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Development of Ethnosciene Reels of Ketapang Malay Tribe as Supplementary Learning Resources on Hydrocarbon Compounds

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Abstract: The habit of the Malay community in using natural materials as fuel can be integrated into chemistry teaching materials in schools. The aim of this research is to assess the validity and practicality of reels as a learning resource and to develop reels based on the ethnoscience of the Ketapang Malay tribe. The research development model used is the Three Stages Research and Development (TSRD) model, which consists of three steps: planning, development, and dissemination. Data collection techniques involve indirect communication using validation sheets and response instruments. The subjects of the research are students from SMA N 1 Sungai Laur. The results of the study indicate that the ethnoscience-based reels of the Malay tribe are valid and practical, with validity and practicality scores of 96.3% and 90.30%, respectively. The reels can be used as an independent, practical, and engaging learning resource that is relevant to students. Therefore, the validity and practicality results of the development of ethnoscience-based reels are expected to serve as an innovative and contextual alternative media for chemistry education in schools.

Keywords: Ethnoscience; Hydrocarbon; Malay ethnic group; Reels

Introduction

The increase of 45 million internet users during the Covid-19 pandemic accelerated and positioned Indonesia as the 4th largest Instagram user in the world in 2022 (APJII). Instagram is a widely popular application among various demographics, with 12.2% of users aged 13-17. This report is in line with the findings of a study indicating that the majority of Instagram users are students. Preliminary research conducted by the researcher through a questionnaire given to 32 students from Ketapang Regency showed that 81.25% of students use Instagram as their preferred social media platform siswa adalah reels (72%). Students using Instagram is accessed more than 20 times a day for 15-30 minutes to upload photos, video reels, to maintain visibility, gain recognition from many people, and stay updated with the latest news (Guspa & Ibrahim, 2019; Wibisono, 2020; Harahap et al., 2022).

Hydrocarbons are simple carbon compounds composed of hydrogen (H) and carbon (C) atoms. Hydrocarbon materials are divided into several main topics: classification of hydrocarbon compounds, nomenclature of alkane, alkene, and alkyne compounds, isomers, and reactions of hydrocarbon compounds (Oktavianita et al., 2019) Hydrocarbons are closely related to daily life through their use in plastics, paraffin, asphalt, and natural gas, which contain alkane hydrocarbon compounds. Natural gas, also known as methane (CH4), is a fossil fuel in the form of gas that contains the shortest chain hydrocarbon molecules. On the other hand, paraffin contains long-chain alkane compounds with more than 20 carbon atoms (Sembiring et al., 2020).

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The material of hydrocarbon compounds is quite challenging to understand in asynchronous learning, such as predicting carbon chains to reactions (Kartikasari et al., 2021) Common student errors in naming alkanes, alkenes, and alkynes include their inadequate reading of the questions. Traditional teaching methods for abstract hydrocarbon compound learning, often involving lectures, whiteboards, textbooks, and laboratories, have made it difficult for students to grasp the material (Rikawati & Sitinjak, 2020). Students' difficulties in understanding the basic concepts of hydrocarbon compounds are due to the conventional teaching media used by teachers, which fail to engage students (Anggraini et al., 2022).

This is in line with the pre-research interview results stating that students find it difficult to understand hydrocarbon compounds due to the use of media such as books and chalkboards power PowerPoint (PPT). This instructional media has several drawbacks: not all materials can be effectively presented using PowerPoint, it can be unappealing and monotonous, it requires a long time to grasp a concept, can be boring and abstract, and teachers writing on the chalkboard may not be able to fully engage with students as they focus on the board (Kamil, 2019). Therefore, there is a need for the development of engaging educational media that is easily accessible and enhances students' learning outcomes and knowledge. One potential educational media to develop is Reels. Reels is a popular feature on Instagram among students for self-expression. Users can create innovative and creative videos by combining or editing multiple clips into a single video (Setiawan & Soniya, 2023; Dilapanga et al., 2022; Nugraheni et al., 2019). Reels are a feature on Instagram popular among students for self-expression, where users can create innovative and creative videos by combining or editing multiple clips into one cohesive video.

Reels have been successfully developed as a learning resource for SPU materials, categorized as highly suitable (95.4%), as indicated by student and teacher survey responses demonstrating that the developed product is easy and practical to use during lessons (Lovina et al., 2021). In colloid materials, reels can also serve as an easy, highly practical learning resource that supports the learning process, validated by material and media expert assessments with percentages ranging from 88.4% to 86.7% (Saputri, 2013). Literature review results indicate that reels have not been developed for hydrocarbon materials. Therefore, in this study, the researcher will develop reels as a learning medium to complement the existing development of hydrocarbon learning media, specifically the e-module. The e-module has some drawbacks, including the time-consuming process of its creation and its lack of practicality for portability, as it requires the installation of additional applications for access (Kartikasari et al., 2021). The advantages of reels as a learning media include the ability to be studied anytime, low production costs, and the potential to help learners explore IT skills in chemistry education. Reels provide video and photo editing services, adding value for teachers by showcasing students' creativity in presenting learning outcomes and serving as a medium for conveying local cultural practices (Sari, 2021). Reels as a hydrocarbon learning media are expected not only to facilitate students in learning hydrocarbon materials but also to serve as a means of introducing traditions in communities that have long utilized hydrocarbon concepts in their daily lives, yet remain unfamiliar to students. The concept of hydrocarbons has long been practiced by communities, particularly the Malay ethnic group in Ketapang Regency. Traditions such as the use of TKKS (rubber wood) and damar mata kucing (cat's eye resin) as fuel sources demonstrate the application of hydrocarbon compounds in daily life. However, these traditions are often unfamiliar to students. Therefore, this research aims to integrate the traditions and culture of the community into hydrocarbon learning through an approach known as ethnosciences. The integration of ethnosciences in hydrocarbon education is expected to make learning more meaningful, enhance scientific thinking, and incorporate environmental contexts into education. Moreover, ethnosciences serve as a solution for preserving cultural practices that are starting to fade away, particularly among the Malay ethnic group in Ketapang. Ethnoscience-based learning is also developed in science education in the form of modules, with 80% categorized as moderate and 20% as high (Fitriani, 2017).

To date, there have been no reports of ethnosciences-based learning among the Malay ethnic group in Ketapang Regency specifically in hydrocarbon education. Therefore, this study will develop "Reels Based on Malay Ethnosciences in Ketapang Regency as a Supplementary Learning Resource for Hydrocarbon Compounds.

Method

The type of research used is Research and Development with the Three Stages Research and Development model, consisting of three stages: planning, development, and post-development, as described (Ariyani, 2022; Mau & Ramli, 2022; Anggreni et al., 2023). The planning stage involves needs analysis, material analysis, and design development. The Development stage includes prototype development, participant feedback, development stage re-evaluation, expert review (material, media, and language), product

development, and prototype testing. Post-dissemination is the final process involving posting reels on Instagram, intellectual property rights (Haki) creation, and publication of articles in journals.

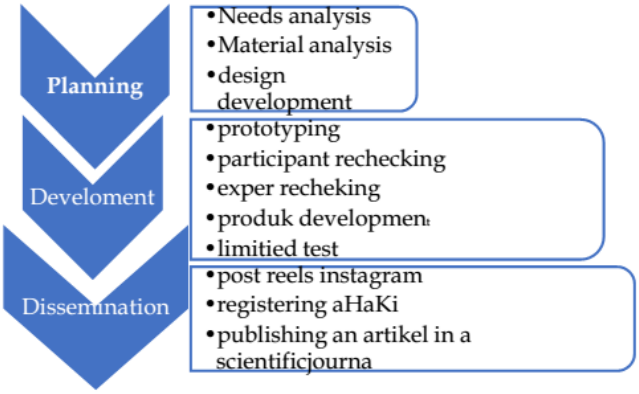

Figure 1. TSRD development model scheme

The data collection technique utilized indirect communication through the distribution of questionnaires and validation sheets. The questionnaires were distributed to students to assess their responses and knowledge at SMA N 1 Sungai Laur and SMA N 1 Sandai, employing a Likert scale with four categories: strongly disagree, disagree, agree, and strongly agree. Responses from students regarding the Malay ethnosciences reels in Ketapang were then tabulated and analyzed using Equation 1. Criteria for student responses were determined based on Table 1.

Table 1. Criteria for Student Responses

Interval (%)	Explanation
0-20	Very impractical
21-40	Impractical
41-60	Less practical
61-80	Practical
81-100	Very practical

The formula for calculating the questionnaire score from student responses is as follows:

$$score = \frac{\Sigma response\ values}{\Sigma highest\ possible\ score\ from\ respondents} x100\% \quad (1)$$

Explanation:
Percentage = Percentage indicating the quality of the instructional media.
Σ Sum of respondent answers = Total sum of all responses provided by respondents.
Σ Sum of highest scores from respondents = Total sum of the highest possible scores that respondents could achieve

"Validation of Malay Ethnosciences Reels from Ketapang was conducted by 6 validators, consisting of two media experts, two language experts, and two subject matter experts, with validation criteria shown in Table 2.

Table 2. Validation Criteria (Asyhari & Silvia, 2016)

Interval (%)	Explanation
0-20	Not valid
21-40	Less valid
41-60	Sufficiently valid
61-80	Valid
81-100	Very valid

Validity is calculated based on Equation 2. The formula for calculating validity results is as follows:

$$score = \frac{\Sigma\ validato\ score}{\Sigma highest\ avlidator\ score} x100\% \quad (2)$$

Explanation:
Percentage = Percentage indicating the quality of instructional media
Sum of validator responses = Total number of responses provided by validators.
Sum of highest validator scores = Total sum of the highest possible scores that validators could give (Zahra & Rina, 2018).

Result and Discussion

Design Stage

The first stage involves distributing questionnaires to students from SMA N 1 Sungai Laur and SMA N 1 Sandai to analyze their needs. Teachers who currently only use learning resources such as books and PowerPoint with a teaching time of two hours per week find it challenging to implement locally-based learning. Integrating authentic local learning with formal education is crucial for enhancing students' knowledge, yet this approach has not been adopted by teachers in classrooms. Students perceive the need for practical learning resources, such as using social media platforms like Instagram, which they can access at home for 30 minutes to one hour daily. In addition to distributing questionnaires to students, needs analysis is also conducted through interviews with 5-10 The Malay community of Ketapang. Their habit of using natural fuels for combustion remains a tradition that cannot be eliminated due to the abundance of such fuels. The community emphasizes the need to preserve this tradition by introducing it to the younger generation as successors to this practice.

Based on interview results, the practice of using natural fuels in the Malay community of Ketapang is the focus of this research. Ethnoscience from the traditions of the Malay community of Ketapang is studied with

local content such as Empty Palm Fruit Bunches and Damar. These materials used in Ketapang Malay traditions are classified and indicators of hydrocarbon compounds alkane, alkene and alkyne are presented in Table 3.

Table 3. Material (Mulyono et al., 2012; Yanti, 2021)

Tradition	Material	Hydrocarbon Compounds	Name and Formula
Combustion	TKKS	Alkanes and alkenes	Decane($C_{10}H_{22}$) Dodecane ($C_{12}H_{26}$) Heptane(C_7H_{16}) Hexane (C_6H_{16}) Naphtalene ($C_{10}H_8$) Nonane (C_9H_{20}) Pentane (C_5H_{12}) Trihicosane ($C_{23}H_{48}$) Tridecane ($C_{13}H_{28}$) Undecane ($C_{11}H_{24}$) Tetradecane ($C_{14}H_{30}$) Pentedecane($C_{15}H_{32}$) Octadecane($C_{18}H_{38}$) Nonadecane ($C_{19}H_{40}$) Hexadecane ($C_{16}H_{34}$) Heptadecane ($C_{17}H_{36}$)
Combustion	Damar	Alkene	Bicyclogermacrene $C_{15}H_{24}$

Development stage of the design, based on indicators of the basic competence (KD) of hydrocarbon compounds at the high school level, in accordance in accordance with Minister of Education and Culture Regulation Number 24 of 2016, the design development is carried out in a structured and systematic manner to facilitate the development process. Ethnosciences reels are illustrated with an outline of the process design.

Development

The materials on hydrocarbon compounds and Malay ethnoscience from Ketapang are sourced from journals and relevant books, which are the initial steps in prototyping development. This involves researching the connection between hydrocarbon compounds and Ketapang Malay traditions, creating illustrated diagrams based on literature, and producing reels using Canva.

The reassessment by language, media, and subject matter experts consisting of six teachers specialized in their fields and two chemistry education lecturers from Muhammadiyah University Pontianak validated the Malay ethnoscience reels, resulting in a 95.30% evaluation score. They assessed content relevance, graphic presentation, language clarity, imagery, and readability. After expert feedback, improvements were made to the ethnoscience reels accordingly.

Following the development of the ethnoscience reels based on expert feedback, a test was conducted with 64 students from Grade XI Science at SMA N 1 Sungai Laur. The students' responses to the ethnoscience reels regarding usability and presentation showed a high level of preference, with an average score of 80.93.

Students rated the ethnoscience reels positively, achieving an 82.5% rating under the criteria of "excellent." The suitability of colors, fonts, and images contributed to their appeal and aesthetic impression, making them easily perceptible to the eye (Iswandi, 2021). Students positive responses and their reading interest can be enhanced with digital learning media, which can save time, facilitate quicker and easier learning, and provide access to the most current information (Aisyah, 2022; Rahmawati et al., 2023). Students' curiosity about culture can enhance their critical thinking skills through observation and engagement with ethnoscience Reels (Efendi & Muliadi, 2023).

Integrating local traditions into chemistry lessons can foster students' appreciation for preserving regional culture. This approach not only benefits classroom learning but also allows character education to be incorporated into learning resources (Nuralita, 2020; Purwanti, 2017; Suastra & Pujani, 2021). These reels contain material that enhances students' knowledge of the local traditions of the Malay community in Ketapang. Students evaluate watching these reels as increasing their knowledge. The reels portray values of patriotism, environmental awareness, and knowledge.

Reels as an educational media digital can increase students' interest in learning, motivate them, and enhance their creativity while exploring local Malay Ketapang traditions. Furthermore, while expanding students' knowledge and adapting to modern times, it is important to preserve existing traditions (Fitria, 2022; Akbar et al., 2023; Nuralita, 2020; Mohamad et al., 2023). Incorporating traditions into ethnoscience education can deepen students' understanding of local customs in Indonesia. Reels used in the learning process have proven to be effective, efficient, relevant, and consistent, providing utility in helping students grasp the material. Students are more motivated to learn and find the educational videos both accessible and enjoyable, as they can be accessed anytime and anywhere (Dewanti, 2021; Dikarsa et al., 2016; Juariah & Irwandi, 2016; Pratiwi et al., 2015; Sri et al., 2019; Doyan et al., 2021; Dewi & Kamaludin, 2022).

Dissemination

This stage involves posting the Malay ethnoscience reels on the Instagram account @llaftri21, tagging the chemistry education professors from Muhammadiyah University Pontianak, chemistry teachers, and the head

of Grade XI Science at SMA N 1 Sungai Laur, and publishing a scientific article. This journal publication marks the final stage of disseminating the results of the ethnoscience reels.

Conclusion

Based on the results and discussion of the research, the Malay ethnoscience reels are highly valid and practical, with scores of 96.3% and 93.30%, respectively, according to assessments by language, media, and subject matter experts. Developed using the Three Stages Research and Development model, these ethnoscience reels effectively provide knowledge to students and can be used as an engaging and relevant self-learning resource for students.

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L.F, Observation, research implementation, data collection and analysis; R.F., concept, ideas, process administration, and drafting of the original manuscript; D.H., methodology, validation. All authors have read and approved the final manuscript version for publication.

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Conflicts of Interest
The authors declare no conflict of interest.

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