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Artful Pathways to Interreligious Understanding: Student Responses on STE(Arts)M Integration Through Maker Education in Interreligious Learning

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Abstract

Religious diversity in Austria, particularly between Muslims and Catholics, is currently receiving significant attention, especially in primary schools. As a result, we are conducting interreligious learning activities to assist students in comprehending and appreciating the teachings of different religions. To enhance the appeal of interreligious learning, we integrated it with STEAM (Science, Technology, Engineering, Arts, and Mathematics) and maker education. This study takes place in Austria. This study explores the implementation of interreligious learning through the integration of maker education and a multiple art approach at the primary school level. The study investigates students' responses across various indicators, including inter-religiousness, exploration and understanding, art through maker education, and learning progress. The findings indicate positive student responses based on the questionnaire. The study contributes to the existing body of research on interreligious learning and maker education, emphasizing the suitability of these approaches in promoting interreligious understanding, critical thinking, artistic expression, and meaningful learning. However, limitations include the small sample size and the specific educational context, suggesting the need for further research to validate and expand upon these findings in diverse settings.

Key words: *interreligious learning, maker education, multiple art approach, primary school, student responses*

Peer-reviewed article
Άρθρο με διπλή κριτική αξιολόγηση

1. Introduction

In modern education, STEAM (Science, Technology, Engineering, Arts, and Mathematics) is incorporated into schools (Herro et al., 2019; Quigley et al., 2020). The inclusion of Arts as a separate element within STEAM is becoming more prominent, as it aims to offer students aesthetic experiences in their learning journey (Hunter-Doniger, 2018). The definition of "art" has expanded beyond its conventional meaning, which typically encompassed areas like paintings, sculptures, color theory, and tangible forms of creative expression known as fine arts (Clowney, 2011). Within the context of STEAM, the term "art" has also broadened to encompass liberal arts, which has changed over time. Initially, liberal arts focused on seven disciplines: astronomy, mathematics, geometry, music, rhetoric, grammar, and dialectic (Tubbs, 2014). However, in modern education, liberal arts now include fields such as philosophy, theology, history, art, literature, and the social sciences (Cohen & Ignash, 1992; Mongrain, 2007), reflecting the evolving needs of education today.

In our research, we employed various approaches in art, including both fine arts and liberal arts, to facilitate the teaching of interreligious subjects, particularly theology (religious study) as a component of liberal arts, and various fine arts techniques such as painting and crafting. Additionally, we integrated different domains of STEAM to promote a comprehensive learning experience. It is widely acknowledged that traditional school-based learning often separates different disciplines, despite their inherent interconnectedness. Our study utilized a multi-faceted art-based approach to educate students on interreligious subjects, emphasizing an interdisciplinary and integrated approach to education.

Introducing interreligious subjects in the classroom serves several primary objectives, particularly establishing a safe and inclusive learning environment (Engebretson et al., 2010; Leirvik, 2011). Our aim in this study is to foster an open-minded atmosphere that values mutual respect and avoids judgmental attitudes. Numerous studies have been conducted in countries with diverse religions and cultures, such as Indonesia (Latifah, 2021; Zemmrich, 2020), Germany, and Austria (Kolb, 2021). Interreligious learning has positively impacted students' thinking and acceptance of differences. For instance, Weisse (2010) discovered that interreligious learning facilitates interreligious interaction and familiarity with religious diversity. However, certain challenges arise, such as teachers lacking the ability to discuss perspectives outside of their religion in the classroom (Kienstra et al., 2019; Sterkens, 2001). Briefly, considering the advantages and challenges of implementing interreligious learning, employing suitable approaches to achieve the desired goals is crucial.

To ensure the implementation of interreligious studies remains flexible, we incorporate STEAM (Science, Technology, Engineering, Arts, and Mathematics) through an art-based approach using maker education. Maker education is closely associated with the maker movement, which has emerged alongside advancements in

high technology and digital manufacturing technologies like robotics and 3D printing (Halverson & Sheridan, 2014). However, the concept of the maker movement continues to evolve and comprises three core elements: creation, maker space, and makers themselves (Kurti et al., 2014; Pei, 2018). Makers are individuals who share and disseminate knowledge by transforming ideas into reality (Pei, 2018). Beyond fostering innovation, makers can embody cultural values, attitudes, and learning styles (Pei, 2018). Integrating art and maker education creates a dynamic learning environment that combines STEAM disciplines, interreligious studies, and creative problem-solving.

We have incorporated an art-based approach into our learning methodology, where we encourage students to reconsider their perceptions of religion and express them through artistic creations. This process involves transforming their ideas into tangible works of art, which falls under the concept of *creation* within a dedicated learning environment known as the *maker space*. The outcomes of their artistic endeavors are then shared with their peers who follow different religious beliefs, aiming to foster interreligious dialogue through interreligious learning.

Integrating interreligious learning with STEAM through an art-based methodology aims to bridge students' understanding of their religion with that of others. Historically, art, as a cultural artifact, has been utilized to disseminate and symbolize religious concepts (Goldammer, 2020; Wolterstorff, 2004). Despite its historical significance, this approach is infrequently applied in contemporary religious education, which often remains inflexible. We found small studies using this art approach in religious learning (Gärtner, 2018; Mazzarello, 2007). This study highlights the critical role of art within the STEAM framework, enabling students to express their religious beliefs creatively and facilitating mutual understanding among students of different faiths.

The primary focus of our study is to examine how students respond to implementing interreligious learning within the classroom. This study addresses two research questions. The first is, "What are students' perceptions of implementing interreligious learning through various art approaches within maker education in religious studies?" This question seeks to understand students' views on the learning process. The second question examines, "Are there differences in perceptions based on demographic aspects (religion, gender, and age)?" This aims to determine if and how students' perceptions of this learning approach vary according to demographic factors. As this represents the first attempt at introducing such an approach in our school, it is a valuable reference for future implementations of similar initiatives on a larger scale. By evaluating the students' reactions and experiences, we aim to gain insights that can inform and enhance future efforts in incorporating interreligious learning in education.

2. Theoretical Background

This study explores the theoretical foundations of interreligious learning and its connection to maker education. We draw upon the research conducted by various

scholars in this field. Additionally, as we incorporate maker education into our study, we align our research with the principles of constructionism theory. In the following section, we provide an overview of the theoretical concepts of interreligious learning and constructionism theory.

2.1. Interreligious Learning

Kolb (2021) discusses three key interreligious learning concepts, as German pedagogues outlined. These concepts include adaptation to other religion-specific perspectives, interreligious competence, and trialogical learning.

The first concept was introduced by Schweitzer (2014) about concept *adaptation to other religion-specific perspectives*. According to Schweitzer (2014), interreligious learning begins with knowledge about different religious communities. It emphasizes the reflective management of pluralistic situations and goes beyond interfaith learning to include non-religious students (Kolb, 2021; Schweitzer, 2014). Schweitzer argues that this concept encompasses embracing other religious perspectives, portraying interreligious learning as an approach to engaging with unfamiliar beliefs and practices (Schweitzer, 2014).

The second concept, interreligious competence, is formulated by Schambek (2013), building upon the work of Willems (2011). Schambek (2013) defines *interreligious competence* as a combination of skills, perspectives, and attitudes necessary for engaging with religious pluralism. This competence involves the ability to differentiate oneself from others (differentiation competence) while also establishing meaningful connections with them (relationship competence) (Kolb, 2021; Schambeck, 2013; Willems, 2011).

The third concept, *trialogical learning*, was introduced by Sajak (2015) and Langenhorst (2016). They conducted interfaith learning sessions involving three religions—Jewish, Christian, and Islamic—where constructive conversations were held to explore life practices. *Trialogical learning* aims to foster understanding, respect, and appreciation among participants (Kolb, 2021; Langenhorst, 2016; Sajak, 2015). The selection of these religions is based on their theological similarities in belief in one God, facilitating the concept of convivence (Kolb, 2021; Langenhorst, 2016; Sajak, 2015). Convivence emphasizes perceiving without appropriating, acknowledging differences, and developing an understanding of other religions (Kolb, 2021; Langenhorst, 2016; Sajak, 2015).

When examining the three concepts, the underlying focus is understanding and respecting other religions. This aspect is directly relevant to our study, as we aim to design an interreligious learning approach that enables students to comprehend other religions and appreciate the differences that arise through this understanding.

2.2. Constructionism Theory as a Basis of Maker Education

Constructionism theory serves as the foundation for maker education, aligning with the principles of constructivism (Hughes & Kumpulainen, 2021; Pei, 2018). Seymour Papert initially introduced this theory, which asserts that students are active creators of knowledge, aligning with constructivism (Papert, 1980). However, constructionism differs in some aspects, emphasizing students constructing tangible, external, and shareable artifacts using detailed materials to build their knowledge systems (Papert, 1980).

Constructionism encompasses fundamental ideas that underpin maker education. Firstly, it prioritizes student-centered teaching, where students actively construct knowledge instead of passively receiving information (Papert, 1980). Secondly, it emphasizes teaching in real-life situations, enabling students to utilize appropriate resources to support their learning. Leveraging modern resources is crucial for creating more authentic learning experiences (Papert, 1980). Thirdly, collaboration plays a significant role in learning (Papert, 1980). Knowledge construction is enhanced through the sharing of collective thinking. The theoretical underpinning of constructionism provides strong evidence for learning behaviors within maker spaces. In maker spaces, students can develop new knowledge by building upon existing knowledge and experiences through collaboration (Papert, 1980). These spaces provide a conducive environment for students to share knowledge and construct knowledge systems.

Concerning our study, this theory is relevant when students create art forms representing aspects of their religion. Furthermore, collaboration through dialogue and exchange aligns with this theory. The combination of interreligious learning and maker education represents a novel approach to teaching interreligious concepts within the classroom.

3. Method

3.1. Study Contexts

This research represents our ongoing investigation into the design of maker education in primary schools. In this study, we implemented design-based research that consists of three parts: 1) analysis and exploration; 2) design and construction; and 3) evaluation and reflection (Van den Akker et al., 2006). This study is part of the analysis and exploration. The research was conducted within a primary school located in Linz, Austria, involving three classes: Grade 2, Grade 3, and Grade 4. Two religious teachers from the school facilitated the interreligious learning process. The participants in this study are students enrolled in religious subjects. Meanwhile, students not affiliated with a religious community usually do not participate in this class, so the religious subject only consists of Muslim and Catholic students. Consequently, the study focuses solely on students engaged in religion classes.

The choice of design-based research (DBR) aligns with its goal of refining interventions and understanding design principles (Van den Akker et al., 2006). This study aims to develop a STEAM learning design for religious education, necessitating an iterative cycle to inform future STEAM-based maker education designs in classroom settings. Currently, this study represents the initial phase of DBR, namely analysis and exploration, laying the groundwork for subsequent design and implementation stages. Given the absence of prior studies on this topic within religious education, this pilot study provides a preliminary framework. Student perceptions gathered at this stage will inform the format and content of future learning instruments.

3.2. Participants

The primary participants in this study were 111 primary school students, consisting of 61 males and 50 females. A detailed description of the overall participant data is provided in Table 1. The participants engaging in interreligious learning were a mix of Muslim and Catholic students. Furthermore, the participants included students from different classes and age groups, categorized into three groups: 8–9 years old, 10 years old, and 11 years old. The sampling method employed in this study is purposive sampling (Campbell et al., 2020), meaning the samples were selected based on the researchers' criteria. The participants chosen are students actively engaged in religious classes. It is important to note that students not involved in religious classes and not affiliated with any specific religious community were not included as participants in this study.

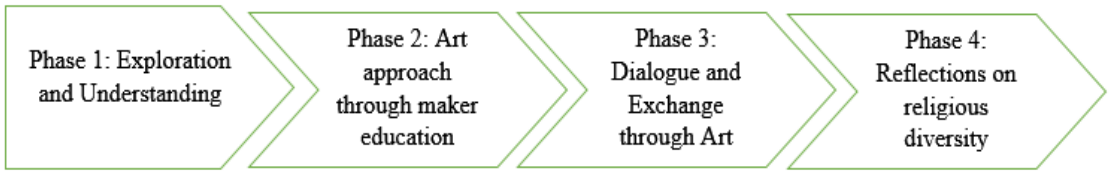
Table 1
Information of Participants

	Frequency	Percentage
Gender		
Male	61	54.05%
Female	50	45.95%
Religion		
Islam	87	78.38%
Catholic	24	21.62%
Age		
8–9 Years	59	53.15%
10 Years	42	37.83%
11 Years	10	9.02%

3.3. Implementation of Learning

This study's implementation of interreligious learning was structured into four distinct learning phases. These phases were inspired by the work of Kolb (2021), who explored various applications of interreligious studies in Germany and Austria. However, we employed an art-based approach by integrating maker education principles (Hsu et al., 2017; May & Clapp, 2017) to cater to primary school children more efficiently. The overall structure of the learning phases we designed is visually depicted in Figure 1.

Figure 1
Implementation of Learning



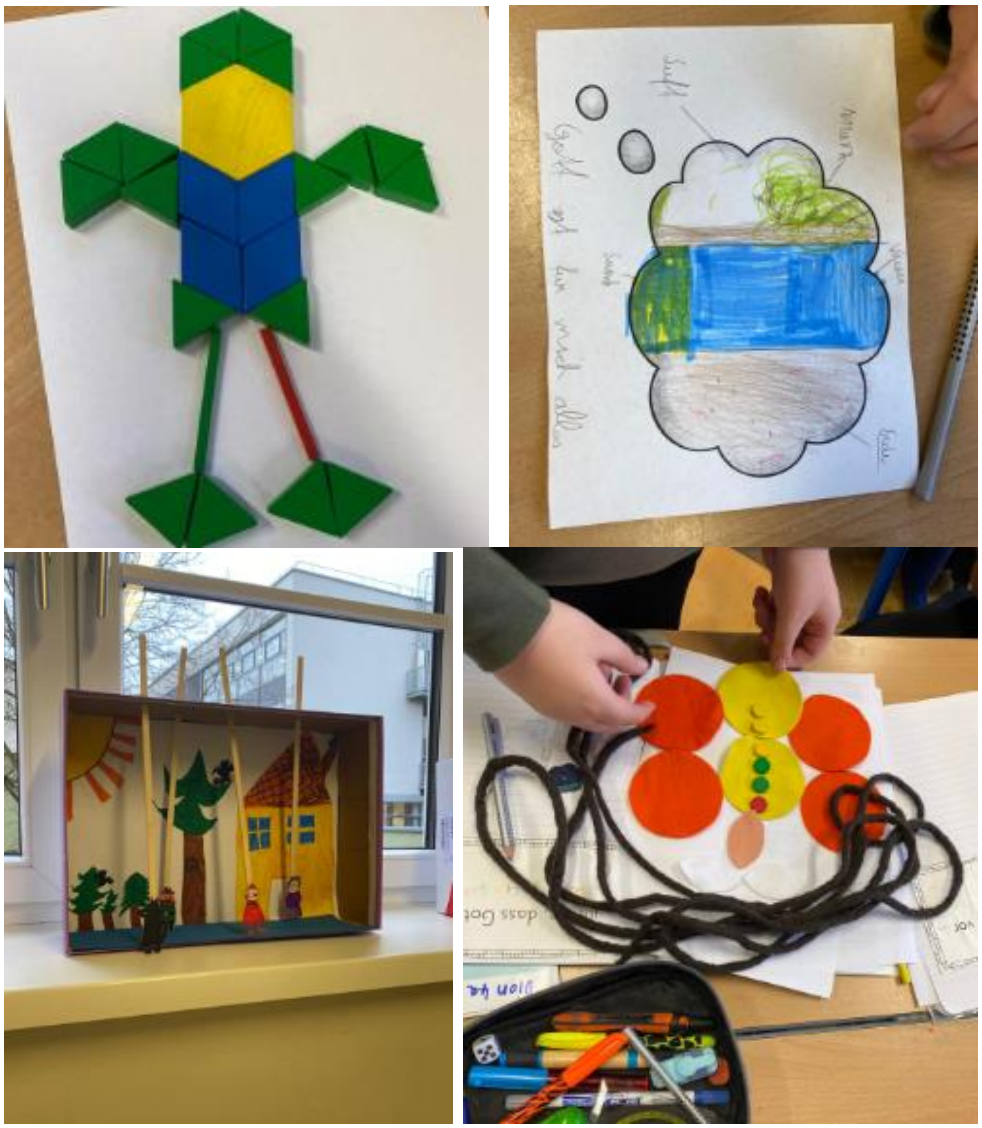
In the initial phase, referred to as the exploration and understanding section, students are collectively engaged in research, reading, and discussions about different religions. At this stage, students are encouraged to formulate questions and contemplate potential answers, aiming to cultivate their identities as researchers and philosophers. These questions are saved for later use in subsequent stages.

Equipped with their self-generated questions, the second phase employs an art-based approach within the framework of maker education. Students are tasked with visually representing the answers to their questions through various art forms. This study incorporates several mediums, including paper puppets, geometric shapes, crafting with objects, and painting (see Figure 2). These artistic creations will be utilized in the following phase.

The third stage revolves around dialogue and exchanges through the art medium. Students belonging to different religious backgrounds are grouped. Within these groups, they engage in dialogues centered around the questions they formulated initially, sharing and presenting their artwork. Group members offer diverse perspectives on the questions stemming from their religious backgrounds. Additionally, they describe the questions they formulated and the art forms they produced.

The subsequent stage involves reflection. During this phase, students reflect upon their understanding of other religions. Furthermore, they are encouraged to apply their experiences from the interreligious learning process to practice tolerance and mutual respect among different religions within the school and community environments.

Figure 2
Implementation of Learning



3.4. Data Collection

Data collection was conducted following the completion of the learning implementation, utilizing a questionnaire featuring a Likert scale ranging from 1 to 5. The questionnaire sheets were developed based on a comprehensive literature review about the theoretical concept of interreligious learning and multiple studies exploring the implementation of interreligious learning (Horga, 2009; Kolb, 2021; Mercier, 2023). Furthermore, various aspects of maker education were incorporated into the questionnaire (Hsu et al., 2017; May & Clapp, 2017). A detailed description of the questionnaire can be found in Table 2. Prior to administering the questionnaire, content validation and face validation were performed by experts and linguists to

ensure that the developed questionnaire did not lead to misinterpretation among the students. In each statement, we give a code in the form of an abbreviation, as in the inter-religiousness indicator, we give the code I, and then the number is a serial number. This code is used later in the results section.

Table 2
Statement Items in Questionnaire

No	Indicator	Statement item(s)
1	Inter-religiousness	• I was able to have good conversations with children of other religions. (I 1) • The two religious teachers agreed and did not contradict each other. (I 2) • I can also reflect on my religion with children of a different religion. (I 3) • Differences between religions were also discussed. (I 4)
2	Exploration and Understanding	• I can explain what a researcher/scientist/philosopher is. (E 1) • I can ask questions. (E 2) • I can make predictions (E 3) • I can read and think independently (E 4) • I can verify my prediction (E 5)
3	Art through maker education	• I can engage in discussions with the teachers. (A 1) • I can express my own opinions in class. (A 2) • I was not criticized when I worked creatively. (A 3)
4	Learning progress	• I have learned something through this type of teaching. (L 1) • I have found these lessons meaningful. (L 2)

3.5. Data Analysis

Data analysis involved examining the collected questionnaire data, whereby we computed the percentages for each item based on the responses provided by the students. Descriptive statistics were employed to analyze the data, enabling us to determine the percentage distribution of answers for each statement item included in the questionnaire (Chakrabartty, 2014). This approach allowed us to understand the students' perceptions and responses to the interreligious learning experience. We summarized and presented the overall patterns and trends observed in the students' feedback using descriptive statistics.

In addition to conducting descriptive analysis, we performed inferential analysis on the questionnaire data to address the research questions concerning differences in

perceptions based on student demographics. We utilized independent sample t-tests and ANOVA (Ross & Willson, 2017; Sedgwick, 2010), depending on the number of groups. For religious and gender groups, we applied independent sample t-tests, while for age groups, we employed one-way ANOVA. The demographic grouping was based on participant information, categorizing religious groups into Muslims and Catholics, gender groups into male and female, and age groups into 8-9 years, 10 years, and 11 years.

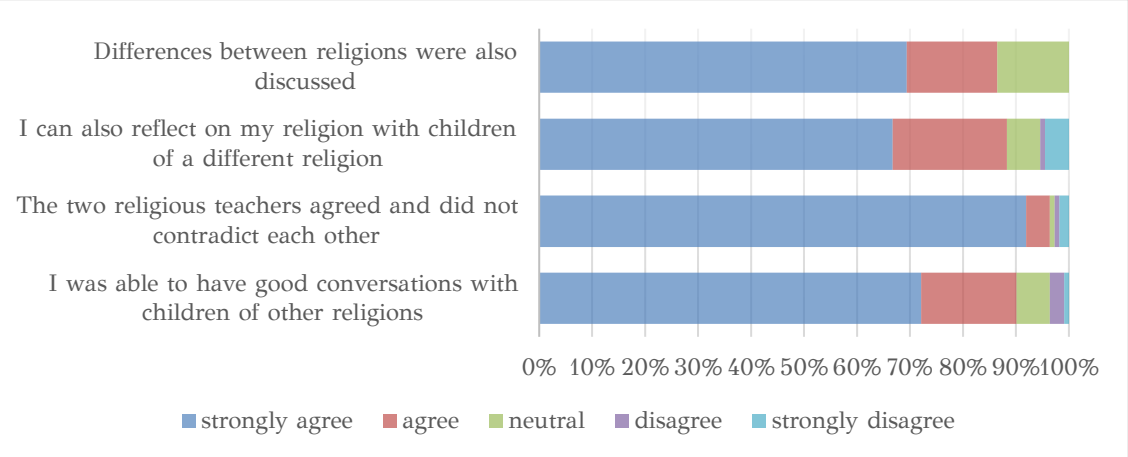
4. Results

The results section presents the percentage of questionnaires completed for each indicator, as depicted in Table 2. This section encompasses four discussion areas: inter-religiousness, exploration and understanding, art through maker education, and learning progress.

4.1. Inter-religiousness

The inter-religiousness indicator includes four statements within the questionnaire that pertain to student interactions, teacher involvement, interreligious discussions, and reflections on interreligious experiences. Figure 3 illustrates the outcomes for each statement, revealing relatively consistent results across all areas. Notably, over 60% of students expressed strong agreement with each statement. The highest percentage was observed concerning religious teachers, with 91.9% of students strongly agreeing. On the other hand, the reflection component had the lowest percentage, with 66.7% of students indicating strong agreement. Furthermore, a substantial portion of students agreed to the second position in each statement. For instance, in the reflection statement, 21.6% of students agreed. It indicates an overall positive response from students regarding the inter-religiousness aspect.

Figure 3
Percentage of Questionnaire Answers Related to Inter-religiousness

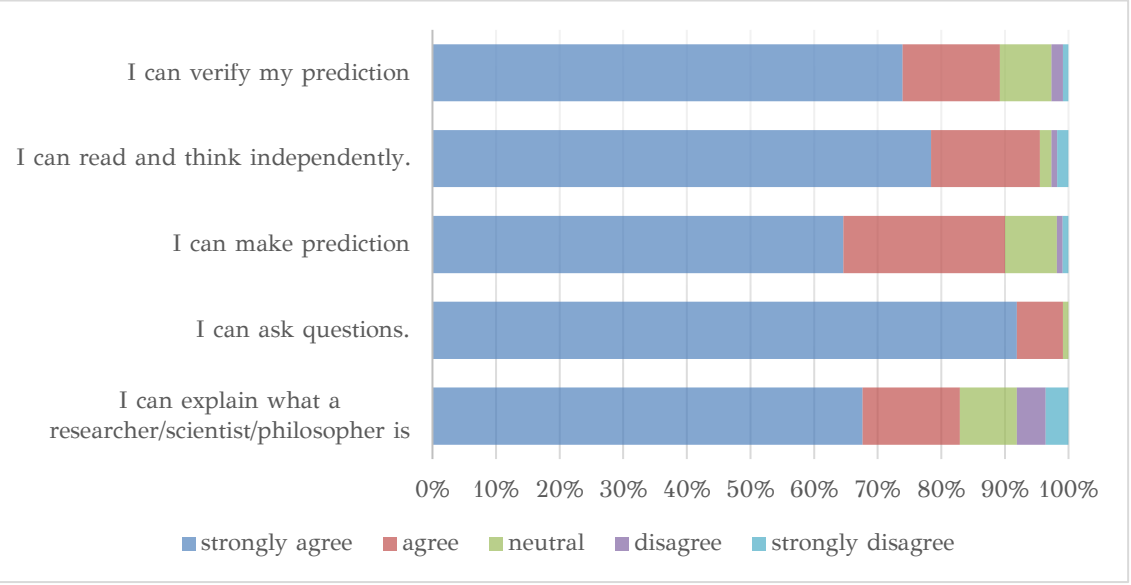


4.2. Exploration and Understanding

One of the stages involved in implementing interreligious learning is analysis and exploration, where students are tasked with conducting research, reading, and engaging in discussions on different religions. Students are encouraged to formulate questions and contemplate potential answers during this stage. These aspects were reflected in the questionnaire statements. Similar to the findings in the previous indicator, a significant percentage of students strongly agreed with the statements, ranging from 64% to 91.9%. Additionally, 7.2% to 25.2% of students provided an agreed response (Figure 4). Overall, the statements within this indicator received a positive response from students.

Figure 4

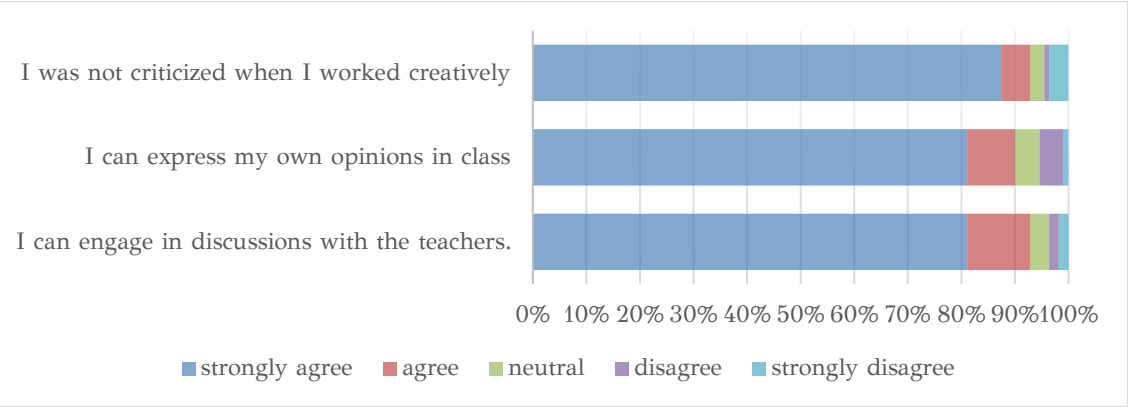
Percentage of questionnaire answers related to exploration and understanding



4.3. Art through Maker Education

This indicator focuses on how students respond to various art approaches used in maker education to represent interreligious learning and facilitate dialogue and exchange. The questionnaire assesses student responses regarding discussions with teachers, expressing opinions, and engaging in creative work. The results obtained from the questionnaire indicate a high level of positivity, with the percentage of students strongly agreeing exceeding 80% for each statement item. The range of strongly agreed responses falls between 81.1% and 87.4% (Figure 5). These findings demonstrate that students responded positively to implementing multiple art approaches through maker education.

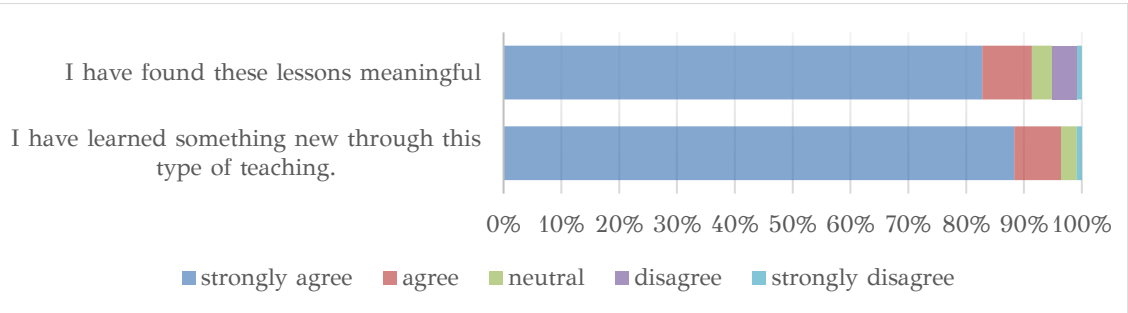
Figure 5
Percentage of Questionnaire Answers Related to Art Through Maker Education



4.4. Learning Progress

The learning progress indicator pertains to students' overall perceptions of their learning experience. It encompasses their experiences in acquiring new knowledge and engaging in meaningful learning. Similar to the previous indicator, the questionnaire responses for each item in this indicator demonstrate a very positive trend. The percentage of students who strongly agreed with each statement item exceeds 80%, ranging from 86.5% to 88.3% (Figure 6). It indicates that most students believe they have learned something new and have experienced meaningful learning throughout the interreligious learning process.

Figure 6
Percentage of Questionnaire Answers Related to Learning Progress



4.5. Comparison of Student Perceptions Based on Demographics

Following the descriptive analysis of the questionnaire responses, we conducted inferential statistical tests to explore differences in student perceptions based on demographics. As detailed in the methods section, our study focused on variations by religion, gender, and age. We utilized independent sample t-tests for religion and

gender comparisons and one-way ANOVA for age comparisons. The significant results of these tests are presented in Table 3. Abbreviations such as I1 in the table refer to specific statements outlined in Table 2 of the methods section.

Table 3
Difference of Student Perception by Religion, Gender and Age

	Difference by religion[o]	Difference by gender[o]	Difference by age[oo]
I1	0.190*	0.168	0.461
I2	0.698	0.367	0.210**
I3	0.376	0.927	0.029[a]
I4	0.445	0.133*	0.118**
E1	0.073*	0.911	0.139
E2	0.546	0.369	0.644
E3	0.397	0.699	0.479
E4	0.272*	0.544	0.574
E5	0.080*	0.479*	0.922
A1	0.001*[a]	0.766	0.021**[a]
A2	0.268*	0.723	0.016**[a]
A3	0.731	0.385	0.899
L1	0.002*[a]	0.381	0.740
L2	0.051*	0.304*	0.138**

[o] : analyzed with an independent sample t test because it has two independent sample groups

[oo] : analyzed using one way anova because there are more than two sample groups

* : analyzed using Mann-Whitney because the data is not homogeneous

** : analyzed using Kruskal Wallis because the data is not homogeneous

[a] : there are mean differences between groups

Based on the analysis results, it was found that not all data for each statement were homogeneous. Non-homogeneous statements were marked with an asterisk. We used non-parametric analysis for these statements: Mann-Whitney tests for data with two groups (coded *) and Kruskal-Wallis tests with more than two groups (coded **).

Perceptions were considered significantly different if the significant value was less than 0.05. Most data showed a significant value greater than 0.05, indicating no significant difference, except for a few marked statements (marked with [a]).

In the religious groups, significant differences in perceptions were observed for statements A1 and L1. A1 pertains to student engagement in discussions with the teacher, while L1 relates to students' perceptions of their learning outcomes. No significant differences were found in any statements for the gender group. Significant differences appeared in statements I3, A1, and A2 for the age group. I3 concerns students' experiences reflecting on their religion alongside other religions; A1 relates to engaging in discussions with teachers; and A2 involves expressing opinions in class. The small number of significant differences suggests that student perceptions vary in only a few aspects. Despite this, the descriptive analysis showed that most students responded positively, with most strongly agreeing with each statement.

5. Discussion

Interreligious learning is a relatively nascent area of study, with limited existing research in this field. Most previous research has primarily focused on interreligious studies within the high school or higher education settings (Ali et al., 2021; Dahl et al., 2023; Gill, 2016; Latifah, 2021; Rockenbach et al., 2018). Introducing interreligious learning at the primary school level is still relatively uncommon, although a few studies have explored its implementation in primary schools (Kim, 2017; Sterkens, 2001). However, these studies have predominantly emphasized facilitating dialogue to foster understanding and bridge student differences. The integration of STEAM, particularly art, and the application of maker education within the dialogue process have yet to be extensively explored, making our study unique in its approach. As our study is in its early stages, we discuss this section of the discussion by comparing it to several existing studies that have yet to be implemented in primary schools.

The first aspect addressed in the questionnaire pertains to inter-religiousness, which encompasses understanding, respecting, and engaging with multiple religious traditions or beliefs (Horga, 2009; Mercier, 2023). The questionnaire items are designed to gauge students' perceptions of their involvement in interreligious learning, including their communication with students of different religions and their interactions with teachers. The results indicate that students' responses are highly positive, with most strongly agreeing with the statements. One key focus in several items is the communication between students regarding interreligious discussions. Students demonstrated a strong ability to reflect on their religion compared to others and engage in meaningful discussions about the differences that arise. This finding aligns with Rockenbach's (2018) research, which showed that the discussion process in interreligious learning among university students positively impacted their acceptance of differences and other worldviews. Reflection is particularly relevant, enabling students to develop interfaith perceptions within their immediate

environments (Moyaert, 2018). Thus, the exchange of perspectives between students in our study facilitated a positive response to interreligious learning.

Furthermore, students' perception of the teacher was examined within the inter-religiousness indicator. The questionnaire included statements assessing whether the two religious teachers did not present contradictory information. Most students agreed with the statements, indicating the importance of coherence among teachers in interreligious learning. This finding is consistent with Goldburg's (2010) assertion that teachers should foster critical dialogue, promoting self-understanding and supportive attitudes among students in understanding religious diversity. Tabroni et al. (2022) also emphasized the role of teachers in instilling respect and tolerance among students. The positive response from students regarding the teacher's perception in our study suggests that the teachers effectively managed the interreligious learning environment and implemented appropriate instructional strategies.

The subsequent indicator focuses on exploration and understanding, highlighting how students manage their knowledge of other religions through reading, exploration, questioning, and predicting. These steps aim to cultivate students' philosophical and systematic thinking skills, enabling them to approach interreligious learning as scientists and researchers. Existing studies have emphasized the importance of these stages, as they encourage students to formulate informed and well-grounded questions during exchanges and discussions rather than relying on unfounded assumptions about other religions (Harris, 2018; Peace, 2020). Furthermore, it has been suggested that this approach helps prevent prolonged and passionate debates during interreligious learning discussions (Syeed, 2020). The positive outcomes in this section indicate that students respond positively to the exploration and understanding stages, both within their religion and concerning other religions.

The art through maker education indicator examines students' responses as they engage in creative art-making activities within the framework of maker education, where they represent their answers to the questions posed. For instance, students may visually depict the concept of God or symbolically represent their religion through their artistic creations. While limited literature specifically discusses maker education's use in interreligious learning, maker education within the broader context of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education is closely connected to artistic expression (Hsu et al., 2017). Artistic experiences within maker education can profoundly impact the learning process (May & Clapp, 2017). The emphasis of maker education in our study is not solely on the technology employed but on how students express their thoughts and effectively communicate them within an interreligious context. One study stated that the dialectical role of culture and social context within maker education could play a transformative role for students (Hughes & Kumpulainen, 2021). The responses from students in the questionnaire demonstrate that when they are allowed to express their thoughts creatively through art, they feel fully supported in their learning journey.

The final aspect examined in this study is the indicator related to learning progress. It assesses how students perceive their learning experiences, specifically in acquiring new knowledge and finding meaning in their learning process. The responses from students in this indicator also indicate a positive trend, with a predominance of strongly agree responses. This encompasses two dimensions: maker education's methodical application and interreligious learning's content-related aspects. Previous studies have highlighted that maker education aligns with the principles of meaningful learning, as it encourages students to create and imbue their creations with personal meaning (Chiu, 2022; Patton & Knochel, 2017). In our study, the meaning-making process relates to the goals students set for their artistic creations, particularly in interreligious studies and their aim to disseminate their religious perspectives to students from different faiths. From a content perspective, interreligious learning is inherently meaningful, as it promotes acceptance of human differences by fostering knowledge about other religions and nurturing tolerance (Court & Seymour, 2015). Consequently, students' learning progress is positively influenced, indicating they acquire new knowledge and find their learning experiences meaningful.

The differences in perceptions revealed minor variations between groups based on religion and age, as outlined in Table 3. In religious groups, these differences were evident in student engagement during discussions with teachers and in perceptions of learning insights gained. While previous research has not highlighted perception differences based on religious groups in interreligious learning, these findings underscore the need to address the unequal engagement in teacher-student discussions. This ensures all students receive equal attention and participation. The variation in learning insights suggests that effective interreligious education requires long-term implementation and clear objectives, aligning with previous findings highlighting the challenge of providing diverse insights in such learning environments (Berling, 2020; Sterkens, 2001). These differences serve as valuable reference points for refining learning objectives to accommodate all students better.

Age-related differences in perception were notable, particularly in statements about reflecting on one's religion with others, engaging in discussions with teachers, and expressing opinions in class. This may be attributed to the primary school setting of the study, where students' exposure to religious diversity is still developing, contrasting with previous studies conducted at the high school and higher education levels (Ali et al., 2021; Gill, 2016). These findings emphasize the need to consider these aspects in future designs of interreligious learning programs. Additionally, the integration of STEAM is in its early stages and remains underexplored, which may contribute to students' lack of focus. Incorporating art elements into religious learning is a novel approach, requiring further refinement to enhance effectiveness.

In summary, most students responded favorably across all indicators, as evidenced by the high proportion of strongly agreed responses. This indicates that students have positively engaged with interreligious learning through integrating maker education using multiple art approaches. The findings of this study contribute to the existing body of research on interreligious learning and maker education, further supporting

the effectiveness of these approaches in fostering interreligious understanding, nurturing critical thinking skills, encouraging artistic expression, and facilitating meaningful learning experiences. The positive outcomes observed in this study can serve as a valuable reference for future implementations of interreligious learning and maker education in diverse educational contexts, promoting inclusivity, empathy, and constructive dialogue among students from various religious backgrounds.

6. Conclusion

In conclusion, this study explored the implementation of interreligious learning through the integration of maker education using a multiple-art approach. The findings indicate that students responded positively to this innovative educational approach, reflected in their high agreement levels across various indicators. The positive responses observed in inter-religiousness, exploration and understanding, art through maker education, and learning progress suggest that students engaged actively, developed interreligious understanding, and found meaning in their learning experiences.

By introducing interreligious learning at the primary school level, this study extends the scope of research in this field, which has predominantly focused on higher education settings. The integration of maker education and art allowed students to express themselves creatively and facilitated dialogue and exchange of perspectives among students from different religious backgrounds. The positive outcomes observed in this study align with previous research on interreligious learning and highlight the effectiveness of incorporating maker education and art as transformative tools in promoting interreligious understanding, critical thinking, and empathy.

While this study contributes valuable insights, it has limitations. A potential area for improvement of the study is the reliance on a single data collection method. While questionnaires provided quantitative data on students' perceptions, the study could have benefited from including qualitative methods to gain deeper insights into students' experiences, emotions, and learning processes. Furthermore, the study primarily focused on students' perspectives and did not extensively explore the impact of interreligious learning and maker education on teachers or the broader school community. Future research could consider investigating the perceptions and experiences of teachers and the wider school community to better understand the benefits and challenges of implementing interreligious learning and maker education. Future research should replicate and expand upon these findings in diverse settings, encompassing a larger and more diverse student population. Additionally, incorporating qualitative methods such as interviews or focus groups could provide deeper insights into students' experiences and perspectives.

In conclusion, the positive student responses to interreligious learning with maker education through a multiple art approach support its potential for fostering inclusivity, empathy, and dialogue among students of different religious backgrounds.

This study underscores the importance of incorporating innovative educational approaches to promote interreligious understanding and meaningful learning experiences. By embracing such approaches, educators and policymakers can create a more inclusive and harmonious society where individuals respect and appreciate religious diversity.

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