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Muhammad Irfan bin Mokhtar

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Preface

Pioneering Educational Perspectives: Series 2025 is a collection of thought-provoking insights and research contributions exploring contemporary educational trends and practices. This eBook presents a diverse range of perspectives on innovative teaching methodologies, digital learning strategies, and transformative approaches in education. Designed to serve as a resource for educators, researchers, and practitioners, it aims to inspire meaningful discussions and advancements in the field. Through carefully curated chapters, this publication offers fresh ideas and practical solutions to enhance learning experiences in an ever-evolving educational landscape.

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CHILD CONNECT - EMPHASIZING THE SEAMLESS CONNECTION BETWEEN THERAPISTS, EDUCATORS, AND CAREGIVERS 212

Dr Syamsul Anwar Sultan Ibrahim[1,*], Ain Najihah Mohd Bakri[2], Muhammad Danial Mohd Yasin[3], Iffah Amirah Mohd Nasir[4] & Dayang Nur Hadziah binti Abang Saufi[5] 212

ENHANCING BIOLOGY EDUCATION THROUGH CBM (CABANG MINDA BIOLOGI) AND DIGITAL MEDIA: A BILINGUAL APPROACH FOR IMPROVED STUDENT COMPREHENSION AND ENGAGEMENT 216

Tun Mohd Firdaus bin Azis[1,*] Tun Norasida binti Aziz[2] 216

VMATT - VIBRATION MAGNIFICATION AND ANGLE TEACHING TOOL 220

Mohd Nor Azmi Ab Patar[1,*], Schufee Amani Suhaime[2], Shaharudin Ahmad[3], Chi Hieu Le[4] & Jamaluddin Mahmud[5] 220

MUMBLE TO MARVEL: SPEAK LIKE A CHAMP 224

Muhammad Irfan bin Mokhtar[1,*], Nur Alyani binti Khairol Anuar[2], Nurul Hijah binti Jasman[3] & Nursuhaila binti Ibrahim[4] 224

A TINKERCAD-BASED APPROACH TO AMR DEVELOPMENT IN ELECTRICAL ENGINEERING .. 227

Rozi Rifin[1], Kamaru Adzha Kadiran[2,*], Mohamad Zhafran Hussin[3], Nor Diyana Md Sin[4] & Ezril Hisham Mat Saat[5] 227

OPTIMISING QUIZIZZ FOR BLENDED LEARNING: INNOVATING ESL HOMEWORK SUBMISSION AND MONITORING 231

Fathiyah Ahmad @ Ahmad Jali[1], Berlian Nur Morat[2,*], Syakirah Mohammed[3], Noor 'Izzati Ahmad Shafiai[4] & Mohd Hilal bin Muhammad[5] 231

INSTITUSI KHALIFAH (I-KHALIF) E-LEARNING COURSEWARE FOR STPM STUDENTS 235

Nurul Wafa Wardina Rosli[1], Zazaleena Zakariah[2],*, Raudzatul Fathiyah Mohd Said[3] & Wan Safra Diyana Wan Abdul Ghani[4] 235

DEVELOPMENT OF INTRODUCTORY MANDARIN (EASYMANDARIN) COURSEWARE USING PERSUASIVE SYSTEM DESIGN 239

Nur Syazwani Mohd Shukri[1], Zazaleena Zakariah[2], Raudzatul Fathiyah Mohd Said[3],* & Wan Safra Diyana Wan Abdul Ghani[4] 239

KAEDAH TAMBAN 243

Nooraini binti Ab Latif[1], Masni Binti Jamin[2], Habilah Begam binti Abu Bakar[3*], Tuan Khalisah Binti Tuan Arif Sahibu Fadhilah[4] 243

PENGEMBARAAN DARORI 247

Nur Amirah Hatasya binti Harwi, Raihan Najeehan binti Abdul Muie, Siti Khadijah binti Mohd Anuar[1], Masni binti Jamin[2] & Nooraini binti Ab Latif [3] 247

CUBE ARCHITECTURE : MAKER PLACE HAVEN 250

Syahmirul Haziq Bin Mohd Hamzani, Ar. Erdayu Os'hara Binti Omar, Ts. Kamal Bin Mohd Idris 250

EDUGO 254

Lim Siew Li[1],*, Lee Wei[2], Goh Ming Chei[3], Tan Ker Li[4], Teh Ee Shen[5] & Ng Kai Chun[6] 254

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ENHANCING BIOLOGY EDUCATION THROUGH CBM (CABANG MINDA BIOLOGI) AND DIGITAL MEDIA: A BILINGUAL APPROACH FOR IMPROVED STUDENT COMPREHENSION AND ENGAGEMENT

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ABSTRACT

The teaching and learning process of the subject of Biology is a difficult one since there are many concepts in Biology that are rather hard to explain to students due to their abstract nature. On this regard, the application of concept maps as well as the use of YouTube as a social media has been incorporated to improve both teaching and learning processes. Concept maps enable the presentation of the biological concepts and their inter-relationships in a simple manner hence enhancing understanding and memorization among students. This is evident by the high views which has been received by these tools where videos alone have received 1,601,114 views and the total watch time stand at 241,325 hours. Moreover, the majority of users' comments appearing in these videos are favourable, as both students and teachers noted that they enhance their learning of Biology concepts when these are presented in a visual manner. This implies that the integration of concept maps and YouTube has the potential of helping in addressing the challenges of teaching and learning of Biology.

KEYWORDS: Biology, concept mapping, digital learning platform, educational technology.

PROBLEM AND OBJECTIVE

Biology as a subject is known to be difficult to teach as well as to learn because it involves a lot of concepts that are complex and abstract (Liu & Lee, 2013). It is crucial to engage students in learning as life sciences cannot be well understood without Biology; however, the conventional methods used in teaching do not always catch students' interest, which results in poor learning (Orazkul et al., 2022). In that connection, the main goal of this initiative is to design a new and useful teaching and learning aid that will employ the concept of "Cabang Minda Biologi" and the digital technology, including YouTube, to improve the teaching and learning of Biology. This approach seeks to help the students and the teachers to comprehend various concepts in biology easily hence enhance performance.

DESIGN DESCRIPTION

Concept Maps: Chapter notes for the Biology course were created in the form of concept maps, to help students to absorb the information. These concept maps were developed in two languages namely Malay language and English language. These maps were done using the iPad Pro 12-inch and Notability app. The concept maps were designed in a way that they have a flowchart like format to enable easy comprehension. Biology textbooks for Form 4 and 5 were

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the main source of information for these maps and all the contents contained in the textbooks were captured in the maps. The information was well structured according to subtopics with branches that linked related subtopics to make sure that there was flow of the information. Figure 1 show the concept map that was design to enhance the student understanding.

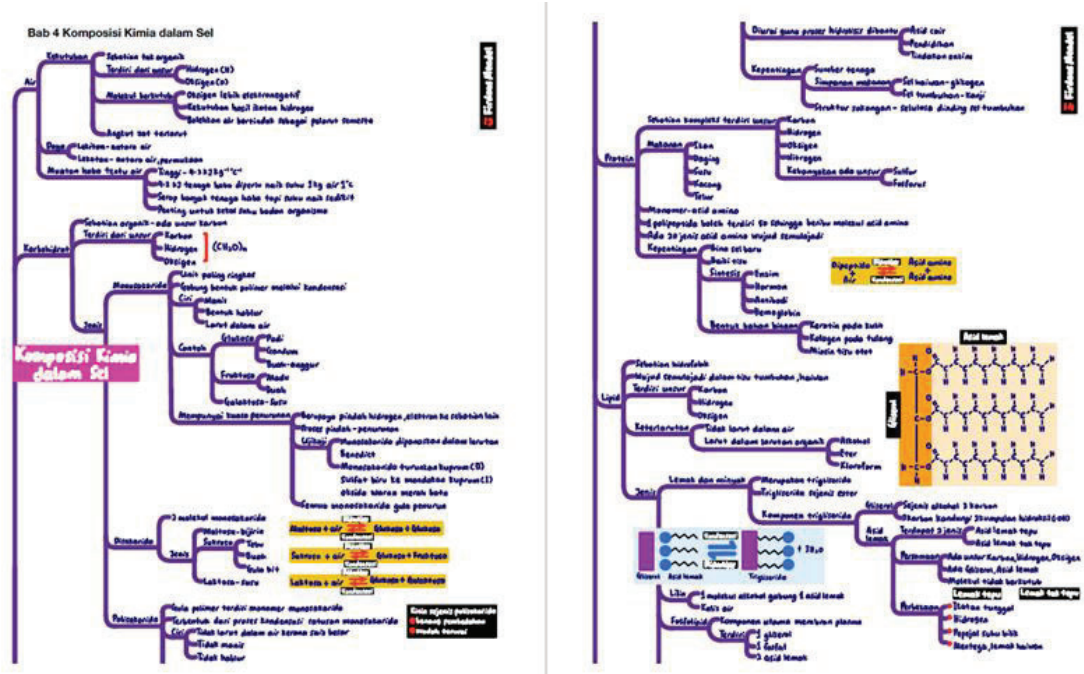


Figure 1 Example of a concept map for Chapter 4: Chemical Composition in Cells for Form 4 Biology.

Following the concept maps, the author created 56 instructional videos in the iPad Pro 12-inch model. These videos are 82 hours in total and the time division for each chapter and sub-chapters. The results of the views, hours watched and comments for the video content related to concept maps and instructional videos regarding genetics were evaluated. There are 56 instructional videos in the course, and they are 87 minutes in total in length. Total of 37 hours of the content was published on the YouTube channel "F I R D A U S" from 25 February 2020. The YouTube channel has been created and the videos have been uploaded in the channel with the following QR codes as presented in the table 1 below.

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Table 1 QR codes for teaching videos of Form 4 and 5 Biology subjects in Malay and English.

Form	Malay	English
Form 4		
Form 5		

NOVELTY AND UNIQUENESS

This work is innovative in that it combines concept maps with other forms of media to provide the learner with a more all-encompassing approach to learning Biology. The language used in this content is bilingual, Malay and English which means that the majority of the society will be able to understand it. Moreover, the incorporation of modern gadgets including the iPad Pro and Notability application in creating flowchart-type of concept maps is creative since the students are able to learn in a more detailed and interesting manner. The flow from the concept maps to the instructional videos also aids the learning process and offers the students with multiple ways of understanding the various biochemical concepts.

BENEFITS TO MANKIND

The use of this educational tool has been very effective as seen by the statistics such as the number of viewers and watch time. The Malay language videos to date have collected 797,282 views and the English language videos has collected 109,903 views up to August 24, 2024. These views have garnered 120,302.2 watch hours for the Malay videos and 15,785 watch hours for the English videos. Another important piece of information is shown in Table 3 which presents the delivery of viewership and watch hours by language. Table 2 list the viewership and watch hours by language all together, the videos have gathered 693,929 views and 105,238 hours of watch time. As for these metrics, it is possible to state that the tool helps to make Biology more understandable and enjoyable, and thus, it contributes to the development of education and the improvement of society.

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Table 2 The viewership and watch hours by language

Form	Malay		English		Total watch view	Total watch hours
	Watch view	Watch hours	Watch view	Watch hours		
Form 4	575884	87300	72442	10818.8	648326	98118.8
Form 5	221398	33002.2	37461	4966.8	258859	37969
Total	797282	120302.2	109903	15785.6	907185	136087.8

COMMERCIAL POTENTIAL

This project presents a lot of commercial possibilities. Since Views and Watch time are high, it generates revenue from YouTube monetization. The book based on this are available and been purchased by student and teachers.

CONCLUSION

This initiative effectively meets the challenges of teaching and learning Biology through the use of concept maps in conjunction with digital media, especially YouTube. The numbers of views and watch time are evidence that this method is helpful in improving the students' comprehension of Biology. Not only does the project have the potential to be a great educational tool, but it also provides a great amount of commercial value, which makes the project valuable for the field of education and the society as well.

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