

## ENHANCING HALAL AWARENESS AND SCIENTIFIC LEARNING THROUGH A CROSS-CULTURAL COMMUNITY ENGAGEMENT BY CULTURALLY INFORMED UNIVERSITY SCIENCE EDUCATORS ON NATURAL HERBAL SOAP-MAKING AMONG THAI SCHOOL STUDENTS

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### ABSTRACT

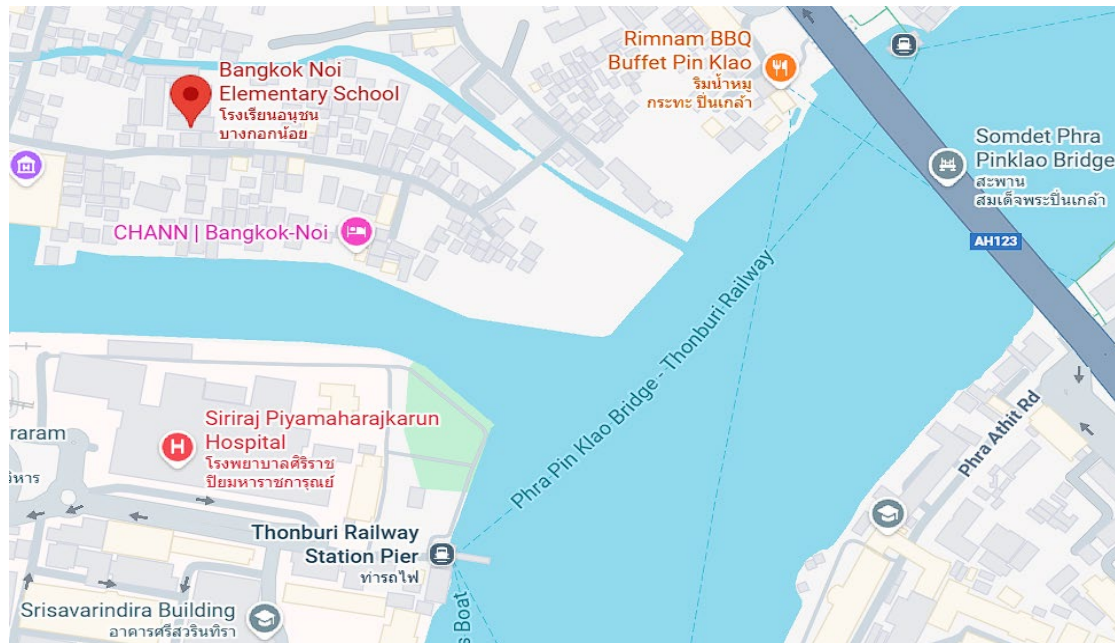
School-based health education provides an important platform for promoting halal, hygiene, cultural understanding, and healthy practices among young learners. This study reports a cross-cultural community engagement by the International Islamic University Malaysia (IIUM), Mahidol University, and Bangkok Noi Elementary School, Bangkok, Thailand focusing on halal-based hygiene education through natural herbal soap-making. *Materials and Methods:* A one-day interactive workshop was conducted involving 32 students aged 12–17 years. The programme combined short lectures, demonstrations, and hands-on soap-making activities. A pre- and post-test design assessed changes in knowledge of halal concepts, natural ingredients, and soap formulation. Quantitative data were analysed using descriptive statistics and the Wilcoxon signed-rank test. *Results:* Participants' mean knowledge scores improved significantly from  $1.72 \pm 0.77$  (pre-test) to  $3.36 \pm 0.81$  (post-test) ( $p < 0.001$ ,  $r = 0.82$ ). Qualitative feedback indicated that 93.8% of students enjoyed the activity, while 87.5% would recommend it to peers. *Conclusion:* The programme effectively enhanced students' understanding of halal-based hygiene and natural product formulation while promoting intercultural appreciation. The IIUM–Mahidol collaboration demonstrates the potential of Shariah-informed community engagement in strengthening health education and halal awareness.

**Keywords:** *halal, herbal soap, traditional medicine, health promotion, science education*

## 1. INTRODUCTION

The concept of *halal* is not only a religious obligation but also a framework of ethical, hygienic, and sustainable practices derived from Islamic jurisprudence (*fiqh*). It embodies both lawful (*halal*) and wholesome (*tayyib*) principles that govern consumption and production (Al-Qaradawi, 1997; Rahman et al., 2024). It also emphasises quality, safety, hygiene and ethical conduct that go beyond consumption and production (Musaddad et al., 2023). While awareness of halal concepts in food is increasingly widespread, understanding of halal assurance in non-food products such as toiletries, cosmetics, and soaps remains, generally underdeveloped (Nor Zaidi et al., 2023), especially among non-Muslim communities (Ramli et al., 2023). This gap in understanding highlights the need for education that integrates Islamic values with scientific and cultural learning (Ab Rahman et al., 2025; Desfita et al., 2024).

The Kuliyyah of Allied Health Sciences (KAHS, IIUM)– Siriraj Center of Applied Thai Traditional Medicine (Si-CATTM, Mahidol University) Joint Community Engagement 2025 was designed to bridge this gap through a halal herbal soap-making programme conducted at Bangkok Noi Elementary School, Thailand. The school is a private Muslim school located across the river from the Siriraj Center of Applied Thai Traditional Medicine (Si-CATTM), Siriraj Hospital Mahidol University, Bangkok.



**Figure 1.** Location of Bangkok Noi Elementary School across the river from Siriraj Piyamaharajkarun Hospital, Mahidol University, which houses the Siriraj Centre of Applied Thai Traditional Medicine (Si-CATTM) in Bangkok, Thailand. (Source: Google Maps).

This initiative aligns with IIUM’s mission of Islamisation of human knowledge and the advancement of community-based Malay traditional medicine, and Mahidol University’s vision of advancing community-based Thai traditional medicine. Both traditional Malay and Thai medicines have long utilised plant-based ingredients for hygiene, healing, and spiritual wellbeing with the use of flowers, fragrance, and oils for cleansing and dermatological treatment. (Deraseh et al., 2023; Wisetkomolmat et al., 2019) It also embodies the *Maqasid al-Shariah* principle of preserving health (*hifz al-nafs*) and cleanliness (*taharah*), both of which are central to Islamic ethics.

In addition, this engagement demonstrates how fatwa-based guidance, such as rulings on permissible materials and transformation (*istihalah*), can be translated into practical science education. By using halal-certified natural ingredients and incorporating discussions on purity, ethics, and environmental sustainability, the programme exposes students to a holistic worldview in which science and faith coexist harmoniously.

Thus, this paper presents a cross-cultural community engagement programme that not only enhances scientific literacy but also strengthens students’ awareness of halal principles through experiential learning. It explores how Shariah-informed educational design can cultivate intercultural

understanding, ethical sensitivity, and appreciation of halal practices among young learners in a non-Muslim-majority setting.

## 2. LITERATURE REVIEW

The concept of *halal* encompasses more than dietary permissibility; it extends to all aspects of consumption, production, and lifestyle. According to Al-Qaradawi (1997), the principle of *halal and tayyib* ensures that products are not only lawful but also beneficial, safe, and ethically sourced. This comprehensive scope is reflected in contemporary fatwa institutions, including Malaysia's *Jabatan Kemajuan Islam Malaysia (JAKIM)* and Thailand's *Central Islamic Council (CICOT)*, which emphasize halal assurance in both food and non-food sectors (CICOT, 2015; Halal Malaysia Portal, 2023; Najla & Huda, 2025).

In recent years, halal personal care products such as soap, shampoo, and cosmetics have attracted growing attention. Studies by Aziz and Chok (2013) and Talib et al. (2016) highlight that consumer confidence in halal certification is strongly linked to perceived purity and ethical integrity. However, research on halal awareness remains limited in both Muslim and non-Muslim-majority societies (Alam et al., 2025; Harun et al., 2022; Saleh & Rajandran, 2025). The inclusion of soap and hygiene products within halal education provides an entry point to discuss *taharah* (purification) and ethical consumerism (Tukiran & Ahmad Anuar, 2022). These concepts are rooted in Islamic jurisprudence and discussed extensively in classical *fiqh* works such as *Al-Majmu'* and *Nihayah al-Muhtaj*.

Several fatwas have clarified the permissibility and requirements for cosmetic and hygiene products. The *Fatwa Committee of the National Council for Islamic Religious Affairs Malaysia* (2012) ruled that the use of soap derived from non-halal animal sources is impermissible if transformation (*istihalah*) cannot be proven. Similar views have been echoed by the European Council for Fatwa and Research (ECFR, 2013), stressing that the use of impure substances is not allowed unless chemically transformed into a new substance. These rulings underscore the need for awareness of halal compliance in production and education, even in non-Muslim-majority contexts.

From an educational perspective, integrating halal awareness into science learning aligns with the Islamisation of knowledge agenda promoted by IIUM (Al-Attas, 1980; Hashim & Rossidy, 2000). Experiential learning through hands-

on activities, such as soap-making, bridges scientific inquiry with Shariah-based values. Prior community engagement models (Baehaqi et al., 2024; Rosli et al., 2023) have shown that integrating cultural and religious content in Science, Technology, Engineering and Mathematics (STEM) education and halal awareness enhances ethical sensitivity and appreciation of diversity. For example, in Malay traditional medicine plants such as *Curcuma longa* (turmeric) and *Cymbopogon citratus* (lemongrass) are commonly used in traditional bathing preparations and skin treatments. These practices are documented in classical Malay medical manuscripts (Mat Piah, 2019) and continue to influence contemporary herbal product development.

Therefore, this study situates halal-based soap-making as a Shariah-informed educational approach that promotes halal awareness, environmental stewardship, and intercultural understanding. It contributes to the broader discourse on fatwa implementation in daily life, highlights the role of universities as agents of *da'wah bil hal* and demonstrates Islamic ethics through practical, community-based education.

### 3. METHODOLOGY

#### 3.1 Programme Design

The programme adopted a participatory workshop model integrating short lectures, demonstrations, and hands-on practice. It was co-organised by the Malay Medicine Research Unit and the Biomedical Science Department, Kulliyah of Allied Health Sciences (IIUM), with coordination and local assistance provided by the Siriraj Center of Applied Thai Traditional Medicine (Si-CATTM), Mahidol University. The half-day session (9:00 a.m.–12:00 p.m.) was structured to maximise interactive learning within limited time. The herbal ingredients used in the soap formulation were selected based on their historical use in Malay and Thai traditional medicine for skin care and hygiene. For example, turmeric and lemongrass have long been used in traditional Malay herbal baths (*mandi herba*) due to their antimicrobial and aromatic properties (Abdul Aziz et al., 2023; Ismail et al., 2018).

#### 3.2 Participants

A total of 32 students (aged 12–17 years) from Bangkok Noi Elementary School participated. Students were grouped to ensure peer support and equal participation. Faculty members from both universities served as facilitators, assisted by translators to overcome language barriers.

### **3.3 Workshop Procedure**

The event began with an opening session introducing the objectives of the programme, showing IIUM's corporate video, and a short briefing on halal concepts and natural ingredients. Each group was guided by a facilitator through the following stages:

- i. Introduction and Pre-Workshop Questionnaire: Participants completed a simple pre-test assessing their baseline knowledge of halal concepts and soap ingredients.
- ii. Demonstration: Representatives from the universities demonstrated the halal herbal soap-making process.
- iii. Hands-On Activity: Students prepared their own soap bars using pre-measured natural ingredients under supervision.
- iv. Discussion and Feedback: Facilitators explained the function of herbal components, and students shared reflections.
- v. Post-Workshop Questionnaire: The same assessment was administered to measure knowledge improvement.
- vi. Closing and Prize Ceremony: Certificates and small gifts were presented to the best groups.

### **3.4 Data Collection and Analysis**

Quantitative data from pre- and post-workshop questionnaires were analysed using descriptive statistics and the Wilcoxon signed-rank test to evaluate changes in knowledge.

### **3.5 Ethical and Logistical Considerations**

Permission was obtained from the school administration, and verbal consent was obtained from teachers and participants. Translators from Mahidol University assisted throughout to ensure clarity. All ingredients used were halal-certified and child-safe.

## **4. RESULTS & DISCUSSION**

### **4.1 Demographic of Participants**

A total of 32 participants, equally represented by gender, aged between 12 and 17 years, took part in the programme, with the majority aged 13 years (31.25%) and 14 years (37.50%) (Table 1).

**Table 1.** Demographic characteristics of respondents by gender and age.

Item	Gender		Age		
	Male	Female	13	14	Others
Frequency	15	17	10	12	10
Percentage (%)	46.9	53.1	31.25	37.50	31.25
Total number	32		32		

#### 4.2 Previous Experience in Soap-making

Twenty-six students, or 81.25% of participants, have no prior experience in soap-making.

**Table 2.** Previous experience of respondents in the soap-making process.

Existing Experience	Frequency	Percentage (%)
Yes	6	18.75
No	26	81.25
Total	32	100

#### 4.3 Knowledge of Soap Ingredients

Although six participants reported having prior soap-making experience, only one demonstrated knowledge of the ingredients required to make soap. Those without previous experience also indicated that they did not know which ingredients are used in soap-making. Overall, 96.87% of participants lacked knowledge of the ingredients needed for soap production at the start of the activity. The low baseline knowledge observed is similar to previous studies reporting limited awareness of ingredients used in halal cosmetics and hygiene products, particularly prior to targeted educational interventions (Nor Zaidi et al., 2023; Moslem & Prawiro, 2024).

Additionally, 12.5% of participants (n = 4) initially believed that plastic could be used to make soap, while nearly all students (n = 31) thought that herbs might be used, and others mentioned oil (n = 15) and flowers (n = 28) as possible ingredients. Such varied responses are consistent with broader findings in science education showing that learners often hold everyday-based misconceptions about materials (like plastic) and processes prior to instruction (Guerra-Reyes et al., 2024). Systematic reviews and empirical studies have documented that students commonly bring naïve conceptions about matter and material systems that differ from scientific understanding and reflect intuitive reasoning from prior experience (Zhang et al., 2017). After instruction, no participant selected “adding plastic” as an ingredient in the soap-making process, indicating that the programme helped shift learners toward more

accurate conceptions.

Participants' knowledge scores thus improved significantly ( $p < 0.001$ ) from pre- to post-programme, indicating substantial gains in halal and scientific literacy and understanding of natural soap ingredients. The significant improvement in post-programme knowledge scores is consistent with prior educational research demonstrating that short, hands-on learning interventions can produce measurable gains in scientific and halal-related literacy when assessed using pre–post designs (Fauth & González-Martínez, 2023; Nor Zaidi et al., 2023).

#### 4.4 Increase in Knowledge of Soap Ingredient after Soap-making Programme.

Following the soap-making programme, the number of participants who answered positively regarding the ingredients used to make soap increased exponentially to 96.87% (Table 3). Normality tests (Kolmogorov–Smirnov and Shapiro–Wilk) indicated that the data were not normally distributed ( $p < .05$ ) (Table 4); therefore, a Wilcoxon signed-rank test was applied. Their mean knowledge score increased from 1.72 (SD = 0.77) before the programme to 3.36 (SD = 0.81) after the programme (Table 5). The analysis revealed a statistically significant increase in participants' knowledge of halal herbal soap-making,  $z = -4.61$ ,  $p < .001$ , with a large effect size ( $r = .82$ ). Only 1 student still claimed to have no knowledge of the ingredients to make soap.

The findings of this study reveal a substantial improvement in participants' understanding of halal concepts and soap-making knowledge. The statistically significant increase in post-test scores ( $p < 0.001$ ,  $r = 0.82$ ) confirms that even a short, interactive workshop can meaningfully enhance *halal literacy* among school-age students. This aligns with previous studies (Ab Rahman et al., 2025; Pauzi et al., 2024) emphasizing that interactive education is one of the most effective means of promoting halal awareness beyond theoretical knowledge.

**Table 3.** The pre- and post-programme knowledge of respondents involved in this study regarding the ingredients needed to make soap.

Knowledge of soap ingredient	Pre-programme		Post-programme	
	Frequency	Percentage	Frequency	Percentage
Yes	1	3.13%	31	96.87%
No	31	96.87%	1	3.13%
Total	32	100%	32	100%

**Table 4.** Normality tests of students’ pre- and post-programme scores.

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pre_score	.205	32	.001	.927	32	.033
Post_score	.288	32	.000	.778	32	.000

a. Lilliefors Significance Correction

**Table 5.** Descriptive statistics of students’ pre- and post-programme scores.

	N	Minimum	Maximum	Mean	Std. Deviation
Pre_score	32	.0	4.0	1.719	.7719
Post_score	32	1.0	4.0	3.359	.8056
Valid N (listwise)	32				

A follow-up question on the benefit of using herbs in soap after the programme has ended received 27 responses indicating that it is good for the skin, 25 for natural fragrance, 21 for natural colouring and 20 indicating that herbs serve as eco-friendly ingredients (Table 6).

**Table 6.** The view of respondents on the benefit of using herbs in soap.

Question	Possible answer	Responds
3. Why do we want to use herbs in soap?	Good for skin	27 (84.38)
	Natural fragrance	25 (78.13)
	Natural colour	21 (65.63)
	Eco-friendly	20 (62.50)

#### 4.5 The importance of halal soap.

Most students (87.5%) perceived the halal status of soap as important, demonstrating a growing recognition of ethical and purity-related values (A & Siddiq, 2024) though a small portion (9.38%) did not consider halal status significant (Table 7). Such findings are instructive for understanding differences in worldview: while some may see non-consumable products such as cosmetics and detergents (and by extension, soap) as neutral (Hamid, 2023; Talita & Arga, 2020), Islamic jurisprudence considers purity and permissibility integral to personal hygiene, reflecting the principle of *taharah* (cleanliness), safety, and product quality that increasingly become core reasons for consumer choice, implying that halal soap and hygiene goods carry specific importance tied to religious and quality assurance values (Tukiran & Ahmad Anuar, 2022). This is what could drive producers to value halal certification for cosmetic and hygiene products, changing the industry’s landscape towards greater halal compliance (Abdul Halim et al., 2025; Putri & Sjabadhyni, 2025).

The phenomenon is further reinforced by the presence of fatwa rulings, such as those issued by the National Fatwa Council of Malaysia (2012) and the European Council for Fatwa and Research (2013), which affirm that soaps derived from impure sources (*najis*) or containing prohibited elements are impermissible unless transformation (*istihalah tammah*) occurs (Ab Rahman, 2019; Mohamad et al., 2024).

Further questions, however, will be needed such as participants' views on halal food, faith practice, and ethical consumption before a firmer conclusion can be drawn.

**Table 7.** The view of respondents involved in this study on the importance of halal soap.

Importance of halal soap	Frequency	Percentage (%)
Yes	28	87.50
No	4	9.38
Total	32	96.88

#### 4.6 Programme Feedback

A high level of positive responses was observed following the halal soap training, with 93.8% of participants reporting that they enjoyed the soap-making activity and found the trainer's explanations clear and easy to understand (Table 8). In addition, 87.5% of the participants indicated that they would recommend the course to their peers, reflecting a favourable overall evaluation of the programme. Intention to recommend is commonly employed in educational and training research as an indicator of learner satisfaction and perceived programme value, and high recommendation rates are generally interpreted as evidence of effective knowledge delivery and engagement (De-Juan-Vigaray et al., 2024; Sun et al., 2022).

Furthermore, 87.5% of participants expressed an intention to repeat the soap-making activity at school or at home, suggesting potential transfer of halal-related knowledge and skills beyond the training environment. In educational research, intention to apply learned knowledge in new contexts is widely recognised as a valid proxy for learning transfer and future behavioural adoption (Fauth & González-Martínez, 2023; O'Neill, 2025). Such measures are particularly relevant in halal science education, where practical application and daily-life integration are central to reinforcing halal awareness and compliance.

**Table 8.** Participants’ perceptions of the programme.

Questions	Agree (n, %)	Not Sure (n, %)	Disagree (n, %)
1. I enjoyed the soap-making course	30 (93.75)	-	2 (6.25)
2. The trainer explained clearly	30 (93.75)	-	2 (6.25)
3. I would tell my friends about this course	28 (87.5)	2 (6.25)	2 (6.25)
4. I would like to make soap again either at home or at school	28 (87.5)	2 (6.25)	2 (6.25)

Overall, these findings reflect a high level of satisfaction and positive engagement among participants towards the halal herbal soap-making programme.

#### 4.7 Challenges and Recommendations

Despite the overall success of the programme, several challenges were encountered during its implementation. Firstly, the language barrier posed minor difficulties in communication, as some elementary school students had limited English proficiency. This challenge was effectively addressed through the assistance of translators from Mahidol University and the use of the Google Voice Translator app, which facilitated real-time communication and ensured that participants could follow instructions with ease, in line with findings from other studies on the effectiveness of voice-to-voice mobile translation apps. (Kreienbrinck et al., 2025). Secondly, the availability of certain equipment initially posed a logistical challenge. However, this was resolved through the support of the Siriraj-Center of Applied Thai Traditional Medicine, Mahidol University, which kindly supplemented the necessary tools and equipment for the soap-making activities. Lastly, the limited duration of the session constrained the depth of engagement and experimentation (Hasselhorn et al., 2024), with data collection using a questionnaire. If duration is not an issue, a longer questionnaire could be prepared to delve further into issues related to halal, scientific literacy, and faith practices that are relevant to herbal soap-making. Nevertheless, as the participants are school-age children, this may come with a caveat as longer duration may lead to survey fatigue, increased skipped questions or lower quality responses (Jeong et al., 2023)

To further enhance future collaborations, it is recommended that programmes include bilingual facilitators or pre-prepared translated materials to strengthen communication and comprehension. Extending the programme duration or

conducting it over multiple sessions would allow for deeper learning and creativity.

## 5 CONCLUSION

From a pedagogical perspective, integrating these Shariah concepts into hands-on science activities provides a contextualised form of Islamic science education. Students learned to differentiate between natural and synthetic ingredients, understood the concept of purity in material transformation, and developed appreciation for ethical production practices. In addition, students not only learned about chemical reactions in soap-making but also internalised the importance of lawful materials and environmental care, thus realising the *maqasid* of preserving life (*hifz al-nafs*) and intellect (*hifz al-'aql*). This aligns with the Islamic educational philosophy of *'ilm* (knowledge) serving as a means to attain *amal salih* (righteous action).

Furthermore, the cross-cultural dimension of this collaboration between IIUM and Mahidol University demonstrates *da'wah through action* (*da'wah bil hal*). It models how halal awareness can be introduced respectfully within pluralistic environments, fostering mutual understanding rather than imposition. For example, the workshop also served as a platform for introducing elements of Malay traditional medicine to an international audience. By demonstrating herbal soap-making using ingredients commonly employed in Malay ethnomedicine, the programme highlighted how indigenous knowledge systems can be disseminated and integrated into contemporary science education and halal awareness initiatives. The use of bilingual facilitation and participatory learning ensured inclusivity, embodying the *maqasid al-shariah* objectives of safeguarding intellect (*hifz al-'aql*) and promoting societal harmony (*maslahah*).

Overall, this initiative illustrates how fatwa principles and halal education can be operationalised in real-world community engagement. In this paper, universities' strategic role in transforming Shariah knowledge into practical community benefit is also highlighted and thereby exemplifying a model for international collaborations in Islamic-based science education where culture and language may be an issue.

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