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Analysis of Religious Beliefs of Pre Service Teacher in Teaching Mathematics at School

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***Abstract.** This research aims to analyze the religious beliefs of the pre service teacher. religious beliefs are measured based on scheme's Heie. His describes three integrative approaches, namely, incarnational, coexistence and coherence approaches. This research involved three pre service teacher in Institut Agama Islam Negeri (IAIN) Lhokseumawe, Indonesia, who carry out teaching practices in schools. This research is a case study. The assessment of religious beliefs was measured using a observation and semi-structured interviews. It demonstrates pre service teachers' ambition in integrating their religious beliefs into the teaching of mathematics. There were discovered various modes. Three different teaching strategies thematic, add-on, and implicit were discovered based on these three lessons. These methods were contrasted with Heie's classifications. These approaches were compared with the classifications' Heie. This result suggested that teachers' teaching of mathematics is impacted by their religious beliefs, which in turn affects their ability to help learners learn mathematics.*

***Keywords:** Analysis, Religious Beliefs, Pre Service Teacher, Teaching Mathematics*

Introduction

The Islamic campus known as PTKIN is an institution that is full of Islamic aspects, as stated in its curriculum document. PTKIN wishes to improve the order of community life; therefore, serious attention from various parties is required in implementing this curriculum. To realise this desire, the main factor that will have a direct impact on transformation is to focus on the Islamic aspect. The Islamic aspect refers to the Islamic values that integrated in mathematics learning together with spiritual values possessed by teachers and the preservice teacher. In some literature, it is known as 'religious beliefs'.

Cooling in (Topidi, 2021) interprets post-secular religious education as a matter of faith rather than knowledge, despite religious belief. Religion has a long history in human culture. However, there are subtle distinctions between religion and spirituality (Zinnbauer, B. J., & Pargament, 2005). From an educational standpoint, spiritual education can be viewed as a broader educational goal that may or may not be achieved through religious education. However, religious education is usually one of the compulsory subjects at almost all levels of education in most countries that adhere to a national religion, including education for pre service teacher.

This research was conducted at PTKIN Aceh, specifically IAIN Lhokseumawe, where these institutions are dedicated to realising the integration of religious sciences and general sciences. As a result, conducting research on this study is critical. Research on the integration of mathematics education and religious education, particularly in education programmes for pre service teacher, has not been widely conducted. Among the few studies is the work of (Chan & Wong, 2016), who raised the issue of integrating religious or spiritual education and mathematics education at the school level (primary and secondary). There are two significant studies in the context of education for pre service teacher. Woolley (2008) discusses religious education for prospective citizenship teachers in the United Kingdom. Stolberg (2008) emphasised the integration of spiritual education and science education in a primary school teacher education programme in the United Kingdom.

The purpose of this paper, which is a report on an empirical study, is to look into how pre service teacher communicate their own religious ideas to their students. We don't assume that their communications qualify as religious education or not. whatever we did, it wouldn't be our intention to suggest any strategies for incorporating religious views into the curriculum. We are completely aware that education in general—as opposed to merely religious education is a complex topic, therefore we don't want to draw hasty judgments. Just displaying the phenomenon from our empirical data is all that is required of us.

Method

A case study with a grounded theory was used to investigate the use of religious beliefs in mathematics education at PTKIN Aceh specifically the mathematics education departments at IAIN Lhokseumawe, This research will involve mathematics 3 pre service teacher The location of this study was chosen using convenience sampling, which collects data from samples that are easily accessible to researchers (Fraenkel, J. R., Wallen, N. E., & Hyun, 2011).

Participants were asked to create and implement mathematics lessons based on their religious beliefs about teaching mathematics. They are reminded that the teaching content does not have to be directly related to their religion, but that the learning design and teaching approach must be in accordance with their personal religious beliefs. The lesson plan, as well as a short paragraph explaining why lessons referring to participants' personal religious beliefs, were collected. The lesson was then carried out, observed, and videotaped by the researcher. Following learning observations, semi-structured interviews were conducted to clarify the reasons for the lesson design.

The data was analysed in two stages. In the first stage, a grounded theory approach was used. The learning process and interviews were transcribed verbatim. Different lesson teaching approaches are compared and contrasted. Interview scripts were coded with an emphasis on the

rationale for the instructional design. The theme of the resulting teaching approach coherence. The resulting approaches are then compared to the existing classification schemes in the literature in the second stage. Until our awareness, there has been no framework to classify teaching approaches associating religious beliefs, particularly Islam, with mathematics in the context of teacher education. (Heie, 2002), on the other hand, proposed a classification scheme for integrating Christian religious beliefs and mathematics learning, but only at the university level. His classification scheme is based on the Christian premise that all knowledge comes from God.

According to (Howell, R. W., & Bradley, 2001), mathematics should be taught in conjunction with other knowledge, including religious knowledge. Thus, (Heie, 2002) describes three integrative approaches: the incarnation approach, coexistence, and coherence. The incarnation approach focuses on prospective teachers' well-being and spiritual growth. The coexistence approach juxtaposes mathematical facts and religious statements with no explicit relationship. According to Heie, the third approach, namely the coherence worldview approach, is true integration. He defines a worldview as "one's comprehensive set of beliefs about the nature of reality and how one should live in light of those beliefs". As an example, he explains how he guides his students through integrative questions to investigate the nature of mathematics from a Christian perspective. This research will look at how this classification scheme can be used to describe an integrative approach in the context of prospective mathematics teachers' education and Islamic religious beliefs.

Results and Discussion

The data analysis using Heie's approach will be provided in this paper together with its results and suggestions. The paragraphs that follow include details about the results and the discussion.

Table 1. Background Information of the Participants

No	Teachers (pseudonyms)	School level
1	Andi	Dayah Darul Ulum Lhokseumawe
2	Ina	SDN 1 Blang Mangat Aceh Utara
3	Ita	MtsN 1 Aceh Utara

The collected data of the three lessons (Andi) were compared in terms of content, presentation method, the way the referring per service teacher's religious beliefs in teaching and the rationale behind. The following three approaches were identified.

Thematic Approach: Andi

The teaching materials are centered on a particular theme in lessons using a thematic approach. The lesson includes supplementary resources from other subject areas (including but not limited to religion) in addition to the necessary mathematical information so that the relationship between mathematics and religion may be clearly demonstrated.

At Dayah Darul Ulum in Lhokseumawe City, Andi teaches SPLDV in class 2. Twenty women compose the class, and they all choose to learn using the halaqah technique, which involves sitting on the carpet and looking at the instructor. Students are initially given perspective by Andi by asking if they like maths. They immediately replied that they didn't like it. Andi continued his explanation of perception by motivating people with the fact that mathematics is utilized widely in everyday life like purchasing and trading things. SPLDV is an algebraic issue, as Andi explained. Al Khawarizmi, he underlined, was the Muslim mathematician who invented algebra. It is clear that these students are more interested about their studies. With story questions,

Andi provides an illustration of SPLDV in the context of Friday alms: "Hamada every Friday gives donations of caluk noodles and sugar cane juice for a dayah." IDR 10,000.00 will buy you one caluk noodle and 4 small bottles of orange juice; IDR 45,000.00 will buy you 7 caluk noodles and 3 small bottles of orange juice. For 5 caluk noodles and 5 small bottles of orange juice, how much money will Hamada bring to the dayah? Students appeared interested when Andi described the answer to the issue since it was put out in the context of religious principles, including donations. Before arriving at the conclusion that Hamada was offering donations on that Friday for Rp. 23,000.00 for 5 caluk noodles and 5 small bottles of orange juice that would be taken to the dayah, Andi methodically set out the procedures for the solution.

Add-on approach: Ina

Both mathematical goals and religious themes are meant to be made plain in add-on approach lessons. One of these, however, is more important than the other; it is an addition. The connection between the religious and mathematical components is made suddenly; their relationship is not particularly clear. Ina adopted the ad-on approach.

Ina and her group carry out teaching practice at SDN 1 Blang Mangat. He teaches in class 6A with a total of 27 students. Ina brought fraction material; this material had been taught by their teacher before meeting us, namely in the form of introductory fraction material. Ina explained fractions by bringing media in the form of an apple to explain the illustration of fractions. Ina taught the concept of fractions by demonstrating an apple that was split into two halves.

After displaying the two half of the apple that resulted from the split, she enquired, "What would happen if one of these halves was split into two halves?" The student provided a four-part

response, and Ina further clarified the idea of fractions on the board by drawing an image of an apple. Ina also drawn a connection between religion and the fact that tahajjud, or night prayers, are held around midnight or during the third of the night, as Allah mentions in Surah Al-Muzammil verse 3. He continued by explaining that there are 24 hours in a day and night, which is why various fractional numbers, such as half a day ($1/2$), a third of the night ($1/3$), and so on, are used in this context.

He used the word "kid." In giving knowledge to the kids, he seems to be very friendly.

After introducing the idea of Ina fractions, his team separated the students into 4 groups and posed 8 questions regarding fractional numbers. Because they were motivated by the benefits in the form of prizes that would be awarded, the kids genuinely appreciated and were passionate about responding to these questions. They competed to answer the questions and wanted to gather them more quickly since they were driven by the prize, yet the ice-breaking process happened despite the noisy environment.

After explaining that they were today's students, Ina claimed that students were asking about her and her team's contact numbers. In the past, students had been asked for their home address, according to him (Ina experience). Being separated from Ina and her team caused the students to appear unhappy. Ina and her group do not speak Acehnese since they are not Acehnese, which is another crucial point to keep in mind in this situation. Therefore, there is a less favorable environment when breaking up into groups and also while explaining the topic, which should be able to stress understanding with the use of language. Ina and her group generally follow a very planned curriculum when teaching arithmetic.

Implicit approach: Ita

Religious topics were not specifically covered in lessons using the implicit approach. On the surface, it appears to be typical mathematical instruction without any religious overtones, yet the rationale of the lesson design is based on the teacher's religious beliefs.

Ita instructed a class of 30 students in class 2.5 as part of her teaching practice with her group at MTSN 1 Aceh Utara. The Pythagorean theorem is one of Ita's subjects to teach. He began the lesson by reading a prayer aloud to the students, talking to them about their readiness to learn, and checking on their wellbeing. The subject of the study and its goals were then covered by Ita. When Ita asked the students to define the Pythagorean theorem before introducing this subject, they replied, "triangle." The student replied, "don't know," when he asked how large a right angle was. Additionally, none of these students comprehend what a triangle's sides are.

After completing the material description and group formation, Ita resumed the course by explaining that Muslim scientist Thabit bin Qurra was the creator of Pythagoras. Students appear more engaged and active when working in groups and seem more enthused.

The LCD facilities were problematic, and the formation of groups was something we lacked, which impacted the learning we did. It showed out that some groups had poor communication skills, which caused them to appear still, and the majority of students could not get the main idea of the content being studied.

Many research investigations have been conducted in relation to the classification proposed by Heie's, including (Mahdalena & Nuraini, 2021); (Imamuddin et al., 2020); (Barzegari, 2014); (Abdussakir & Rosimanidar, 2017); (Snezana Lawrence, 2015); (Che et al., 2017); (Cipta & Hori, 2019); (Triana et al., 2023); (Muniri, 2016).

This study needs to be repeated, and steps must be taken to put previous research into practice. Another crucial issue is the requirement for government authority policy, particularly for the education department, to require the development of mathematics learning resources that are integrated with Islamic principles, particularly given that Aceh is an area with unique characteristics in the field of education. The government must also remind teachers to have sufficient religious knowledge or religious views in order for them to create learning situations that integrate religion. Thus, by taking this step, we will be able to teach children with noble character and emphasize the intimate connection between mathematics and religious in order to prevent knowing dichotomies.

Revisiting the three approaches

In each of the three described situations, it became clear how the participating teachers' religious beliefs were expressed in their approach to teaching mathematics. Two different enactment methods, in particular, have been made clear. On the one hand, Ita has a broad conception of implementation and regards teaching well as a religious duty. Andi, on the other hand, has a limited understanding of what constitutes enactment and has actively attempted to link religion to mathematics in her teaching of the subject. The three cases examined in this study, however, can be classified into three categories based on how they refer to religious beliefs in mathematics learning. We shall discuss these strategies once again in the sections that follow in relation to Heie's classification. The explicitness of the relationship between the subject discipline (mathematics) and religious beliefs varies throughout these approaches. Heie's classification, which was initially intended for school mathematics, largely holds true in this context.

The implicit technique, used by Ita exhibits the least overt connection of religion and math instruction among them. There was seldom any explicit religious content in their lessons.

Instead of incorporating religious substance into their (mathematics) instruction, they attempted to implicitly live out their faith. This might be viewed as fitting within Heie's "incarnational mode," which holds that the teachers "incarnated" as their performances (or Islamic personalities) in order to show their concern for and affection for the students.

The add-on strategy has poor content integration. In Ina's lessons, both the mathematical content and the religious message have been made clear. The two parts are, however, somewhat divided. This strategy is comparable to Heie's coexistence strategy.

A good content integration strategy is thematic approach. Coherence themes were supposed to be organized in Andi's lessons. Under the themes, explicit connections between mathematical goals and religious messages were made. This strategy is consistent with Heie's coherent worldview strategy, which places a focus on the explicit relationship between mathematics and religion. Islamic viewpoints on the significance of the mathematics themes were purposefully included in their lessons. This design attempted to move the teaching of mathematics from a purely technical to an epistemological perspective, therefore potentially affecting religious viewpoint. Heie's method, however, has a wider scope. It aims to "Islamize" the entire mathematics curriculum by closely tying together the epistemological principles of the two subject fields (rather than simply one particular mathematical issue). We refer to Heie's coherence worldview approach and the theme approach as local and global coherence worldview approaches, respectively, to distinguish between them.

Conclusion

The institution's major priority is the combination of spiritual and religious education with a number of academic subjects. This objective is particularly important for schools without religious education curricula. However, the literature indicates that the actual implementation is not quite equal. This is one of the few empirical studies that has looked at the intention-practice gap in schools.

We described mathematics lessons created and delivered by three teachers. The lessons were specifically created so that references to the teachers' religious beliefs were made when teaching mathematics. Thematic, add-on, and implicit teaching approaches were discovered based on these three lessons. These methods were evaluated in comparison to Heie (2002)'s classifications. It was discovered that our methodologies are largely similar, with the exception that Heie's coherence worldview approach is not as comprehensive in our study. At the level of classroom mathematics, we have suggested a potential implementation strategy for a worldview approach with greater coherence. This study also provided examples of how to implicitly incorporate religious ideas into the teaching of academic subjects when explicit religious allusion

is not encouraged. The teacher is crucial. There is always a way if the teachers are committed enough. A small improvement can make a big difference.

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