118	302.40
	Sulawesi	78	291.72
	Kalimantan	29	215.12
	Sumatera	143	320.80
	Maluku/Papua	18	284.06
	Total	609	
Willingnes	Java	223	327.08
	Bali NTT NTB	118	319.22
	Sulawesi	78	273.87
	Kalimantan	29	194.90
	Sumatera	143	306.86
	Maluku/Papua	18	235.83
	Total	609	
Spiritual	Java	223	324.67
	Bali NTT NTB	118	306.77
	Sulawesi	78	275.18
	Kalimantan	29	203.43
	Sumatera	143	314.90
	Maluku/Papua	18	263.89
	Total	609	
Total	Java	223	319.37
	Bali NTT NTB	118	319.65
	Sulawesi	78	270.79
	Kalimantan	29	199.00
	Sumatera	143	317.69
	Maluku/Papua	18	249.08
	Total	609	

Table 7. Test Statistics for regional aspects

Test Statistics[a,b]

	Knowledge	Belief	Willingnes	Spiritual	Total
Kruskal-Wallis H	15.637	10.763	21.702	16.274	18.371
df	5	5	5	5	5
Asymp. Sig.	.008	.056	<.001	.006	.003

a. Kruskal Wallis Test
b. Grouping Variable: Region

Comparison Based on Gender

Tests for gender aspects were carried out using the Kruskal-Wallis Test. The results of the Kruskal-Wallis Test for gender aspects are presented in Table 8 (Ranks) followed by Table 9 regarding Statistical Tests to determine the U and W values.

Table 8. Kruskal-Wallis Tess (Ranks) for gender aspects

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Knowledge	Female	500	293.98	146989.00
	Male	97	324.89	31514.00
	Total	597		
Belief	Female	500	301.96	150978.50
	Male	97	283.76	27524.50
	Total	597		
Willingnes	Female	500	301.13	150563.00
	Male	97	288.04	27940.00
	Total	597		
Spiritual	Female	500	301.85	150924.50
	Male	97	284.31	27578.50
	Total	597		
Total	Female	500	300.50	150250.50
	Male	97	291.26	28252.50
	Total	597		

Table 9. Test Statistics for gender aspects

Test Statistics[a]

	Knowledge	Belief	Willingnes	Spiritual	Total
Mann-Whitney U	21739.000	22771.500	23187.000	22825.500	23499.500
Wilcoxon W	146989.000	27524.500	27940.000	27578.500	28252.500
Z	-1.630	-.983	-.697	-.920	-.483
Asymp. Sig. (2-tailed)	.103	.325	.486	.358	.629

a. Grouping Variable: Gender

The comparison results show that all components and the total are not significantly different between female and male students. Thus, the gender aspect does not affect students' level of ACS. The levels of ACS among students may not be directly affected by gender aspects. This is due to the fact that the acquisition of practical skills is primarily influenced by factors such as curriculum, teaching methods, and student engagement, which are accessible to individuals regardless of their gender. When the educational setting promotes gender equality in terms of learning opportunities and the development of practical skills, both male and female students possess an equal capacity to cultivate ACS. (Aldraiweesh & Alturki, 2023; De Prada et al., 2022; Guo et al., 2023; Hanisch & Eirdosh, 2023; Merayo & Ayuso, 2023; Qi et al., 2023; Tabassum & Nayak, 2021; Taylor, 2017; Zvavahera et al., 2023). Social, cultural, and value factors that change over time may also play a role in reducing gender differences in the development of action competencies in higher education institutions (Andersen & Smith, 2022; Balducci, 2023; Lundberg, 2020). Therefore, focusing on designing inclusive and supportive learning experiences for all students, regardless of gender, can promote the balanced development of ACS among students. The degree of spirituality in a given society, which is based on religious values, possesses a distinct quality as it is adjusted to sociodemographic conditions. This adjustment leads to minimal or even nonexistent disparities in values within countries (Shakhobiddin, 2022). However, the levels of spiritual well-being can differ within countries due to various factors, such as socio-economic and demographic characteristics (Endress, 2022). While religious well-being may drive heightened levels of spiritual well-being, there can still be variations in existential well-being among individuals (Armond et al., 2020). The cultivation of spirituality is considered to be crucial for societal advancement and can aid in addressing challenges in the economic and socio-political realms (Saleh & Vergil, 2022). Moreover, variables associated with religion can influence social capital, with greater levels of religious affiliation and prayer correlating with stronger citizenship norms (Greenfield, 2014). All in all, the intricate relationship between spirituality, religious values, and societal well-being is multifaceted and subject to variation based on the specific context and factors at play.

Spirituality is subject to the influence of culture, life values, and sociohistorical experiences in different countries (Guenther & Németh-Torres, 2016) due to the fact that these factors mold and impact individuals' comprehension and manifestation of spirituality. The foundation of spirituality lies in the values and customs of a particular country (Piedmont & Leach, 2002). Extensive research has illustrated that spirituality is a universal human encounter that surpasses religious and cultural disparities (Lomas, 2019). People's attitudes towards spirituality and religion in their daily lives can vary, influenced by their cultural background (Stefa-Missagli et al., 2020). The notion of spirituality is multifaceted and can be interpreted differently across diverse cultures, although there are shared themes, such as the sacred, contemplative practices, and self-transcendence (Lucchetti et al., 2016).

This phenomenon will naturally exhibit variation in nations characterized by a secular disposition.

Secular nations are prone to undergoing alterations in their value orientation, akin to what has been witnessed in Western Europe and North America during preceding decades (Hekmatpour, 2021). The waning significance of religious matters in society and the influence of secularization have resulted in a shift in values and attitudes within European society (Knutsen, 2009). A transition towards a more egalitarian perspective is evident in the diminishing impact of conventional religious beliefs, particularly in relation to gender values (Sen, 2009). Investigations into geographical disparities in social and political value orientations also substantiate the notion that secularization can engender transformations in value systems (Breen & Reynolds, 2011; Voicu, 2009).

Conclusion

This research provides interesting results. The accreditation score of a university or study program does not affect ACS. However, unique data shows that students from universities with C/Good accreditation have higher knowledge. Aspects of students' semester level also do not affect their ACS. Another unique thing is that students in the Java region have the highest mean rank in the willingness and spiritual components, meanwhile students in the Bali/NTT/NTB region achieve the highest mean rank compared to other regions in the knowledge component and total or all aspects. Students from Kalimantan tend to be the lowest in all aspects of ACS. It is important to note that the gender aspect does not affect students' ACS. The aspect of spirituality tends not to stand out or become a difference in this research, this could be due to the similarity of views in Indonesian society as a nation based on the belief in One Almighty God, where this is taught in the world of education and is the basis of education.

This research does not analyze based on Grade-point average (GPA), age, initial capital (from high school), status of lecturers teaching environmental science courses (educational status: master, doctor, professor; certification status: certified and not certified; teaching experience: less than five years and more than five years), and learning patterns (mode: online, offline, blended; strategy: student-centered learning or not). Some of these things are very likely to influence the level of ACS so they are very worthy of consideration in further research.

This research has implications for the future. Data or information regarding the level of competency in ACS among prospective biology teacher students in Indonesia can be the basis for implementing environmental education in teacher training colleges.

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Conflicts of Interest

The researcher declares that there aren't any competing interests related to the writing of this article.

Author of Interest

A. Rahardjanto: methodology, writing original article, review and revision; **H.Husamah:** conducting the research, collecting data, writing original article, and revision **S. Hadi:** collecting data and review**; N. Lestari:** collecting data and review.

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