

ENTOR GUIDE: A DIGITAL LEARNING TOOL FOR ELECTROPHILES, NUCLEOPHILES AND TYPES OF ORGANIC REACTIONS

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ABSTRACT

ENTOR (or Electrophile-Nucleophile & Type of reaction) Guide is a digital learning tool developed by The Enthusiasts from Kolej Matrikulasi Negeri Sembilan (KMNS). ENTOR Guide aims to enhance students' ability in identifying the electrophiles, nucleophiles and types of organic reactions through non face-to-face (NF2F) activities. It comprises a series of steps linked to notes, videos and formative assessment tests. The content of this innovation is presented in the form of thinking maps which incorporate cognitive learning process with infographics. A study was carried out on 40 KMNS students to review the effectiveness of the ENTOR Guide usage. Pre- and post-tests were used to compare students' achievement after using ENTOR Guide. The findings showed that ENTOR Guide significantly improved students' abilities in identifying the electrophiles, nucleophiles and types of organic reactions. There is a significant increase in students' achievement scores for the post-test (mean score = 8.18) as compared to pre-test (mean score = 4.78). Students also showed positive views towards the usage of the learning tool in ENTOR Guide Questionnaire. ENTOR Guide promotes self-learning among students as it is interactive, user-friendly and easy to access. In addition, ENTOR Guide also enables lecturers to plan and implement NF2F reinforcement activity in a more systematic manner.

Keywords: ENTOR Guide, electrophiles, nucleophiles, types of organic reactions, digital learning tool

1. INTRODUCTION

ENTOR Guide is the abbreviation for Electrophile-Nucleophile & Type of Reaction Guide. It is a digital learning tool developed by "The Enthusiasts" from Kolej Matrikulasi Negeri Sembilan (KMNS) to address students' problems in learning the basic concepts of organic chemistry. These problems include weaknesses in identifying "Electrophiles and Nucleophiles" and "Types of Organic Reactions" in Topic Introduction to Organic Chemistry [1].

ENTOR Guide comprises a series of steps linked to PowerPoint notes, videos and formative assessment tests in Google Form. The content of the presentation is summarised in thinking maps which incorporate cognitive learning process with infographics [2].

Two types of thinking maps utilised in ENTOR Guide are Double Bubble Map and Multi-flow Map. Double Bubble Map is used to compare and contrast electrophiles and nucleophiles whereas Double Bubble Map is used to explain cause and effect of a specific type of reaction. These innovative ideas were initially introduced by an action research involving small group activities in workshop [3]. The ideas were then transformed into digital application by "The Enthusiasts".

ENTOR Guide aims to enhance students' ability in identifying the electrophiles, nucleophiles and types of organic reactions through non face-to-face (NF2F) activity. The specific objectives of this innovation are to guide students:

1. to identify nucleophiles and electrophiles.
2. to identify type of organic reaction given a reaction equation.

2. METHOD

A study was carried out on 40 KMNS students from practicum groups S1AP3, S1AP4, S1FP2, S1FP3 and S1FP5 to review the effectiveness of the ENTOR Guide usage. The students were given QR code to access ENTOR Guide (Figure 1) through their smartphones for NF2F activity. A post-test similar to pre-test was used to measure students' achievement level after using ENTOR Guide. The pre-and post-tests consisted of 10 multiple choice questions carrying 10 marks. Short interviews and questionnaire that comprised 12 five-point Likert Scale items were used to gauge students' view on the ENTOR Guide usage.

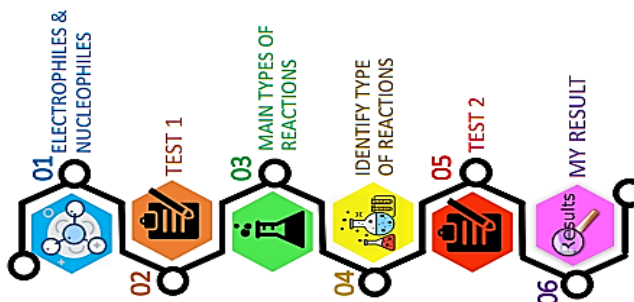


Figure 1: Front Page of ENTOR Guide

3. RESULTS AND DISCUSSION

Data analysis showed that ENTOR Guide had significantly improved students' abilities in identifying electrophiles, nucleophiles and types of organic reactions from a mean score of 4.78 in the pre-test to a mean score of 8.18 in the post-test. Table 1 shows the comparison between pre- and post-tests for the percentage of students at three score ranges.

Table 1. Comparison between Pre-test and Post-test on Achievement Score

Score Range	Identify Electrophiles & Nucleophiles (%)		Identify Types of Reactions (%)	
	Pre-test	Post-test	Pre-test	Post-test
4-5 (Excellent)	47.5	100.0	2.5	57.5
2-3 (Moderate)	50.0	0.0	52.5	42.5
0-1 (Weak)	2.5	0.0	45.0	0.0

The result of the survey showed that the items obtained a mean score of 4.77, indicating that students had positive views towards ENTOR Guide. The three top ranking items (Mean Score = 4.83, S.D = 0.38) are:

Learning made easier by ENTOR Guide because all at our finger tips.

I am having fun in learning using ENTOR Guide.

This method should be continued in learning other topics of organic chemistry.

Some feedback collected from students in short interviews include:

“It’s an effective way to learn as it teaches us to progress slowly and understand the little part in organic chemistry.” “The notes and exercises enhance my understanding about types of organic reactions”

4. CONCLUSION AND SUGGESTION

Besides promoting self-learning among students, ENTOR Guide also enabled lecturers to plan and implement NF2F reinforcement activity in a more systematic manner. Based on the feedback from lecturers, some of the content was revised accordingly for improvement.

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Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 30 Ogos 2022

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Kelulusan daripada pihak YBhg. Profesor dalam perkara ini amat dihargai.

Sekian, terima kasih.

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