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STEAM Approach Learning to Build Complete Knowledge in Fiqih Lesson Themes Halal and Haram Food

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Abstract

The complexity of technology has changed the paradigm of society that tends to be happy with instant things. This also happens in the process of food processing and service. Education about halal and haram food is important in the era of technology and current food trends that are starting to bias halal and haram. STEAM learning can help students understand the concept to face the challenges of the 21st century, especially studying the concept of halal and haram food. The purpose of this study is to describe how STEAM-based learning can build complete knowledge related to halal and haram food. This research is a type of critical literature study research with the Cresswell analysis knife. Data sources are taken from the Scopus database, web science of direct and Google Scholar. The findings obtained are that the STEAM approach, including science, can be used to analyze food substances so that students know how halal food is from a scientific perspective. Learning using technology makes students understand food processing. Meanwhile, learning food engineering will provide a new perspective for students. So, knowing halal and haram food engineering. Likewise, discussing food from its aesthetic elements is also important. Where in Islam there are also rules for eating clean and non-disgusting food. Finally, mathematical literacy is needed for arrange food so that you don't overdo it consuming food. Therefore, the integration of halal and haram food learning with the STEAM approach can teach students more complete knowledge of halal and haram food using 21st century competencies.

1. INTRODUCTION

The trend that is happening in the world, halal food is most in demand by both Muslims and non-Muslims. For a Muslim, consuming halal food is a provision that is required by Allah. The obligation of a Muslim to consume halal food has been enshrined in the provisions of Allah SWT. QS Al-Maidah verses 3-4, Al-Baqarah verses 168 and 172, and An-Nahl verse 114. The benefits of

consuming halal food besides for health are the reasons for answered prayers (Lubis et al., 2016). Meanwhile, non-Muslims choose halal food because halal food is more hygienic and guaranteed health (Zulfakar et al., 2014). Halal food providers not only protect Muslim consumers, but also maintain food standards, because the halalness of food is guaranteed from all sides (Khalek, 2014).

According to a study, the amount of halal food represents more than 17% of the total food in the world. A fairly small amount apparently. In Indonesia, public awareness in consuming halal food is already high (Vanany et al., 2019). Even so, Indonesian people, especially teenagers, often fall into consuming non-halal food unintentionally due to their ignorance.

Many Muslims live in non-Islamic countries to work, seek knowledge, and/or for other reasons. The challenge for Muslims in non-Islamic countries is that they have to adapt and choose halal food to consume from the many foods available (Feizollah et al., 2021). Of course, this is not easy, because even though halal food is guaranteed to be healthy, it may not be according to taste and the climate in the country. In cold European countries, Westerners are used to enjoying wine or alcoholic beverages to warm their bodies. A Muslim who does not understand the sharia will use the same method to warm himself.

The problem of halal and haram food bias makes knowledge about halal and haram food important. When discussing halal food in the 21st century, it is not enough to just highlight the ingredients. Halal food can identified as a critical point of halal and haram, starting from food ingredients, how to process them, food content, and how to obtain them. Knowledge related to halal and haram food in the world has developed. If you only study it from two sides of the ingredients and how to obtain them, it is not enough. Moreover, in the 21st century, the development of technology and food processing engineering as well as innovation and increasingly rapid access to information require people to be observant in identifying the halalness of food (Nurhayati & Ihromi, 2021).

The 21st century demands critical thinking skills, because many foods are engineered from haram foods made to look halal (Thomas et al., 2017). In the 21st century, If someone does not understand basic literacy, it will complicate their life, because finding information from thousands of information presented is not easy (Rubin, 2019). Therefore, Islamic education needs to implement a STEAM-based learning model that combines science, technology, engineering, art, and mathematics approaches in learning, especially on the theme of halal and haram food.

Knowledge changes rapidly and may lose its status (Rochmat, Alamin, Maulaya, 2024). Therefore, individuals must be able to access information, distinguish between true and false information, and apply it in everyday life (Yüzüak & Recepkethüda, 2023). STEAM (Science, Technology, Engineering, Arts, and Mathematics) learning with its technological approach will keep society abreast of the rapid changes (Chounta et al., 2023).

STEAM technology is prepared to support and improve the quality of education (Demir, 2021). As discussed above, the STEAM acronym has been around since the 2000s (Li et al., 2020). However, the STEAM approach is only considered appropriate in the 21st century education paradigm. Rapidly changing technology has a serious impact on generations (Demir, 2021). If there is no innovation in learning, there will be a knowledge gap with today's world. (Hogenstijn and Cuypers, 2023).

Innovation in the world of education will affect the pattern of future life, because the beginning of determining the civilization of life begins with education (Rochmat, Huwaida, Az-Zahra, Lifdhita, & Maulaya, 2024). Learning with the STEAM approach has been widely adapted. Among them are dominated by research that describes learning with the STEAM approach in early childhood (Novitasari, Zaida, & Hasanah, 2022), (Syafi'i & Dianah, 2021), (Agustianih & R., 2022). In addition, STEAM learning research is also widely applied to exact learning (Triprani, Sulistyani, & Aini, 2023), (Febriansari, Sarwanto, & Yamtinah, 2022).

The STEAM learning approach is still rarely used to understand fiqh lessons. There have been no studies that mention the STEAM approach being adapted in Fiqh learning. If classical Fiqh learning only offers theory and practice of practical laws in Islam accompanied by its arguments, then the collaboration of the STEAM approach in Fiqh lessons will provide a different nuance. In particular, Fiqh learning can not only answer practical questions about Islamic law, but can also answer how to face the challenges of the 21st century.

Therefore, in this paper, we would like to contribute to filling the research gap on education with a STEAM approach on the Fiqh material of the subject of halal and haram food to face the 21st century era. The needs of 21st century competencies are very complex to adjust to the challenges faced, thus requiring cognitive, creative and problem-solving skills, as well as collaborative skills (Nouri et al., 2020). Thus, the purpose of this study is to describes how STEAM-based learning can build comprehensive knowledge related to the concept of halal and haram food which is starting to become commonplace in the 21st century.

2. METHOD

This research is a type of literature study. Research based on literature studies can provide broad insights and ideas so that they can be used by other researchers as a source of literature (Siddique et al., 2021). The subject of the research is Fiqh lessons with the theme of halal and haram food. The analysis carried out is to observe how the STEAM approach can be used to study the concept of halal and haram food which is experiencing various challenges in this era.

Data instruments are taken from various sources of articles from the Scopus database, Google Scholar, and Science of Direct. Meanwhile, for data processing, the Creswell model analysis knife is used. Creswell has 6 stages, namely preparing data from various literatures, reading all the literature, grouping the data to be processed, mapping themes and creating data descriptions, constructing data according to themes, and the last step is interpreting and communicating data according to themes. (Toledo Pereyra, 2012).

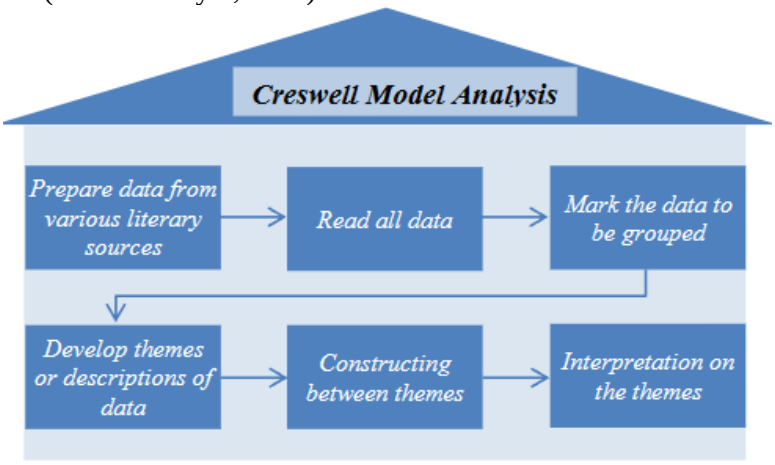

Figure 1. Creswell Model Analysis

3. RESULTS AND DISCUSSION

Result

According to the World Economic Forum regarding the literacy that humans need to master in the 21st century, STEAM learning is included in it. Thus, the analysis of the description of the STEAM learning approach on the theme of halal and haram food matches the literacy initiated by the World Economic Forum.

Table 1.

Subject Halal and Haram Foods	**Science**	Science literacy to discuss the science of halalan thoyyibah food. Halal food also needs to fulfil the rules of thoyyib and be beneficial for health.
	Technology	Technological literacy is used to unravel and analyse how technological developments have affected the tipping point of halal and haram food.
	Engineering	Technological literacy also needs to be learnt in relation to food engineering. Techniques such as food engineering like intoxicating fermentation may change the content of halal

		food into haram.
	Arts	Art/cultural literacy is related to food presentation, where the aesthetics of good food also need to be considered. As for disgusting food, it is included in haram food.
	Mathematic	Mathematical literacy is used to measure the amount of food so as not to overdo it.

The table below shows how the STEAM approach meets the educational objectives as formulated by ATC21S and UNESCO. These objectives include complete learning objectives based on 21st century competencies that can be used to face the challenges of the times.

Table 2.

STEAM Learning Approach Halal and Haram Food Theme	Learning to know = Way of Thingking.	Thinking of ways to identify halal and haram food.
	Learning to do = Way of Working	The process of internalising the character of adhering to Islamic law is to only eat halal food and avoid haram food.
	Learning to Be = Skill for Living in the World	The process of internalising characters so that they have the ability to become good agents in campaigning for halal and haram food.
	Learning to live together = Skills for Living in the World	In this stage, the target goal is that after learning that is internalised in the form of character, students can assist the community to consume halal food together and avoid food that has not been guaranteed halal.

Discussion

A. The Need for Competencies in Education in the 21st Century

The era of society 5.0 aims to place humans at the center of innovation by utilizing technology and industry to achieve a quality life (Carayannis and Morawska, 2022). The concept of the era of society 5.0 aims to create an intelligent society, where the integration of the virtual world and the real world helps in various sectors to achieve sustainable development goals (Hysa et al., 2021).

Due to the development of technology and the concept of society, life in the 21st century is full of the term VUCA (volatility, uncertainty, complexity, and ambiguity). The influence of this era covers all fields including education. The development of science and technology brings unwanted and unexpected changes (Rasa & Laherto, 2022). Like two sides of a coin, this change has both beneficial and detrimental impacts. The ease of accessing information creates a new paradigm in the world of education. The learning process is no longer carried out conventionally by providing information to students, but students independently construct their knowledge with the help of teachers as a means of guidance (Safonova, 2014).

Surviving in the 21st century with the VUCA era surrounding it will be difficult if it is not accompanied by 21st century competencies (Karneli, 2022). Educational projections will have a significant influence on individual competencies that will be used to survive in the 21st century. Thus, the mechanism of the flow of technological progress and competency needs in the 21st century can be described in the following diagram:

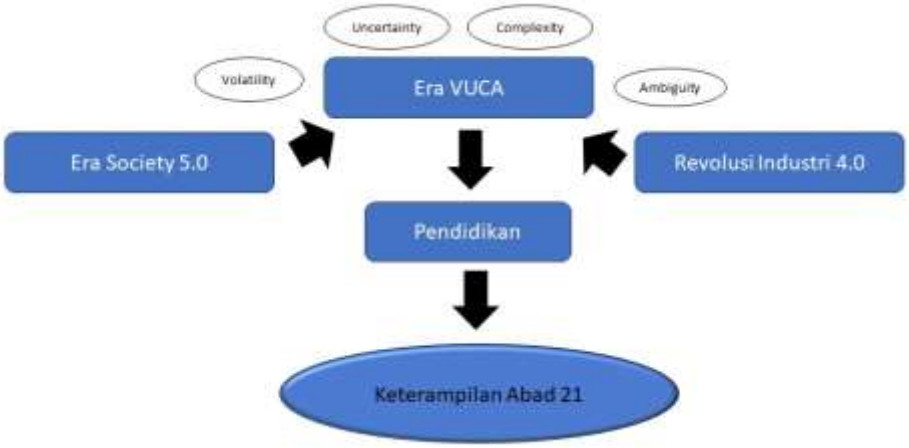

Figure 2. The relationship between education and skills in the 21st century

21st century learning generally has the basic principle that learning must be student-centered, collaborative, contextual, and integrated with society (Rochmat, Susanti, Maulaya, 2022). It is currently known as a century full of competency challenges in both science and technology.

The competencies needed in the 21st century focus on conceptual knowledge and skills in applying knowledge and thinking skills (Saepuzaman et al., 2021). Life in the 21st century challenges teachers to innovate so that 21st century competencies can be embedded in their students (Rochmat, Huwaida, Maulaya, & Wibawa, 2023). Several institutions, organizations, or individuals have attempted to formulate what the 21st century competency needs are. The results vary, but generally have the same characteristics. Several studies that describe the results of 21st century competency needs are as follows:

*First,*World Economic Forum (WEF). WEF divides literacy skills into basic literacy, scientific literacy, digital literacy, technological literacy, numeracy literacy and cultural literacy.

*Second,*UNESCO's pillars consist of 4 terms, including learning to know, learning to do, learning to be, and learning to live together.

*Third,*Assessment and Teaching of 21st Century Skills (ATC21S). AT2CS categorizes 21st century competencies into 4 categories, namely way of thinking, way of working, tools for working and skills for living in the world..

B. STEAM Approach

The focus of STEAM (Science, Technology, Engineering, Art, and Mathematic) learning is the collection of information through inquiry and authentic learning (Firetto et al., 2023). This STEAM approach of integrating various disciplines is considered to have its own challenges and difficulties due to the complex, abstract, and multidimensional nature of the subject (L. H. Wang et al., 2022). This complete approach is constructed by the students themselves in their learning with the teacher as the facilitator (Wannapiroon & Pimdee, 2022).

In the STEAM approach, students integrate knowledge and skills to solve problems with a dominating inquiri learning base (Ku et al., 2022). The essence of inquiri learning is how the process of students finding knowledge independently. Teachers no longer give new knowledge to students, but rather act as a guide for students to gather the right knowledge.

Trends about STEAM have been widely used as research materials and written. A simple Google search with the term "STEM," "STEM education," or "STEM education research" all returned more than 450,000,000 items (Li et al., 2020). STEM is an old pretext, the latest one has the addition of an "A" or Art approach in it.

In the global world, STEAM is becoming a trend (Wannapiroon & Pimdee, 2022). The STEAM approach can stimulate students to be able to understand the world better (Connor et al., 2015). 21st century actualization has also been integrated into the STEAM learning approach system (Laar et al., 2017) This approach has penetrated many aspects of life (Fadlelmula et al., 2022).

In recent decades, countries and organizations around the world have largely shifted the focus from disseminating science, technology, engineering, and mathematics (STEM) knowledge to

teachers to emphasizing students' authentic involvement in meaningful STEM learning experiences centered on real-world problems and the integration of STEM disciplines (Firetto et al., 2023).

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Science education

The importance of science education is increasing in a society that is open to technological developments and is aware of the great challenges of the influence of technological developments on generations (Charina et al., 2022). European countries make science education an integrated subject taught from the first level of education, because science is something that can never be separated from life (Jusuf et al., 2019). The urgency of science in the 21st century is how science becomes a shield in the thinking process in an era where information is easily spread excessively where disinformation and misinformation are also very common (Rubin, 2019).

By involving scientific knowledge, researchers and students can use local knowledge to solve problems that occur (Kobori et al., 2016). The importance of scientific thinking has been emphasized in science education standards. Learning is designed so that students design authentic scientific procedures to obtain new knowledge. Although the process is quite long, which includes making hypotheses, designing experimental procedures, and interpreting data and evidence, learning such as training students to get used to solving problems (Nouri et al., 2020).

Technology education

In the 21st century, technology is familiar to teachers and students in learning activities (Cardim et al., 2023). Covid-19 has an influence on the acceleration of technology in the field of education (Caratozzolo et al., 2022). The need for e-learning has increased from year to year, various kinds of learning platforms are available both for early education and higher education (Alyoussef, 2023). In terms of importance, the use of technology in various disciplines depends on the learning carried out (Pumptow & Brahm, 2023).

The use of technology is directed so that it can be used in the long term in the field of education considering that the mechanism of life in the future will always be in contact with technology (Koster et al., 2017). However, it is also important to note that the use of technology must be considered on other sides of its impact. Especially those who adopt technology into the classroom, because value-free technology will often plunge students (Easterday et al., 2017).

One of the fundamental components of the UN 2030 sustainable development agenda is quality education. It aims to ensure inclusive and equitable quality education for all. Digital technology has emerged as an essential tool to achieve this goal (Haleem et al., 2022)

Engineering education

The field of engineering has always been related to robotics and combines complex multidisciplinarity, which integrates the knowledge of a number of disciplines such as: electrical engineering, mechanical engineering and manufacturing, physics, programming, etc. Robotic operations in the 21st century have begun to mushroom to help with daily life. (Potkonjak et al., 2016). Therefore, it is important for the world of education to adopt learning skills in using robots or even designing robots. Fierce competition must also not eliminate the essence of humans with robots. Humans must have unique values and characters that robots do not have, namely their human side.

Art Education

In general, art is a beauty created that is able to evoke feelings. Art is an exploration of feelings expressed through works in the hope that art connoisseurs can feel the depth of feelings possessed by the creator artist. So that art education will smooth human feelings.

Mathematic Education

Mathematics is a science that can only be understood by reasoning, and is often referred to as a tool for logical, imaginative, and critical thinking. Mathematics holds significant importance as an academic discipline, serving as a valuable indicator of students' learning abilities and their logical thinking abilities (Angraini et al., 2023). Mathematics is a unique science. This science can play an important role in building human scientific mindsets and attitudes. Not only that, mathematics materials play an important role in developing students' connections and thinking skills (Diana et al., 2020).

C. Implications of the STEAM Approach in Halal and Haram Food Education in the 21st Century

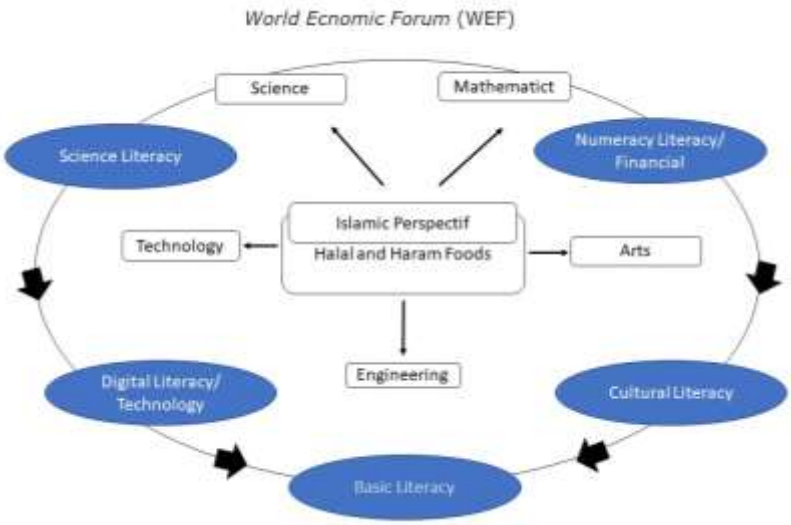
Recently, halal food has become a dominant lifestyle for the world community (Junaidi, 2020). Attention to food quality is an interesting phenomenon for researchers, especially halal food researchers (Wahyuni et al., 2019). "halal" defines anything that is allowed or lawful according to Qur'an, it is most commonly used in the context of acceptable food. Foods that are prohibited or unlawful, such as pork and alcohol, are known as "haram" (Wilkins et al., 2019).

There are various foods in this world including, legumes; vegetables; fruit; sweet food; fried food (including packaged potatoes); processed meat (burger, sausage, mortadella, salami, ham, chicken nuggets, or sausages); sugar-sweetened beverages (Ruiz-Roso et al., 2020). From the variety of food, there is an interest in keeping Muslim consumers from consuming halal food (Ratanamaneichat & Rakkarn, 2013). The group that is vulnerable to consuming non-halal food accidentally is teenagers, because they really like to try out current food trends. Therefore, the world of education needs to guard Muslim teenagers so that they know the difference between halal and haram foods.

In learning Islamic education, students are introduced to halal and haram materials. With this knowledge, it is hoped that students can distinguish between halal food and haram food and can effectively carry out Allah's commands by consuming halal food and avoiding the consumption of haram food. The limited content of the material in the textbook makes the STEAM approach important for teachers to strive for when teaching halal and haram material.

Awareness of the importance of 21st century competencies needs to be applied in the world of education (Bronstein et al., 2023). STEAM has always been associated with 21st century competencies. As shown in the picture, STEAM has a complex and close relationship with the needs of 21st century competencies. Learning halal and haram foods taught with the STEAM approach indirectly internalizes 21st century skills.

a. STEAM-based halal and haram food learning integrates 21st century competencies in the WEF.



- Science Food for Science Literacy

The principles of natural law are nothing contrary to Islamic religious knowledge. So that knowledge of science is also included in the learning of Islam. There is no exception with scientific knowledge related to food. The way science views food is by looking at the substances contained in food. High nutritional content is included in the standards that need to be contained in food. Substances in food such as lipids, proteins, carbohydrates, and vitamins will affect the activity of enzymes and deudenum or digestive activity (Singh et al., 2017). Islamic food science discussion shows that food is haram.

- Digital Literacy for Technology Food

In the last century, the food sector has grown rapidly with varied technical innovations (Kurth & Glasbergen, 2017). Critical related to food technology is necessary because technology can cause food that was previously halal to have haram levels. Halal animals are those whose necks are slaughtered by saying the name of Allah. If there are chickens injected so that they die quickly to streamline their slaughter, then the technology has changed chickens that were previously halal animals to be consumed into haram because of the wrong processing techniques (Afifah et al., 2022). However, learning technology to instill critical thinking character to increase a Muslim's awareness of wrong food technology needs to be learned, even if it is only the basics.

- Technology Literacy for Food Engineering

Food engineering is found in biotechnology. Where the fermentation process in different foods will produce different outputs. Fermentation of wine will produce alcohol products that are clearly haram because there is a divine similarity between alcohol and khamr in the time of the prophet. In addition, fermentation is a genetic engineering process by adding microorganisms that could come from haram animals (Atma et al., 2018).

- Cultural Literacy Food Arts

Everything has values, principles, ethics and aesthetics. Studies related to ethics and aesthetics are included in the scope of the art approach in learning. Food that is halal to be consumed according to the Islamic view is food that is good from its elements and appearance. Allah forbids all kinds of disgusting foods (Soon et al., 2017). In the 21st Century, food-related trends hide behind their identities that are usually weird. For example, the naming of devil's noodles, devil's noodles, and so on.

- Numeracy Literacy for Foods Mathematics

In Islamic education, in addition to halal and haram food provisions, there is an encouragement not to overdo it in consuming food. The amount of food consumed by humans determines the health of their body. A person who has diabetes, of course, will measure sugar

consumption. Someone who is overweight, of course, will measure the portion of carbohydrates and so on. Knowledge of this certainly requires basic mathematical skills.

b. STEAM-based halal and haram food learning integrates 21st century competencies in ATC21S and UNESCO Pillars

Figure 5. Integration STEAM with ATC21S and UNESCO Pillars

- Pilar UNESCO: Learning to Know and ATC21S: Way of Thingking

Learning in the first pillar of UNESCO is how one learns to know science. The Way of Thinking is an elaboration of learning to know in the UNESCO pillar of learning to know. The way a person thinks has an effect on formulating knowledge. In this level, students are taught at the level of concepts that are still theoretical in nature. So, if implemented in the theme of halal and haram food lessons, the basic concept of halal and haram food must be known by students. This knowledge is cognition.

- UNESCO Pillars: Learning to Do and ATC21S: Way of Working

The second pillar of UNESCO is how cognitive knowledge is transformed into action. In ATC21S, it is called the way of working. This action or work is adopted or based on a person's knowledge and way of thinking. In this realm, not only cognition works, but has spread to the affective aspects of students. In halal and haram material, this action is in the form of consuming halal food and avoiding haram food. If values are not internalized in the affective aspect, then this action will not be realized. Therefore, actions/work must be based on the correct theoretical concept.

- Pilar UNESCO: Learning to Be and ATC21S: Skill for Living in The World

The next pillar of UNESCO is how learning makes a person useful both for himself and those around him. This is similar to the competency in ATC21S, namely the skill for living in the world. The ability to live in the world is how a person can fill space through interaction with others. These interactions are sought to provide shade or benefits. The implementation in this learning is how to campaign for halal food to be consumed and haram food to avoid. This action will have a positive impact, because the success in campaigning for halal food consumption will affect the health of the body.

- Pilar UNESCO: Learning to Live Together and ATC21S: Skill for Living in The World

The last pillar of UNESCO is how learning or education in general has a beneficial impact so that humans can coexist with a good quality of life. Learning to be able to coexist is the same as the ATC21S Skill for Living in The World competency. This action in halal and haram learning is manifested in the realization to assist the community to always consume halal food together and avoid food that has not been guaranteed halal. This action will not only form harmony but will also create a healthy community in society.

4. CONCLUSION

The STEAM approach is an educational approach that produces student out The STEAM approach is an educational approach that produces student output that is integrated with the needs of 21st century competencies. Especially in Islamic education on the theme of halal and haram food,

STEAM is able to answer 21st century questions related to food. The STEAM learning approach can achieve the concept of 21st century competency needs formulated by ATC21S, WEF, and UNESCO. With the STEAM approach, Fiqh of halal and haram food not only presents how Islamic law regulates halal and haram food, but can also describe how to face the challenges of halal and haram food that are starting to be biased in the 21st century. Therefore, this approach is appropriate to be adopted by educational authorities in their educational institutions so that students are skilled and have a new perspective in viewing progress in the 21st century. This study has limitations, because it only describes a critical theory regarding the STEAM approach implemented in the material of Fiqh of halal and haram food. Thus, future research is needed to prove how STEAM is effectively applied in learning Fiqh on the theme of halal and haram food

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