i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"Optimizing Innovation in Knowledge, Education and Design"

EXTENDED ABSTRACT

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Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality . I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH

WELCOME MESSAGE (i-SPiKE 2023 CHAIR)

We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPiKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPiKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail
Chair
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

PERCEPTION OF SECONDARY SCHOOL STUDENTS ON THEIR UNDERSTANDING ON TERMINOLOGY-ANALOGY OF REACTION RATE IN CHEMISTRY

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ABSTRACT
Reaction rate-related terms such as activation energy, catalysts, and collision theory may require students to understand the meaning and significance. A terminology- analogy is a cognitive tool used to explain or clarify a concept by comparing it to something else that is more familiar or easily understood. Assessing students' understanding of reaction rate terminology-analogy is essential to identify areas of improvement and effective methods of teaching.The present research successfully identified the level of understanding of analogy in chemistry terms specifically on reaction rate. Quantitative measurement was conducted via SPSS using a sample of 101 students from four different states (Johor, Negeri Sembilan, Penang and Selangor). Based on the analysis, 41.6% of respondents required help with further explanations related to terminology and 19.8% of the students faced difficulties in accurately translating terminology and relating to analogies. This showed students need assistance to relate the terminology to analogy. These analogies can help in understanding and visualizing the concept of reaction rates in chemistry by relating it to familiar scenarios in everyday life Hence, this research is objectively designed to evaluate the perception on the reaction rate terminology-analogy in chemistry for further improvement in teaching material and method for secondary school students.

Keywords: Reaction rate, Chemistry, Terminology, Analogy, Perception

INTRODUCTION

Textbooks play an important role in the development and diffusion of 'normal science' because they improve on the prevailing scientific paradigm by using the terminology. Terminology refers to the specialized vocabulary or set of terms used within a particular field, subject, or domain (Faber et. al. 2019). It consists of words, phrases, or expressions that have specific meanings or serve as shorthand for concepts, ideas, or processes relevant to that area of study or practice. However, there is an issue when the textbook is taken as an irrefutable and irreversible source of information, leading to the belief that all claims in textbooks are factual and lack interpretive meaning (Souza & Porto 2012). It has been proposed that analogy can assist students in learning scientific concepts and gaining an understanding of the scientific process. Analogies are still used sporadically in the classroom, probably due to teachers' lack of adequate approaches and their fear that analogies will mislead students (Nahum Kipnis 2005). Evagorou et al., 2015 reported that research on scientific education around the world has underlined the significance of imparting science processes to students in order to ensure that the content of knowledge is perceptible.

Students' understanding on the parameters that influence the rate of reaction such as pressure, temperature, and catalyst is still inadequate. They are unable to connect the terminology-analogy in order to comprehend what happens to the rate of reaction when the parameters are modified. Because of the difficulty students have grasping the concept of reaction rate, chemistry teachers must build a unique curriculum that eases their understanding (Juan Quilez 2009). Reading and memorization help students understand. However, challenges may develop if the subject content is read and memorized without further understanding (Ahmad et al. 2022). Because of the importance of knowing the reaction rate in chemistry, an earlier survey among secondary school students should be undertaken. Hence, this research is objectively designed to evaluate the perception of secondary school students on the reaction rate analogy in chemistry.

METHODOLOGY

Secondary school students from four distinct states (Johor, Negeri Sembilan, Selangor, and Penang) were sampled. A quantitative study was conducted with a survey technique using the Google Form platform for data collection. Students have one month in February 2022 to complete the perception survey by online survey. The online survey was distributed by convenience sampling. The data were examined and imported to SPSS version 26 for analysis. Based on the online feedback, the total sample size was 101 respondents. Furthermore, while the results of this study gave summaries and conclusions for the sample used, it cannot be generalized to the full population. The descriptive statistics were employed to achieve the goal of the research.

RESULT AND DISCUSSION

The survey form was completed by 101 secondary school students. Female respondents outnumbered to male respondents (78.2% to 21.8%). Johor accounts for around 52.5 percent of secondary students, followed by Negeri Sembilan (29.7%), Selangor (12.9%), and Penang

(4.9%). Results from Table 1 showed the majority of students (86.1%) agreed that the terminology of this reaction rate topic should be presented in a more interesting method (video, e-book, comic). This is due to 41.6% of respondents disagreeing that they do not need the help of further explanations related to this terminology if given questions. This showed students need assistance to relate the terminology to analogy. These analogies can help in understanding and visualizing the concept of reaction rates in chemistry by relating itto familiar scenarios in everyday life. Research by (Curtis & Reigeluth, 1984) published few theorists reported to have used analogical reasoning as a tool to aid problem solving. Further, it has been proposed that analogies were traditionally used both in explaining science and in the processes of science (Shapiro, 1985).

Table 1. Student's perception on their understanding towards terminology

Item	Response	Frequency	Percentage
Students think the use of terminology in the topic of response rate is easy to understand.	SD	1	1.0
	D	4	4.0
	N	42	41.6
	A	36	35.6
	SA	18	17.8
Students are able to re -explain all the terminology learned in the topic of response rate accurately	SD	0	0.0
	D	15	14.9
	N	48	47.5
	A	27	26.7
	SA	11	10.9
Students are able to relate the terminology learned to the surrounding situation.	SD	1	1.0
	D	8	7.9
	N	42	41.6
	A	33	32.7
	SA	17	16.8
Students do not need the help of further explanations related to this terminology if given questions.	SD	11	10.9
	D	31	30.7
	N	39	38.6
	A	16	15.8
	SA	4	4.0
Students agree the terminology of this chapter should be presented in a more interesting method (video, e-book, comic)	SD	0	0.0
	D	2	2.0
	N	12	11.9
	A	30	29.7
	SA	57	56.4

[a] (SD= Strongly Disagree; D= Disagree; N=Neutral; A=Agree; SA =Strongly Agree)

Analogies describe new thoughts or ideas by relating them to "familiar ones that are outside of the subject of immediate interest." Although analogies may be more beneficial to students who typically work at the concrete operational level, analogical thinking may be hampered if pupils lack visual imagery (Gokhan Ugur et al. 2012). Table 2 revealed majority of students can define the concept of terminology clearly using the analogy that can be related to everyday life situations but they need assistance to relate analogy to theory accurately However, 19.8 % of the students disagreed that they can relate the concept of analogy to theory accurately without assistance such as friends and teachers. Therefore, a creative approach to applying the analogy-

terminology for the rate of reaction topic delivery should be emphasized by teachers. This is consistent with the findings of Naz and Murad 2017, who discovered teaching innovation to be effective in improving learning activities.

Table 2. Student's perception on their understanding towards analogy

Item	Response	Frequency	Percentage
	SD	0	0.0
The analogy used in this response rate title can be related to everyday life situations	D	5	5.0
	N	24	23.8
	A	36	35.6
	SA	36	35.6
Students can define the concept of terminology clearly using the conceptof analogy	SD	0	0.0
	D	13	12.9
	N	36	35.6
	A	35	34.7
	SA	17	16.8
Students are able to re -explain terminology in words that are easy to understand and clear.	SD	0	0.0
	D	13	12.9
	N	35	34.7
	A	35	34.7
	SA	18	17.8
Students can relate the concept of analogy to theory accurately without assistance	SD	3	3.0
	D	17	16.8
	N	52	51.5
	A	23	22.8
	SA	6	5.9
The terminology used in this chapter needs to be conveyed by adopting a more creative concept of analogy.	SD	0	0.0
	D	1	1.0
	N	17	16.8
	A	39	38.6
	SA	44	43.6

CONCLUSION

Teachers play a crucial role in shaping students' perceptions of their understanding. Effective methods of teaching include using real-life examples, interactive demonstrations, hands-on experiments, and multimedia resources to facilitate comprehension. Students who participate to ask questions, engage in discussions, and actively participate in learning activities can also contribute to a deeper understanding of reaction rate terminology and analogies. These research would allow for preliminary data to explore student perception, perspectives, challenges, and suggestions for improving their comprehension of chemistry.

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