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Making UNO Smart Chemistry Card Game Media based on the Nomenclature of Hydrocarbon Compounds

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ABSTRACT

The nomenclature of hydrocarbon compounds is a chemistry topic that is abstract in nature and often poses difficulties for students in understanding its concepts. To address this issue, it is necessary to develop innovative, engaging, and interactive learning media. This study aims to develop a learning media in the form of the UNO Smart Chemistry Card Game, an educational game based on a modified UNO card designed specifically to facilitate the learning of hydrocarbon compound nomenclature. The uniqueness of this media lies in the addition of smart cards containing summarized material, mission cards featuring puzzle challenges, multifunctional magic cards, and a game manual that supports active and collaborative learning. The research employed an R&D method using the ADDIE approach (Analysis, Design, Development, Implementation, Evaluation), but was limited only to the Development stage. The research stages included needs analysis, media design using storyboards and flowcharts, and product development. Validation was conducted by three media expert validators and one subject matter expert, resulting in an average r-count of 0.90, indicating a very high level of validity. A limited feasibility test was conducted with 12th-grade science students, yielding an average r-count of 0.81 ≥ r-table 0.30. These findings imply that the UNO Smart Chemistry Card Game has the potential to serve as an effective supplementary learning tool that promotes engagement, conceptual understanding, and student collaboration in chemistry learning, particularly for abstract topics like organic compound nomenclature.

INTRODUCTION

Chemistry has unique characteristics from one of the subjects, so it requires the ability to solve problems in terms of concepts, theories, laws, and facts (Susanty, 2022). For some high school/vocational high school students, chemistry is included in the complex subjects because there are several abstract concepts (Lestari *et al.*, 2021). One is the material on the nomenclature of hydrocarbon compounds (Júnior *et al.*, 2021). The nomenclature of hydrocarbon compounds is a systematic naming of hydrocarbon compounds recommended by IUPAC (International Union of Pure and Applied Chemistry) (Naba *et al*., 2022).

Research conducted by Millenia and Fitria states that 25% of students can only learn about naming hydrocarbon compounds. In comparison, 75% of students have difficulty naming alkane, alkene, and alkyne compounds (Utami & Hidayah, 2019). Students will have difficulty understanding the material if the learning uses inappropriate media. Learning media can be used as an alternative to increase students' interest and quality of learning (Rahayu, 2019). Thus, to overcome this and increase students' interest and quality of learning, alternatives can be used in the learning process in the form of learning media (Rahmawati *et al*., 2019).

Improving the quality of the learning process is an urgent need that cannot be postponed any longer because learning plays a vital role in determining educational success (Ahmad *et al*.,

2023). The effectiveness of learning will significantly impact the achievement of student learning outcomes, and the quality of learning also dramatically affects the results (Mea, 2024). The two main aspects that stand out most in the learning process are the teaching method and the learning media used as a teaching aid (Zurna *et al*., 2023). Learning media acts as a tool in teaching activities, which is part of the methodological components the teacher regulates as one of the elements of the learning environment (Arief, 2021). The main benefit of using learning media is to increase the effectiveness of the learning process and the results achieved (Supiadi *et al*., 2023). In the learning process, media is a technology that carries information or messages needed for teaching or as a physical medium to deliver learning materials (Kusum *et al*., 2023). Thus, the application of learning media can overcome various challenges and increase the interest and quality of student learning (Murtado *et al*., 2023).

Learning media is a physical or non-physical aid used as an intermediary between teachers and students. Understanding the subject matter more effectively and efficiently (Robinson *et al*., 2023). Learning media suitable for studying the nomenclature of hydrocarbon compounds are educational games that involve all students in the learning process (Rikawati & Sitinjak, 2020). One of the learning media in this study is the UNO Smart card, a four-color card game with specially printed cards. This card game looks simple but is full of tactics and strategies to achieve victory (Suliyanah *et al*., 2021).

UNO cards in previous studies on improving students' understanding of the periodic table of elements, with results obtained of 96.86%, showed the practicality of using the media (Ilhami & Hermita, 2020). Using UNO cards in learning can increase the percentage of the classical quantity of students by 79.31% (Sari *et al*., 2018). Kimuno media can improve students' learning outcomes by understanding the periodic table of elements, including the location of a component, writing symbols and names of elements, and arranging them in one period and group. The percentage results of the study showed a value of 0.5, which is in the moderate category (Rahayu, 2019).

The weaknesses of the UNO Chemistry learning media (kimono) in the study conducted by Soleh and Mashuri regarding hydrocarbon compounds are that there is no guidebook and no information about the concept of the material. It is individual, which results in other students being unable to participate in the learning process (Sari *et al*., 2018). Thus, innovations are needed for the UNO card media in the form of guidebooks and various additional cards that can be used in the learning process.

Based on preliminary classroom observations, it was found that many students still experience difficulties in naming and drawing the structures of hydrocarbon compounds, particularly in distinguishing between alkanes, alkenes, and alkynes. Discussions with chemistry teachers also revealed that conventional methods such as lectures and textbook exercises have not been fully effective in improving students' conceptual understanding. These findings indicate a real and practical need for more interactive and engaging learning media in the classroom. In response to this, the author developed the UNO Smart Chemistry Card Game, a non-digital educational medium based on a modified physical card game. The game includes a variety of components smart cards summarizing the material, mission cards featuring puzzle challenges, magic cards with flexible functions, and a comprehensive game manual all designed to foster collaborative, strategic, and enjoyable learning experiences for students studying hydrocarbon nomenclature.

The objectives of this study are: 1) to describe the appearance of the UNO smart chemistry card media product on the hydrocarbon compound nomenclature material; 2) to analyze the results of the validation test of the UNO smart chemistry card media on the hydrocarbon compound nomenclature material, and 3) to analyze the results of the feasibility test of the UNO smart chemistry card media on the hydrocarbon compound nomenclature material.

METHODS

Research Design

This study applied a Research and Development (R&D) approach using the ADDIE development model, which includes Analysis, Design, Development, Implementation, and Evaluation stages. The research was limited to the first three stages. In the analysis stage, learning difficulties related to hydrocarbon nomenclature were identified, and relevant literature was reviewed. The design stage included the creation of flowcharts, storyboards, and planning of the game components (smart cards, mission cards, magic cards, question cards, and guidebook). In the development stage, a physical prototype of the card game was produced using Microsoft PowerPoint. Validation was conducted by three media experts and one subject matter expert, focusing on aspects of appearance, content, and language. A limited feasibility test was also carried out with 10 students who had studied hydrocarbon nomenclature. Data were analyzed descriptively using r-count and compared with the r-table (0.30) to determine the validity and feasibility of the developed media.

Research Target

The main target of this study was the development of the UNO Smart Chemistry Card Game as a valid and feasible learning medium to support students' understanding of hydrocarbon compound nomenclature. The validation process was carried out through online platforms by three expert validators: a media expert, a subject matter expert, and a chemistry teacher as a practitioner. In addition, a limited feasibility test was conducted involving ten senior high school students who had previously studied the material. These steps aimed to assess the product's validity and practicality in actual learning settings.

Research Data

The data collected in this study corresponded to the stages of the ADDIE development model that were implemented, namely analysis, design, and development. In the analysis stage, data were obtained from the needs analysis questionnaire, which provided insights into students' learning difficulties and teachers' perceptions regarding the need for interactive media on hydrocarbon nomenclature. In the design stage, data consisted of the completed storyboard and flowchart, which documented the initial planning, visual layout, and structure of the developed media. In the development stage, two primary types of data were collected. The first was validation data from expert reviews, gathered through a structured questionnaire assessing the product's appearance, content quality, and language clarity. This data served as the basis for determining the validity of the product. The second was feasibility data from a student response questionnaire, administered to ten students who had previously studied hydrocarbon nomenclature. This data was used to evaluate the practicality, ease of use, and level of engagement provided by the media. All data collected were analyzed using descriptive quantitative methods, with r-count values compared to the r-table (≥ 0.30) to determine whether the media met the standards of a valid and feasible educational tool.

Research Instruments

Several instruments were developed in this study to support the data collection process in line with the ADDIE development model, which was limited to the analysis, design, and development stages. At the analysis stage, a needs analysis questionnaire was distributed to chemistry teachers to identify common student difficulties in understanding hydrocarbon compound nomenclature and to evaluate the necessity of developing an engaging and contextual learning medium. In the design stage, a storyboard and flowchart were created to

visualize the structure and design of the UNO Smart Chemistry Card Game. The storyboard illustrated the layout, sequence, and function of each card type, while the flowchart described the steps and interactions in the gameplay. In the development stage, three evaluation instruments were used: a validation questionnaire for experts, a student response questionnaire, and a concept understanding test. The validation questionnaire assessed three aspects appearance, material content, and language and was completed by a media expert, a subject matter expert, and a chemistry teacher as a practitioner. The student response questionnaire was used to evaluate the practicality and attractiveness of the media from the users' perspective. Meanwhile, the concept test was used to measure students' understanding of hydrocarbon nomenclature after using the media.

Data Analysis

Data analysis was carried out to determine the feasibility of a learning media created by comparing the calculated r-count of an instrument with the r-table value set, 0.3. The calculation results obtained are compared with the necessary value; the media is said to be valid if the calculated r-count 0.81 ≥ r-table (0.3) (Sukmawati *et al*., 2023). Table 1 interprets the value of the r-calculation of the validation test.

Table 1. Interpretation of validation value (r)

Percentage (%)	Category
0 – 20	Very Invalid
21 – 40	Invalid
41 – 60	Quite Valid
61 – 80	Valid
81 – 100	Very Valid

To analyze the feasibility test results using the Likert scale table, namely the analysis of data obtained through calculations in Table 2.

Table 2. Likert Scale Score

Statement score	Statement score (Respondent's Answer)
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree

The data obtained can be analyzed using the following formula.

$$r = \frac{x}{N.n}$$

Information:
r = Feasibility value
x = Respondent's answer weight
N = Maximum score
n = Number of respondents
The feasibility of learning media that can be used is in the range of 0.7-1 (Arikunto, 2021).

RESULTS AND DISCUSSION

This study has three main topics the appearance of the UNO smart chemistry card media, validation test results, and feasibility test results.

Description of the UNO Smart Chemistry Card Game Media

The development of the UNO Smart Chemistry Card Game followed the ADDIE development model, and this section presents the results of the design stage, which aimed to

translate learning objectives into an instructional and interactive media product. The media was specifically designed to facilitate students' understanding of hydrocarbon compound nomenclature, a topic often considered abstract and difficult by learners. The use of game-based elements was selected to enhance student motivation, participation, and conceptual understanding. UNO cards are rectangular and paper-based (Suliyanah *et al*., 2021). UNO card games can be fun and challenging, motivate students to participate actively, and stimulate student activities during learning (Sari *et al*., 2018). UNO card media is an exciting medium that arouses students' interest in education and aims to improve learning outcomes.

The design process involved the use of a flowchart and storyboard to visualize the structure and interactions of the media. These tools allowed the research team to organize gameplay sequences, map educational goals to card types, and ensure alignment between content and play mechanics. The final product consists of 56 physical cards and a guidebook, divided into the following key components. The first step is to create a storyboard and flowchart to facilitate the storyline for making UNO smart card media.

1. UNO Cards

The UNO card display can be seen in Figure 1.

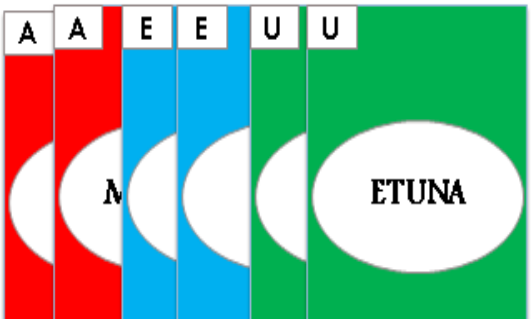

Figure 1. Display of UNO chemistry cards

UNO chemistry cards consist of 56 cards with four colors: red, yellow, green, and blue, like UNO cards. However, the number code is replaced with codes A, E, and U, which indicate that codes A = alkane, E = alkene, and U = alkyne. The difference in card colors can be used if the group does not have a card with the same code as the card played by the previous group; then, the player may issue a card with the same color as the card played by the last player. UNO chemistry cards are the core cards in the game. The Number of players in each group consists of 2-3 people; each group gets four cards. This approach introduces visual and symbolic association that supports students' ability to classify and differentiate compound types. From a design perspective, this aligns with dual coding theory, allowing learners to reinforce conceptual categories using color and symbols.

2. Magic Cards

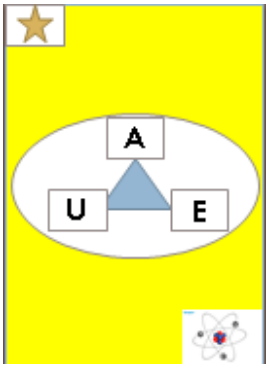

Figure 2. Display of magic cards

Magic cards serve a strategic role in gameplay. They can be used when a player lacks a matching card and are designed to shift the play order or enforce conditional rules. Educationally, this encourages adaptive thinking and game based decision making, which are part of active learning strategies. Instructionally, the unpredictable nature of these cards sustains learner engagement and promotes peer interaction.

3. Smart Card

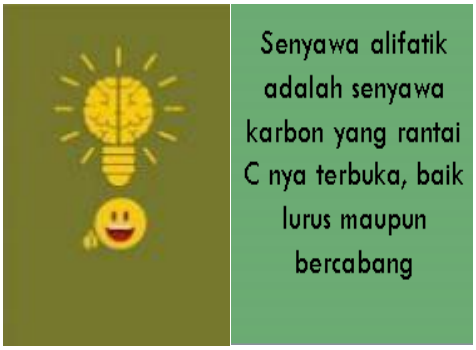

Figure 3. Smart card display

A smart card summarizes the material on the nomenclature of hydrocarbon compounds. This card is made to make it easier for students to answer questions included in the question card. These cards function as scaffolds, allowing players to review essential information before answering questions or completing challenges. Based on cognitive load theory, the inclusion of smart cards supports just-in-time knowledge recall and improves retention by reducing information overload during gameplay. (Silaban et al., 2020). Then, players must understand the summary's contents within a specified time. Furthermore, the summary of the material is presented to other groups.

4. Question Cards and Mission Cards

The UNO Smart Chemistry Card Game includes mission and question cards that serve as integrated tools for learning assessment and cognitive engagement. Both card types aim to support the application of IUPAC nomenclature rules for hydrocarbon compounds while embedding learning into the flow of the game. A question card contains questions about the nomenclature of hydrocarbon compounds. The general indicator of these questions is determining the name and structure of hydrocarbon compounds based on IUPAC rules. Question cards are an alternative media for evaluating student learning outcomes (Sangiddah *et al.*, 2023). The picture of the question card can be seen in Figure 4.

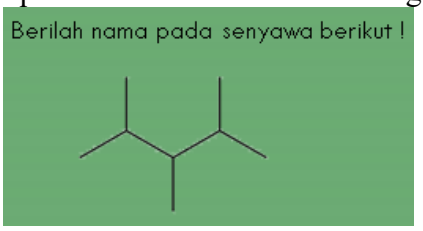

Figure 4. Question card display

A mission card is a card that contains a challenge to solve a puzzle. Unlike the question card, this card is only in the form of a card with a question mark symbol, so the group that gets this card is asked to solve the puzzle. The mission card display can be seen in Figure 5, while the puzzle card can be seen in Figure 6.

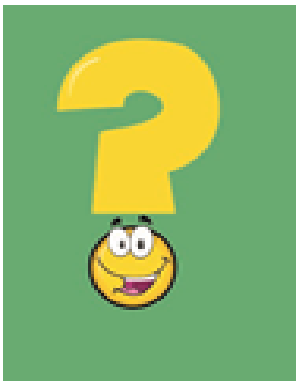

Figure 5. Mission card display

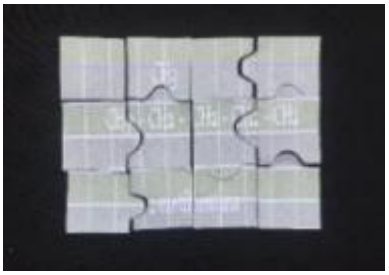

Figure 6. 2-methyl pentane puzzle

Question cards and mission cards are played when the group playing gets the card; then, the player must answer the question on the question card. Meanwhile, if what is obtained is a mission card, the player must complete the puzzle mission. The group that gets the card must answer it within the specified time. If the group can answer the question or complete the puzzle mission correctly and on time, they will score 10. However, if the group cannot answer the question or complete the puzzle mission correctly and on time, the group will be suspended by not being allowed to participate in the game for one round.

Question cards contain structured problems that prompt players to identify or construct compound names based on structural formulas, molecular formulas, or IUPAC naming conventions. These cards are aligned with standard curriculum indicators and function as formative assessments, enabling students to apply previously learned concepts in a game-based setting. From an instructional design perspective, these cards support reinforcement, retrieval practice, and low-stakes evaluation.

Mission cards, in contrast, offer open-ended and puzzle-based challenges that require higher-order thinking. Rather than direct Q&A formats, these cards use prompts such as symbol-based clues, scrambled compound names, or matching tasks. One example involves rearranging pieces to correctly name a compound like 2-methylpentane. These cards are designed to stimulate critical thinking, collaborative reasoning, and problem-solving, which align with the analyze and evaluate levels of Bloom's taxonomy. This mechanic blends competition and feedback, reinforcing student motivation while keeping learning outcomes in focus.

5. Guidebook

The Guidebook contains the rules and instructions for the game. This book is used as a guideline in the UNO smart chemistry card game on the material of hydrocarbon compound nomenclature. The Guidebook can be seen in Figure 7.

Figure 7. Guidebook

The guidebook contains clear instructions, gameplay flow, card functions, and learning objectives. It serves as a teacher and student reference, ensuring that gameplay remains structured and educationally meaningful. From an instructional perspective, the guidebook supports learner autonomy, provides clarity of expectations, and allows for self-directed exploration, especially in group-based activities (Ilhami & Hermita, 2020).

The media design exemplifies the principles of instructional alignment by ensuring that each card type directly supports the targeted learning outcome namely, mastering the nomenclature of hydrocarbon compounds. From scaffolding (smart cards) to assessment (question cards) to strategy and collaboration (mission and magic cards), all elements are integrated to support cognitive, affective, and social dimensions of learning. The design stage successfully combined educational media theory, game-based learning, and chemistry curriculum standards into a cohesive, classroom-ready product.

The Validity of the UNO Smart Chemistry Card Game Media

The validation process was carried out during the development stage of the ADDIE model, using a structured questionnaire instrument that assessed three main dimensions: (1) visual and design aspects, (2) chemistry content/material, and (3) language and instructional clarity. Validators rated each aspect using a Likert scale, and the results were quantitatively analyzed using correlation techniques. The validation results showed that the UNO Smart Chemistry Card Game reached a very high level of validity as an instructional media for learning hydrocarbon compound nomenclature. Based on the assessments of three expert validators comprising a media expert, a subject matter expert, and a chemistry teacher practitioner the media obtained an average r-count of 0.90, which exceeds the r-table value of 0.30 (Arikunto, 2009). This confirms that the developed media fulfills quality standards in terms of design, content accuracy, and instructional language. The results of the validation test can be seen in Table 3 below.

Table 3. Validation Test Results

No.	Observed aspects	r-count	r-table	Description
1	Media display can attract students' attention	0,83	0,3	Valid
2	Media used by learning objectives	0,91	0,3	Valid
3	Media can be used by learning materials	0,91	0,3	Valid
4	Language use in media can be understood	1	0,3	Valid
5	Media use can overcome student boredom	0,83	0,3	Valid

No.	Observed aspects	r-count	r-table	Description
6	Media creation can make it easier for students to participate in learning activities	0,91	0,3	Valid
7	Media used can minimize misconceptions in students	0,83	0,3	Valid
8	Media used can improve students' mastery of concepts	1	0,3	Valid
	Total	0,90	0,3	Valid

The validation test was conducted to examine and analyze the suitability of the instruments used and the products produced with the material (Arikunto, 2021). The questionnaires that have been filled out by the three validators are analyzed for the calculated value and the determined r-tablevalue. The r-table value has been determined at 0.3 which is used as the validation limit of an instrument (Novita & Harahap, 2020). Suggestions from the three validators regarding the UNO smart chemistry card media product are improving the colour combination of each card, and the use of language must be consistent between foreign languages and Indonesian. Then the suggestions are applied to improve the UNO smart chemistry card media product according to the validator's suggestions.

The validation carried out includes three important aspects, namely the appearance aspect, the material substance aspect, and the language aspect. Based on the media appearance aspect, namely the media appearance can attract students' attention, the r-count is 0.83, the suitability of the media with learning objectives and the media can be used according to the learning material is 0.91, the use of media can overcome student boredom, the r-count is 0.83, the media can make it easier for students to follow learning, the r-count is 0.91, the media used can minimize student misconceptions, the r-count is 0.83, and the media used can improve students' mastery of concepts, the r-count is 1. This is in line with Eady's statement in his research, namely that games with goals that provide interesting and structured activities will produce measurable results in the form of learning indicators (Sholihah, 2021). In addition, the results of this study are also in line with Miftah's statement that media in the form of games must be educational and involve all students in the learning process (Miftah, 2022).

Furthermore, the aspect of the substance of the material with the indicator of the suitability of the material with the basic competencies obtained r-count of 1, the material presented is logical and systematic obtained r-count of 0.91, the suitability of the material with the media used obtained r-count of 0.91, some questions can improve students' conceptual abilities obtained r-count of 0.91. This is in line with research (Rahayu, 2019), that UNO card media can improve students' understanding of concepts and character. The level of difficulty of the material is adjusted to the abilities of students obtaining an r-count of 0.83, the accuracy of the material is adjusted to the principles and does not cause misconceptions obtaining an r-count of 0.91, and the material presented explains the principles of hydrocarbon compound nomenclature obtained r-count of 0.83. The language aspect, namely the use of language in the media can be understood by obtaining an r-count of 1 (Bistari *et al*., 2021).

From all these aspects, an average r-count value of 0.90 was obtained which was declared valid because the r-count value ≥ r-table. This is in line with research (Rahmawati *et al*., 2019), that UNO card media is valid for use as a chemistry learning medium with a percentage result of 94.3%.

Student Feasibility Results of the UNO Smart Chemistry Card Game Media

The feasibility test is limited to the material/content aspect and aims to determine the quality of the UNO smart chemistry card game media on the hydrocarbon compound nomenclature material, in terms of material presentation in terms of material suitability, material clarity, and suitability of illustrations with material explanations. The results of the feasibility test on the material aspect can be seen in Table 4.

Table 4. Feasibility Test Results on the Material/Content Aspect

No.	Question	r_{count}	r_{table}	Desc.
1	Chemistry learning with this media makes it easier to master the concept	0,82	0,3	Valid
2	The questions provided in the media are easy to understand	0,77	0,3	Valid
3	The questions given are difficult and cannot be done	0,67	0,3	Valid
4	Understanding of organic compound nomenclature material can be improved by using this media	0,90	0,3	Valid
5	There are difficulties in working on some of the questions given in the media	0,70	0,3	Valid
	Average	0,77	0,3	Valid

Based on table 4, the average percentage of respondents' answers is 0.77. The most prominent criterion is in terms of the ease of students in understanding the hydrocarbon compound nomenclature material using the UNO smart chemistry card game media of 0.90. Thus, the UNO smart chemistry card game media on the hydrocarbon compound nomenclature material is included in the feasible category in terms of material aspects and is ready to be used as a learning medium.

The next review is on the aspect of media appearance. The limited feasibility test on the media aspect aims to determine the quality of the UNO smart chemistry card game media on the hydrocarbon compound nomenclature material in terms of design. The results of the feasibility test on the media aspect can be seen in Table 5 below.

Table 5. Results of the Feasibility Test on the Media Display Aspect

No.	Question	r_{count}	r_{table}	Desc.
1	Learning with game media is easier to do in groups	0,82	0,3	Valid
2	Learning with whiteboard media is easier compared to game media	0,77	0,3	Valid
3	Chemistry learning using media is very effective and easy to understand	0,67	0,3	Valid
4	The use of this media can improve skills in learning	0,90	0,3	Valid
5	more interested in solving puzzles on the media than doing practice questions	0,70	0,3	Valid
	Average	0,77	0,3	Valid

Based on Table 5, the average presentation of respondents' answers was 0.84. The most prominent criterion in terms of learning using the UNO smart chemistry card game media on the nomenclature of hydrocarbon compounds is easier to do in groups, namely with a rating value of 0.97. Thus, the UNO smart chemistry card game media on the nomenclature of hydrocarbon compounds is included in the feasible category in terms of media and is ready to be used as a learning medium.

The results of the limited feasibility test on the UNO smart chemistry card game media on the hydrocarbon compound nomenclature material as a whole in all aspects have an average value of 0.81. Thus, the UNO smart chemistry card game media is included in the very feasible category and is ready to be used as a learning medium.

Based on the recapitulation of the feasibility test results, the largest r-count value of 0.97 was obtained, namely in the aspect of learning with game media that is easier to work on in groups. This is in line with the statement (Sarwinda, 2023) that card media has the advantage of being able to involve all students, is suitable for use in large and small scale groups, increases interaction between students and increases learning motivation. In addition, other studies also

state that study groups are very helpful for each member in mastering the subject matter with various cooperative procedures and providing academic support (Lutpiani, 2021).

Furthermore, the r-count value obtained of 0.9 states that students are more interested in completing puzzle mission challenges and understanding of the hydrocarbon compound nomenclature material can increase by using this media. The questions given are easy to understand and can be worked on with an R-count value of 0.77. The questions used are at the cognitive level C3 (determining) and C4 (analyzing). At the cognitive level C3, students are asked to determine the name and determine the structural image of a compound. Then at the cognitive level C4, students are asked to analyze the structure of hydrocarbon compounds. This aims to measure the level of students' conceptual ability regarding the nomenclature of hydrocarbon compounds.

The use of media can improve learning skills with an account value of 0.77. Then the statement that the use of learning media, namely whiteboard media, is easier than using game media, obtained a count value of 0.72, students tend to disagree with the use of whiteboard media compared to game media. Based on the suggestions submitted learning using whiteboard media tends to be monotonous, less arousing learning enthusiasm, and whiteboard media is not by the principles of using learning media (Kertati *et al*., 2023).

Based on the results of the feasibility test, an average rcount value of 0.81 was obtained and the media was declared suitable for use in the learning process. This is by Arikunto's statement that the eligibility of media that can be used is in the range of 0.7-1 (Arikunto, 2021). In addition, game media can improve learning outcomes because it arouses students' curiosity so that the knowledge gained will be stored in their memory (Asmawadi, 2021).

CONCLUSION AND RECOMMENDATIONS

Based on the results of this study, the UNO Smart Chemistry Card Game was developed using a Research and Development (R&D) approach with the ADDIE model, implemented until the Development stage. The resulting product consists of several integrated components, including UNO cards, smart cards summarizing the nomenclature of hydrocarbon compounds, question cards for evaluating student understanding, mission cards with puzzle challenges, and a guidebook that provides gameplay instructions and rules. These components were designed to increase student interest, engagement, and conceptual mastery in learning abstract topics such as hydrocarbon nomenclature. Expert validation by a media expert, a subject matter expert, and a chemistry teacher practitioner resulted in a very valid classification, with an average r-count score of 0.90. Furthermore, a limited-scale feasibility test with students produced an average r-count score of 0.81, indicating that the media is feasible and appropriate for use as a chemistry learning tool. Future research is recommended to implement the media in a full learning cycle using appropriate instructional models. It is also suggested to enhance the question components by including items that assess higher-order cognitive skills, especially at the C5 (evaluating) and C6 (creating) levels of Bloom’s taxonomy, to further develop students’ analytical and creative thinking.

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