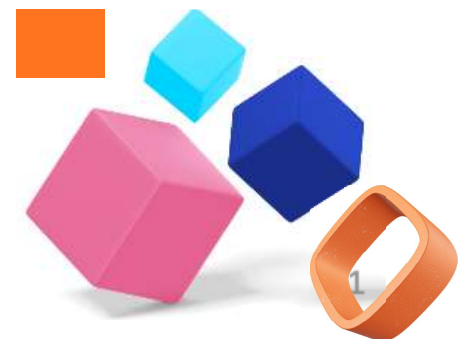




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FAKULTI SAINS KOMPUTER DAN MATEMATIK
UNIVERSITI TEKNOLOGI MARA
CAWANGAN JOHOR



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PREFACE

Praise be to Allah SWT, with His will, this eBook, ICT Trends that Matter, has been successfully compiled to capture some of the most relevant and transformative discussions in the world of Information and Communication Technology (ICT).

The work is a compilation of various views of the different practitioners, scholars, and professionals who have contributed their ideas and thoughts regarding the emerging technologies and their influence. The chapters provide just a few examples of how cybersecurity, big data harmonisation, artificial intelligence, novel learning tools, and social media analytics demonstrate the extent to which ICT has permeated our everyday worlds, our classrooms, workplaces, and communities.

ICT Trends that Matter offers readers a comprehensive exploration of 14 contemporary ICT themes that are shaping education, industry, and society. The eBook covers a wide spectrum of topics such as Big Data & AI, Digital Learning & Tools, Practical ICT Applications, Social Media & Communication and Smart Campus Initiatives highlighting UiTM Johor's experience in developing a data-driven digital ecosystem.

This eBook is informative and inspirational, with contributions that combine theory, research, and practical work. It makes the readers consider the existing ICT issues and opportunities and provides practical knowledge on personal, educational, and professional development. I would like to say that I am very grateful as the chief editor to all the contributors whose commitment, professionalism, and innovativeness have added value to the contents of this eBook. I believe ICT Trends that Matter will be useful to academicians and students, as well as any industry professional, policymaker and those who are keen to learn more about the dynamic ICT environment.

Whether you are an academic, student, or industry professional, ICT Trends that Matter provides valuable insights into the technologies that are redefining our world today. May this work inspire further dialogue, innovation, and collaboration toward building a smarter and more sustainable digital future.

Dr. Shamsatun Nahar Ahmad
Chief Editor
Brain Hub: ICT Trends that Matter

SYNOPSIS

ICT Trends that Matter is a compilation of 14 thought-provoking chapters, which discuss the most significant trends in Information and Communication Technology (ICT) and their implications on education, industry, and society.

The elements cut across essential areas of the digital world. Discussions about the harmonisation of big data and artificial intelligence to fight cybersecurity and comparative studies concerning popular AI tools will be available to the readers. The eBook also highlights innovative approaches to teaching and learning, such as Easymath2U and V-CCMPedia, to improve conceptual learning in calculus, and AI-assisted tools to improve student engagement.

The useful experience is presented with the help of the following topics: computer tips and tricks, free e-learning applications used by children, and the successful utilisation of social media analytics tools. The role of contemporary communication mediums such as Telegram and the global presence of TikTok are also discussed in the chapters, as well as reflections on institutional work towards data-driven digital ecosystems, such as the UiTM Johor RSP16 experience.

This eBook contains the work of numerous scholars and researchers and offers both theoretical insights and practical solutions, which is why it can be of interest to academics, students, practitioners in the industry, or policymakers. ICT Trends that Matter is not merely an anthology of articles but rather is a convenient way to learn about the latest trends in ICT and predict what to expect and what to take advantage of in the digital age.

ACKNOWLEDGEMENT

The Editorial Board of ICT Trends that Matter would like to thank everyone whose assistance and commitment enabled us to make this publication possible.

We would like to thank the Department of Linkage Industry and Alumni, UiTM Johor, Segamat Campus, for enabling the acquisition of eISBN and subsequent guidance throughout the publication process.

A special mention of gratitude belongs to all contributors, whose skills, knowledge and dedication have been instrumental in the content of this eBook. Every chapter is an embodiment of how well, creatively, and committed our writers were to delivering substantial discussions on the current issues in ICT.

We also recognise the unwearying efforts on the part of the Editorial Board, which have been tireless from the very beginning of the conception to the final production of this eBook, which makes it and guarantees its success.

We are most thankful to all who have assisted this undertaking either directly or indirectly. May Allah SWT bless this endeavour and enable it to do good for the readers and the community at large.

IMPROVING CONCEPTUAL UNDERSTANDING OF TOPICS IN CALCULUS VIA V-CCMPEDIA

SHAMSATUN NAHAR AHMAD, ERNY ARNIZA AHMAD,
RUSNANI MOHAMAD KHALID, MUHAMMAD YASSAR YUSRI

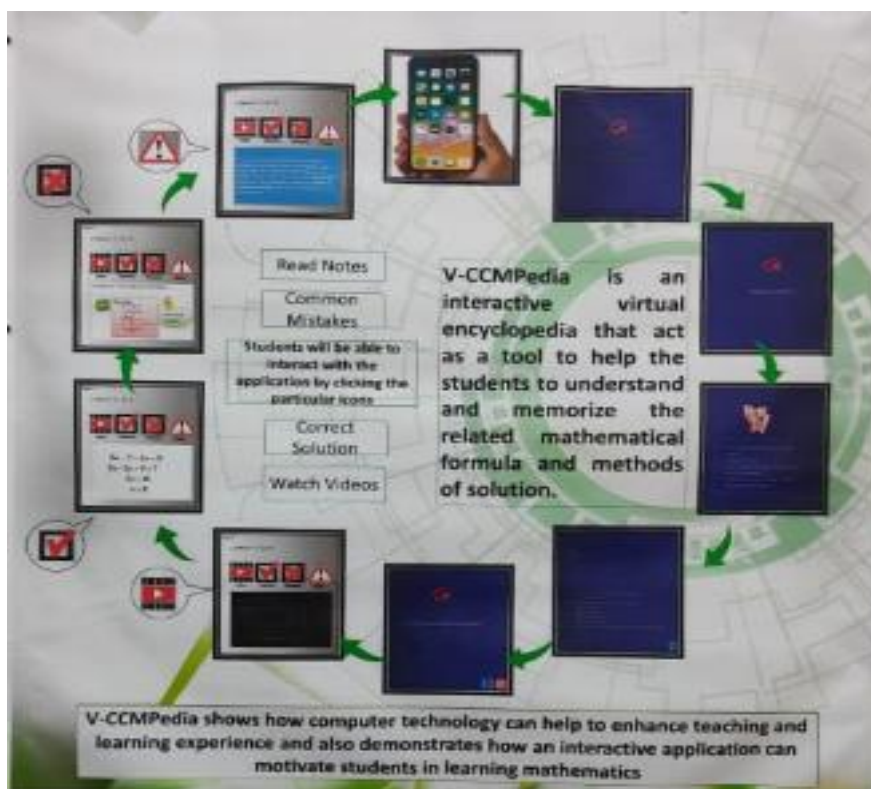


Figure 1. Cycle of V-CCMPedia

INTRODUCTION

There are certain reasons why new technologies are significant in the domain of the education nowadays, i.e. to offer the utilities of new types of interaction, to avail the learning in a much more absolute free form that towards more supercharged digital learning (Rahman & Zain, 2021). Although technological innovation does not have a value of its own, it can only be meaningful when it is the methodology in the tutorial and educational process (Marzano et al., 2013).

might be beneficial to the students in terms of self-learning. The provision of digital pedagogical training on the subject matter will help teachers to overcome the scope of basic technological replacement

One of the new technologies that has been implemented as a teaching tool in the learning and teaching of mathematics over the years are called the virtual manipulatives. According to the definition of virtual manipulatives that was presented by Patricia et al. (2016), it was an interactive and

technology-enhanced visualisation of a dynamical object in mathematics and all programmable aspects of the object that could provide the potential of developing mathematical constructive knowledge. Consequently, Farra et al. (2024) interviewed how virtual and concrete manipulatives are used in teaching fractions to students with positive learning gains in mathematical performance. Furthermore, just recently Sara Ahmad and Hans-Stefan Siller (2024) studied the effect of a mixed combination of virtual and concrete ones on the performance of the fifth grades students with exceptional abilities. The cumulative intervention was great in improving the math levels of low achievers, average and high achievers at high position in comparison to other ordinary techniques of instruction.

Anderson-Pence (2017) reported that when learning mathematical concepts with technology, students have access to multiple modalities of mathematical representations. Therefore, technology enhances the communication of

mathematical ideas and supports students' learning of mathematical concepts.

Calculus is one of the mathematical courses which is a well-known course for the students of Science, Technology, Engineering and Mathematics at the tertiary level. Many educators integrated applying tools in their method of teaching Calculus for students to gain a better understanding on the topics. However, students seem to repeat the same common mistakes. This is a serious problem that is still unsolved due to lack of understanding and focus on the related topics.

A serious effort to design a virtual encyclopaedia was made to compile the common mistakes that always occur while marking students' homework, assignments, quizzes, tests and final exams. The development of V-CCMPedia is mainly to assist the students in understanding related topics and avoiding repeating mistakes. It is also to provide the students with an interactive tool that can help them to understand and memorise the related mathematical formula and methods.

CONTENT DEVELOPMENT

Students are finding virtual books very useful and online education has become more interesting, convenient and affordable (Cohen et al., 2003). But, in online education, they occasionally experience some connectivity and network problems. Consequently, we are interested in the offline service of our interactive mathematical documents.

V-CCMPedia is a virtual interactive encyclopaedia, which is a teaching aid that allows students to learn and create mental maps of the associated mathematical formula and technique of solution. It is easily accessible and not disrupting the internet line. By clicking on the specific icons, students will have a possibility to watch revision videos, read notes, study examples of exercises with their correct answers and learn about the most common errors in solving some specific equations. This product is highly convenient to every user especially students and teachers.

The following are the benefits of V-CCMPedia as shown in Figure 1:

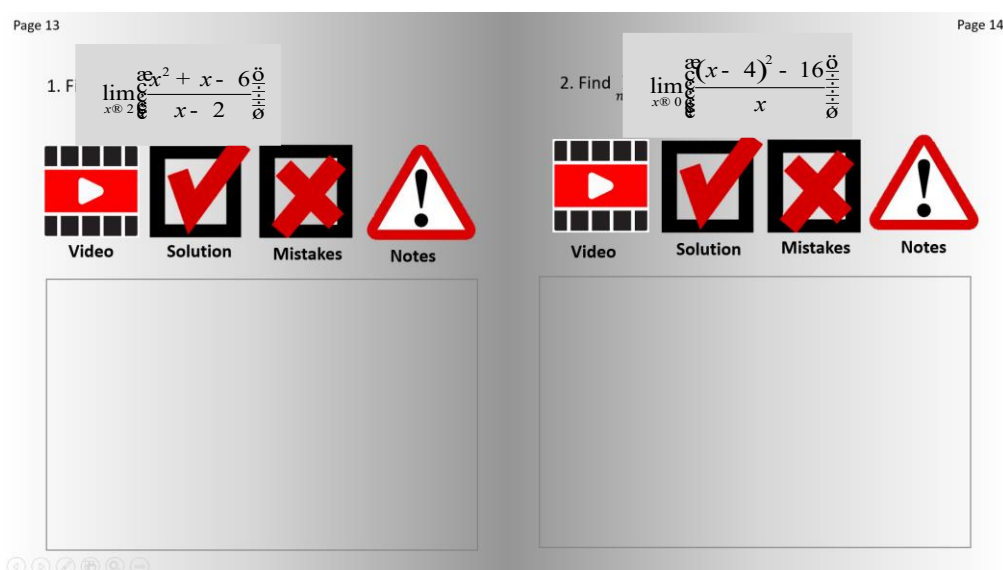
1. V-CCMPedia has an interactive link to the list of topics, which allows students to quickly jump to the page containing the intended content.
2. Since it is an electronic document, students can simply download and use it without internet connection.
3. Students can interact with the application at their own convenience. Mobile devices are common to students. Therefore, the portability of V-CCMPedia allows students to refer to their notes and their course materials at anytime from anywhere.
4. V-CCMPedia contributes active learning process for Calculus course.

Demonstration of V-CCMPedia

1. Table of Content. Students are free to choose the topic.




2. Four options for navigation: video, correct solution, common mistake, notes





3. Option for video


Page 13
Page 14

1. Find $\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x - 2}$


Video


Solution


Mistakes



Notes


Finding limits algebraically


① Factoring


$$\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x - 2} = \lim_{x \rightarrow 2} \frac{(x+3)(x-2)}{x-2} = \lim_{x \rightarrow 2} (x+3) = 5$$

2. Find $\lim_{x \rightarrow 0} \frac{(x-4)^2 - 16}{x}$


Video


Solution


Mistakes


Notes

② Expanding Terms

$$\lim_{x \rightarrow 0} \frac{(x-4)^2 - 16}{x} = \lim_{x \rightarrow 0} \frac{(x^2 - 8x + 16) - 16}{x} = \lim_{x \rightarrow 0} \frac{x^2 - 8x}{x} = \lim_{x \rightarrow 0} (x - 8) = 0 - 8 = -8$$

CONCLUSION

This product is to introduce the interactive application to assist students in understanding some common mistakes made while writing the solutions of certain topics in Calculus. Bringing technology into classrooms has had a positive impact on the quality of education delivered. Mathematics lecturers in UiTM Segamat campus unanimously agree upon the benefits of using V-CCMPedia in learning Calculus for some topics. V-CCMPedia shows how computer technology can help to enhance teaching and learning experience and also demonstrates how an interactive application can motivate students in learning Calculus.

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