

Development and Implementation of Artificial Intelligence (AI)-Based Animated Videos to Enhance Students' Knowledge in the Malay Literature Subject for form Three

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ABSTRACT

The implementation of Malay Language KOMSAS teaching remains largely conventional, less interactive, and insufficiently engaging for students. As a result, previous studies have shown that many students experience difficulties understanding literary content, often perceive literature lessons as uninteresting, and are exposed to limited integration of digital technology in the teaching and learning process. This study aims to develop, implement, and evaluate an artificial intelligence (AI)-based animated video to enhance knowledge of the novel literary in the Malay Language KOMSAS component of secondary school students by employing Mayer's Cognitive Theory of Multimedia Learning, the ASSURE Instructional Design Model, and the mastery learning strategy. The study employed a Design and Development Research (DDR) approach, using questionnaires, pre-tests and post-tests, and expert validation to collect data, involving 31 Form Three students and 2 Malay Language expert teachers. The findings indicated that the AI-based animated video demonstrates a high level of usability and is well received by students in terms of their comprehension, interest, and learning experience. Following the application of multimedia learning principles employed in the development of the AI-based video, the results also showed that the AI video has helped students to understand the synopsis, theme, and issues of the novel through the integration of visual and audio elements. The study also showed that there is a significant improvement in students' knowledge of the literary aspects of the novel within the Malay Language KOMSAS component, after the implementation of the AI-based video. The study suggested that the used of AI-based animated videos have a strong potential to improve the Malay Language literature teaching and learning. The study further implicated that trainings on recent applications and tools necessary to help teachers develop their own AI-based video must be given to the teachers at regular intervals as a way to support the implementation of digital pedagogy in language education particularly in the Malay Language education.

Keywords: Artificial Intelligence (AI), AI-Based Animated Video, Malay Literature, KOMSAS, ASSURE Model

INTRODUCTION

The application of digital technology, particularly artificial intelligence (AI), has increasingly become a central focus in the transformation of education in Malaysia in line with current technological developments. This emphasis is reflected in the *Malaysia Future Education Plan (PPMDM) 2026–2036* and the *Digital Education Policy (DPD) 2023*, both of which highlight the importance of integrating digital technology into the teaching and learning (PdP) process to produce digitally fluent and competitive generations (Bernama 2025; Ministry of Education Malaysia 2025). In this regard, educators need to enhance their digital competencies to ensure that teaching and learning practices are more engaging, interactive, and effective. This need is particularly significant in the teaching of the Malay Language literature component (*Komponen Sastera* or KOMSAS), which is often perceived by students as difficult and less engaging, consequently affecting their interest and academic achievement (Rafiza Abdul Razak 2013; Abdul Rasid 2023). In response to this issue, the use of animated videos as digital teaching aids is seen as having the potential to diversify pedagogical approaches and enhance students' learning effectiveness. A study by Liu and Elms (2019) found that animated videos can increase students' interest and engagement while helping to explain complex concepts through the support of visual and audio elements.

Therefore, the integration of AI-based animated videos is believed to enrich the learning experience and make the teaching of Malay Language KOMSAS more interactive, meaningful, and aligned with the needs of 21st-century education.

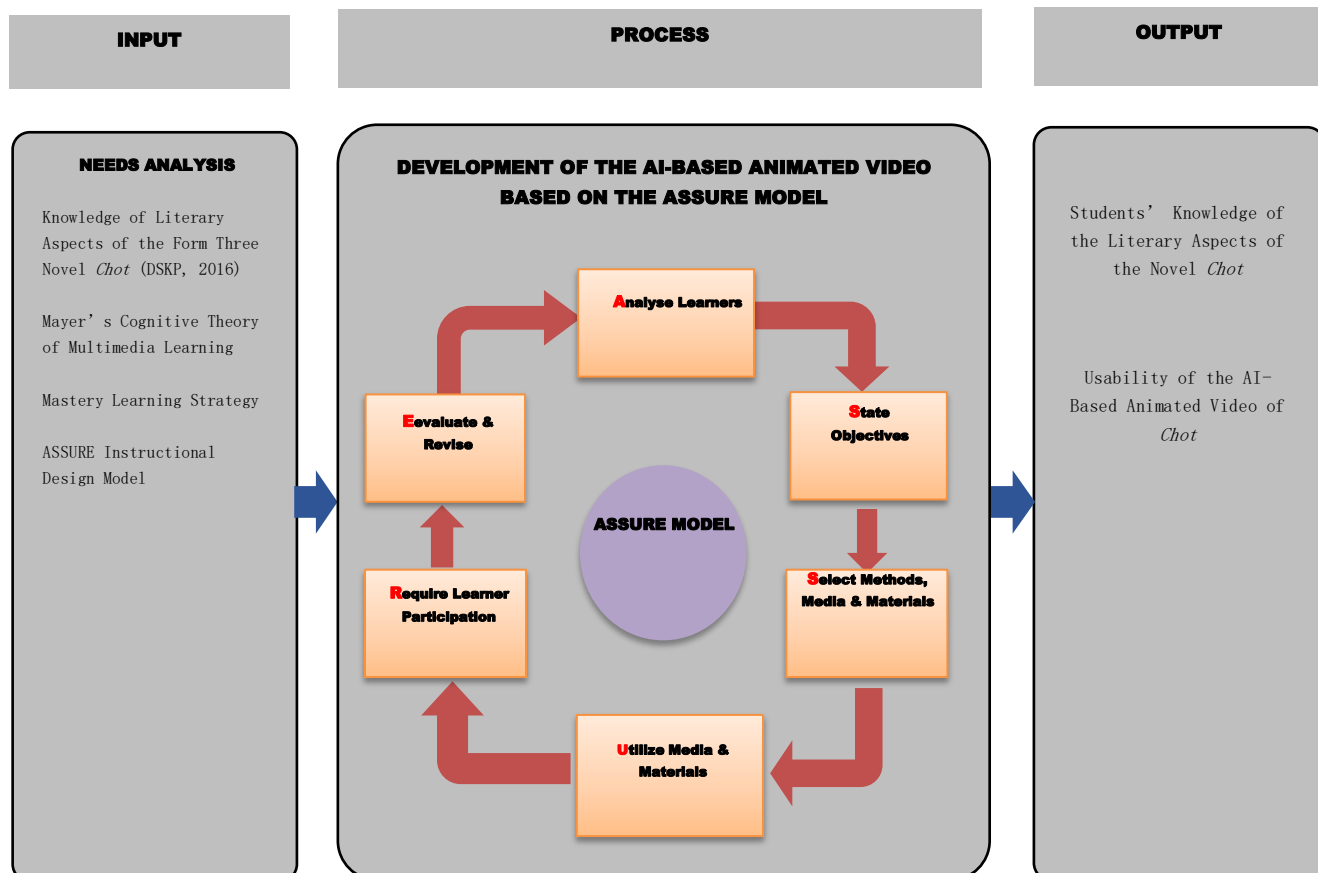
Problem Statement

Previous studies have shown that the teaching and learning (PdP) of the Malay Language literature component (KOMSAS) continues to face various challenges that affect students’ interest and academic performance. The teaching of KOMSAS has been found to remain mainly conventional and teacher-centred, resulting in students learning the subject primarily for examination purposes (Abdul Rasid 2023). The study revealed that only a small proportion of students demonstrate interest in learning KOMSAS, while the majority perceive it as uninteresting due to the heavy reliance on textbooks and the limited time available to complete the prescribed syllabus. In addition, teachers have been found to underutilise technology-based teaching aids and tend to rely on traditional methods such as textbooks and worksheets (Intan Omar et al. 2021; Zuraidah Abdul Karim 2013). This situation results in a one-way teaching and learning process, which limits students’ active participation and negatively affects their understanding of literary content (Rafiza Abdul Razak 2013). Although numerous studies have shown that the use of animated videos can enhance students’ interest, motivation, and learning performance across various disciplines (Sunami and Aslam 2021; Febriani et al. 2022; Saragih et al. 2023), research focusing on their use in Malay Language teaching and learning, particularly in the context of KOMSAS, remains limited. More notably, studies related to the development of AI-based animated videos within the context of Malay Language KOMSAS in Malaysia are still relatively scarce. Therefore, this study was conducted to develop and evaluate the use of AI-based animated videos as an innovative teaching material that has the potential to enhance the effectiveness of KOMSAS teaching and learning while supporting current digital education needs.

Conceptual Framework

The conceptual framework of this study establishes a dynamic and systematic relationship between input, process, and output that are closely interconnected.

Figure 1. Conceptual Framework



In terms of input, the study begins with an analysis of students' needs and the selection of appropriate learning theories and instructional strategies, particularly Mayer's Cognitive Theory of Multimedia Learning, the ASSURE Instructional Model, and the mastery learning strategy.

These theories and models serve as the foundation for planning and designing effective learning materials, while the mastery learning strategy ensures that students fully master a particular skill or content before progressing to the next level.

Subsequently, the process of the study involves the development and implementation of AI-based animated videos specifically designed for learning the literary component of the novel *Chot*. This process is carried out systematically by following the steps outlined in the ASSURE model, while also breaking down the content into smaller learning units as recommended in mastery learning.

The learning sequence begins with the synopsis before progressing to higher-order skills that are more abstract and conceptual in nature, namely the theme and issues presented in the novel.

Finally, the output of the study refers to the effectiveness of the animated video in terms of its usability and the extent to which it enhances students' knowledge of the novel's content.

In summary, this conceptual framework serves as a solid foundation for the overall implementation of the research, ensuring that the development of learning materials is theory-based, systematically structured, technologically supported, and aligned with the pedagogical needs of 21st-century learners who increasingly prefer digital, interactive, and step-by-step learning approaches as emphasised in mastery learning.

Research Objectives & Research Questions

The objectives of this study are to:

1. Explore the need to develop AI-based animated videos for learning the novel *Chot*.
2. Design and develop an AI-based animated video for learning the novel *Chot*.
3. Implement the developed AI-based animated learning video for the novel *Chot* among Form Three students.
4. Evaluate the development of the AI-based animated video in the learning of the novel *Chot*.

Based on the research objectives above, this study aims to address the following research questions:

1. What is the level of students' knowledge regarding the literary aspects of the novel *Chot*?
2. What are the learning styles of the students involved in the study?
3. What learning objectives are expected to be achieved after students watch the AI-based animated video of the novel *Chot*?
4. How is the AI-based animated video of the novel *Chot* designed and developed using Mayer's Cognitive Theory of Multimedia Learning and the mastery learning strategy?
5. How is the AI-based animated video of the novel *Chot* implemented using the mastery learning strategy?
6. What is the level of usability of the AI-based animated video developed for learning the novel *Chot*?
7. Is there an improvement in students' knowledge before and after watching the developed AI-based animated video of the novel *Chot*?

LITERATURE REVIEW

Teaching and Learning of Malay Language Literature Component (KOMSAS)

Previous studies have shown that the teaching and learning (PdP) of the Malay Language literature component (KOMSAS) continues to face various challenges that affect students' interest and academic performance. Among these challenges is the use of conventional and teacher-centred teaching approaches, which result in students learning KOMSAS primarily for examination purposes (Abdul Rasid 2023). The study found that only a small proportion of students demonstrate interest in learning KOMSAS, while the majority perceive the lessons as uninteresting due to the heavy reliance on textbooks and the limited time available to complete the prescribed syllabus. In addition, teachers have been found to underutilise technology-based teaching aids (BBM) despite the availability of such facilities, and instead tend to rely on traditional methods such as textbooks and worksheets (Intan Omar et al. 2021; Zuraidah Abdul Karim 2013).

This situation becomes more pronounced when teachers' creativity in developing instructional materials is found to be at a moderate level and does not sufficiently take into account the diverse abilities of students in the classroom (Abdul Rasid 2023). An excessive emphasis on examinations has led to KOMSAS teaching and learning being implemented in a one-way, exam-oriented manner, thereby limiting students' active participation. Such a situation not only affects learning outcomes but also contributes to negative perceptions and a sense of apprehension toward literary materials among students (Rafiza Abdul Razak 2013). Therefore, more interactive and active learning-based teaching approaches are needed to enhance students' understanding, motivation, and interest in learning KOMSAS.

Although numerous studies have demonstrated that the use of animated videos can enhance students' interest, motivation, and academic achievement across various learning fields (Saragih et al. 2023; Sunami and Aslam 2021; Febriani et al. 2022), research focusing on their application in Malay Language teaching and learning, particularly in the context of KOMSAS, remains limited. More notably, studies related to the development of artificial intelligence (AI)-based animated videos within the context of Malay Language KOMSAS in Malaysia are still relatively scarce. Therefore, this study was conducted to develop and evaluate the use of AI-based animated videos as an innovative teaching material that has the potential to enhance the effectiveness of KOMSAS teaching and learning while supporting current digital education needs.

The Use of Animated Videos in Student Learning

Animated videos as multimedia teaching aids (BBM) are increasingly being used in education because the combination of visual, auditory, and narrative elements helps convey abstract information more clearly and engagingly. Putri Ningsi et al. (2024) demonstrated that animated videos improve students' understanding of abstract concepts and enhance creative thinking in science topics. This finding is consistent with Minalla (2024), who proved the effectiveness of animated videos for learning English vocabulary as a foreign language, while Hanny and Ika (2023) found that animated videos created through Canva enhanced Indonesian language learning and made the teaching and learning process more interactive. These findings suggest that animation functions effectively across disciplines; however, specific exploration within the context of Malay literature, particularly KOMSAS, remains limited.

In terms of motivation and academic performance, studies by Sunami and Aslam (2021) and Febriani et al. (2022) indicate that animated videos can increase students' interest and achievement in science topics. Fisabilillah and Sakti (2021) further found that animation helps explain topics that are perceived as difficult and uninteresting, while Susanti and Damayanti (2022) reported that animated videos helped restore students' motivation during online learning. Within the context of literature learning, animated storytelling has been found to assist students in better understanding narrative elements such as characters and plot in folktales because visual representation allows learners to better understand actions, emotions, and story sequences (Saharudin et al., 2020) while Uktolseja (2021) has demonstrated that animation enhances speaking skills. These findings are further supported by Chabib and Wahyu (2013), who highlighted the role of edutainment elements in learning, as well as Hapsari (2021) and Elpira and Ghufroon (2015), who found that moving visuals and narrative audio facilitate comprehension and allow learning materials to be revisited repeatedly.

Although numerous studies have demonstrated the effectiveness of animation across various learning contexts, research that specifically focuses on the integration of animation and artificial intelligence (AI) within the context of Malay Language KOMSAS remains very limited. Therefore, this study not only addresses the existing gap in the literature but also contributes to an innovative pedagogical approach that aligns with the Digital Education Policy and the demands of 21st-century education.

The Use of AI in Education and the Development of Animated Learning Videos

Artificial intelligence (AI) refers to systems capable of performing tasks that normally require human intelligence, and in the educational context it is applied through intelligent learning systems, virtual tutors, generative applications, and personalised learning environments (Zawacki-Richter et al., 2019). One of the most widely recognised AI technologies is ChatGPT; Krystal Hu (2023) reported that ChatGPT reached 100 million active users in January 2023 following its launch on 30 November 2022. Opara et al. (2023) found that AI tools such as ChatGPT can accelerate information retrieval, generate content, and support adaptive learning, while also reducing teachers' workload related to repetitive tasks. In language learning, Wu Xiaofan and Annamalai (2023) reported that AI enhances students' motivation and self-directed learning through more flexible learning experiences.

Nevertheless, research focusing specifically on the use of AI for the development of animated learning videos remains limited. Applications such as PicVerse, Kling AI, Leonardo AI, and Canva AI enable educators to produce animated content without requiring advanced technical skills while also supporting automation and personalised learning (Pearson, 2024). Lee et al. (2025) reported that generative AI video technologies (Video GenAI) have the potential to enhance students' understanding, provide personalised learning experiences, and support creative expression; however, this field is still at an early stage of development. Studies by Parasyawati (2025) and Fani Azfar (2024) further indicate that AI-based animated videos can improve learning effectiveness and are particularly suitable for students with auditory and visual learning styles. Therefore, exploring the use of AI-based animated videos in Malay Language KOMSAS has the potential to address existing gaps in the literature while supporting interactive and visually oriented pedagogical approaches that are believed to be more effective and capable of overcoming the limitations of increasingly monotonous conventional teaching methods (Fani Azfar, 2024; Imamah et al., 2023).

Within the context of this study, the integration of AI-based animated videos is seen as having the potential to bring KOMSAS content to life in a more contextualised and immersive manner. Therefore, this study is both timely and necessary, as it supports the needs of 21st-century education, which demands more creative, flexible, and technology-driven learning approaches.

Theoretical Framework and Models Supporting the Use of Animated Videos in Education

The use of animated videos in learning is supported by the Cognitive Theory of Multimedia Learning (CTML) introduced by Mayer (2001). This theory is based on three key assumptions: dual-channel processing (visual and auditory), limited capacity for information processing, and the need for active processing to construct meaningful understanding. In the context of KOMSAS learning, which often involves abstract concepts, delivering information solely through text may increase students' cognitive load. Therefore, the integration of moving visual elements, narrative audio, and visual cues such as signalling and segmenting can help students visualise characters, settings, and symbolic elements more clearly, thereby facilitating their understanding of literary content (Mayer 2009; Berney & Bétrancourt 2016). Previous studies have also shown that animation designed based on CTML principles can enhance concept acquisition and comprehension of complex topics (Berney & Bétrancourt 2016; Duaa Albaw 2021).

In addition, this study is guided by the ASSURE Instructional Design Model, which provides a systematic framework for integrating technology into teaching and learning through six main phases: *Analyse learners*, *State objectives*, *Select methods, media and materials*, *Utilize media and materials*, *Require learner participation*, and *Evaluate and revise* (Heinich et al. 1999). This model is employed to ensure that the development of the AI-based animated video aligns with students' needs, the learning objectives outlined in the Malay Language *Dokumen Standard Kurikulum dan Pentaksiran* (DSKP), and the authentic learning context.

In summary, the integration of CTML and the ASSURE model provides a strong theoretical and pedagogical foundation for the development of digital learning materials, thereby supporting a more systematic, interactive, and effective approach to KOMSAS teaching and learning that aligns with the needs of 21st-century education (Sugiri et al. 2020; Fiandra et al. 2022; Zaipul and Saleh 2024).

METHODOLOGY

Research Design

The study adopts a Design and Development Research (DDR) approach, which is a research methodology aiming to systematically design, develop and evaluate instructional and non-instructional products and tools as well as new or enhanced models (Richey & Klein, 2009). DDR typically involves five main stages: (1) need analysis, where existing learning challenges are identified; (2) design, which involves planning the structure, objectives, and instructional strategies of the product; (3) development, where the instructional material is produced; (4) implementation, during which the developed product is implemented in an actual learning context; and (5) evaluation, which assesses the usability, effectiveness, and potential improvements of the developed product. This approach is particularly suitable for the present study as it provides a structured framework for analysing students' learning needs, designing and developing the AI-based animated video based on multimedia learning principles and mastery learning strategies, implementing the material in a real learning setting, and evaluating its usability and effectiveness in improving students' understanding of the literary aspects of the *Chot* novel.

Since DDR is a generic process of designing and developing any products, the study integrated the ASSURE Instructional Design Model to highlight the teaching and learning aspects of designing and developing teaching material for improving novel literary aspects in the Malay Language KOMSAS of secondary school students. Basically, instructional design is defined as a systematic process that is employed in developing education and training program in a consistent and reliable fashion (Reiser & Dempsey, 2007). Within the context of this study, the ASSURE Instructional Design Model was employed because it provides a practical and systematic procedure for integrating technology into teaching and learning processes based on clearly defined objectives and students' learning needs. The ASSURE model consists of six main phases: (1) *Analyse Learners*, which involves identifying students' characteristics, prior knowledge, and learning styles; (2) *State Objectives*, where clear and measurable learning outcomes are identified; (3) *Select Methods, Media, and Materials*, which involves selecting appropriate and suitable instructional strategies and learning resources; (4) *Utilize Media and Materials*, where the selected materials are implemented in the teaching process; (5) *Require Learner Participation*, which encourages active student involvement in learning activities; and (6) *Evaluate and Revise*, which encompasses assessing the effectiveness of the instructional materials and making necessary improvements. In this study, the ASSURE model was adopted in the design and development of the AI-based animated video, ensuring that the instructional materials were systematically planned, aligned with students' learning needs, and effectively integrated with technology to enhance students' understanding of literary aspects in the Malay Language KOMSAS component.

Sampling and Participants

The study involved Form Three students who attended Malay Language classes at a private tuition centre in Melaka. Purposive sampling was employed, as participants were selected based on their suitability and their ability to provide relevant information (Creswell, 2018). During the *Analyse Learners* phase, 31 students were selected based on their academic achievement and their ability to provide verbal feedback. A pilot study was also conducted involving nine students who had previously studied the novel *Chot*.

In the third phase, *Select Methods, Media and Materials*, after the animated video had been developed, two Malay Language expert teachers were appointed to evaluate the appropriateness of the content, language use, and visual approach. This expert evaluation served to strengthen the validity and reliability of the study (Merriam & Tisdell, 2016). In the *Require Learner Participation* and *Evaluate and Revise* phases, the same 31 students who participated in the first phase were invited to attend a learning session using the AI-based animated video. They were required to complete a pre-test, post-test, and usability evaluation of the learning material. Since this

study aims to develop and evaluate the usability of instructional materials rather than generalise findings to a wider population, the sample size was considered adequate for development research purposes.

Research Instruments

This study utilised three main instruments mainly i) Questionnaires; ii) Expert evaluation checklist; and iii) Knowledge tests. Two types of questionnaires were used in the study: i) *Needs Analysis Questionnaire*, which was used to examine students' background information, their interest in KOMSAS, and their dominant learning styles; and ii) *Material Usability Questionnaire*, which was used to evaluate students' perceptions of the usability of the AI-based animated video, particularly in terms of content clarity, language suitability, visual appeal, and effectiveness in supporting comprehension. Both questionnaires employed a five-point Likert scale.

The Expert Evaluation Checklist was used to obtain feedback from two experienced Malay Language teachers specialising in KOMSAS instruction. This instrument assessed three main aspects: i) Content (aligned with the Form Three Malay Language *Dokumen Standard Kurikulum dan Pentaksiran*, DSKP); ii) Language (accuracy and suitability according to students' cognitive level); and iii) Visual and multimedia design (quality of graphics and animation, colour usage, text layout, and the integration of audio and visual elements)

The Knowledge Test Instrument was used to measure students' mastery of the synopsis, themes, and issues of the novel *Chot*. The test was administered in two stages: pre-test and post-test.

Pilot Study

A pilot study was conducted to evaluate the suitability of the AI-based animated video and the research instruments prior to the actual implementation of the study. A total of nine Form Three students were selected to watch the video and respond to the instruments provided. The pilot study assessed several aspects, including the clarity of the storyline, students' understanding of the synopsis, themes, and issues of the novel, the appropriateness of the video duration, the clarity of instructions, and the comprehensibility of the test items.

Validity and Reliability

The content validity of the AI-based animated video was evaluated by two Malay Language experts with extensive experience in teaching KOMSAS. One expert is a PPP DG13 teacher with 28 years of experience in Malay Language teaching, while the other is a tutor with 32 years of experience in teaching secondary-level literature. The evaluation was conducted using a checklist covering aspects of content, language, and multimedia design. Both experts confirmed that the video content was accurate, aligned with the Form Three Malay Language DSKP, and met assessment requirements. The language was considered appropriate for the students' level, while the visual and animation design was regarded as engaging and supportive of students' comprehension. Several improvement suggestions were also provided, including strengthening the use of discourse markers in essay explanations.

In terms of internal reliability, both questionnaires were tested using Cronbach's Alpha through SPSS Version 25 following the pilot study. The alpha values obtained were 0.93 for the *Needs Analysis Questionnaire* and 0.86 for the *Material Usability Questionnaire*. These values indicate a high and consistent level of reliability (Nunnally & Bernstein, 1994), thus confirming the suitability of the instruments for actual data collection.

Data Collection and Analysis

Data were collected through questionnaires and knowledge tests. A five-point Likert scale was used to measure students' perceptions of KOMSAS learning and the usability of the AI-based animated video, where: 1 = Strongly Disagree (STD); 2 = Disagree (D); 3 = Slightly Agree (SLA); 4 = Agree (A); and 5 = Strongly Agree (STA). The data were analysed using *SPSS Version 25*. Descriptive statistics such as frequency, percentage, mean, and standard deviation were employed to analyse respondents' profiles, levels of interest, and perceptions regarding the usability of the learning materials. The interpretation of mean scores was based on the scale proposed by Nurul Hidayah and Norasmah (2021).

Table 1. Interpretation of Mean Scores

Mean Score	Level of Interpretation
4.30 – 5.00	Very High
3.50 – 4.29	High
2.70 – 3.49	Moderate
1.90 – 2.69	Low
1.00 – 1.89	Very Low

Source : Nurul Hidayah & Norasmah (2021)

For the knowledge test, pre-test and post-test scores were analysed using descriptive statistics to examine the distribution and average performance of students. The difference between the scores was further analysed using a paired-samples t-test to determine whether there was a significant improvement following the intervention.

RESULTS

The research results are organised according to the phases of implementation, beginning with the needs analysis of students prior to the development of the AI-based animated video. This phase addresses Research Questions 1 and 2, namely the level of students’ knowledge of the literary aspects of the novel *Chot* and the dominant learning styles of the students.

Phase 1: Needs Analysis (Analyse Learners)

Background of the Study Participants

A total of 31 Form Two and Form Three students from a private tuition centre in Melaka participated in this study. Of the participants, 61% were male students and 39% were female students. The majority of the respondents (71%) were Form Two students, while the remaining participants were Form Three students.

In terms of academic achievement, 55% of the students were from high-performing classes (First and Second Classes). The diversity in academic performance allowed the needs analysis to be conducted more comprehensively without being significantly influenced by factors such as basic literacy weaknesses or major learning difficulties.

Students’ Perceptions of KOMSAS Learning

The analysis of students’ perceptions indicated that the overall level of acceptance toward KOMSAS learning was moderate ($Mean = 3.49, SD = 0.68$). Students’ interest in learning the novel was also moderate ($Mean = 3.10$), as was the level of enjoyment in learning the literature component ($Mean = 3.23$). These findings suggest that although students do not reject KOMSAS learning, they do not demonstrate a particularly high level of enthusiasm for it.

Nevertheless, students showed positive perceptions regarding the benefits of learning the novel. They believed that learning the novel could enhance their Malay language proficiency ($Mean = 3.87$) and that the novel contains important values and moral lessons ($Mean = 3.87$). However, they were less convinced that learning the novel could significantly increase their interest in the Malay Language subject as a whole ($Mean = 3.45$).

Table 2. Respondents’ Perceptions of Learning the KOMSAS Novel

No	Item	STD	D	SLA	A	STA	Mean	SD	Level
1.	I am interested in learning literature.	13.2%	619.4%	1341.9%	1135.5%	-	3.10	0.83	High

2.	I enjoy learning literature.	26.5%	26.5%	1445.2%	1341.9%	-	3.23	0.85	Moderate
3.	Learning literature can improve my Malay language proficiency.	-	26.5%	26.5%	1651.6%	1135.5%	3.87	0.92	High
4.	Learning literature can increase my interest in the Malay Language subject.	-	-	39.7%	1858.1%	1032.3%	3.45	0.96	Moderate
5.	Learning literature is important because it contains many values and lessons that can serve as guidance in life.	-	-	39.7%	1858.1%	1032.3%	3.87	0.92	High
	Overall						3.49	0.68	Moderate

Overall, students acknowledge the importance of KOMSAS in terms of its moral values and its contribution to language development; however, their levels of interest and motivation remain moderate.

Students' Knowledge Level of Literary Aspects

A pre-test was conducted to measure students' existing knowledge of the literary aspects of the novel *Chot*. The results indicate that the overall level of mastery was low, with a mean score of only 41.36%.

A more detailed analysis shows that students demonstrated the weakest performance in the aspect of theme (12.90%), followed by issues or underlying messages (35.48%) and social setting (45.97%). A moderate level of mastery was recorded for setting of place (56.45%) and characterisation (54.84%). The highest level of mastery was observed in the aspects of values (70.97%) and moral lessons (69.35%), which are generally easier to identify through general reading.

Table 3. Respondents' Knowledge of Literary Aspects

Aspect	N	0%	25%	50%	75%	100%	Mean (%)
Theme	31	23	0	8	0	0	12.90
Issues	31	15	2	7	0	7	35.48
Characterisation	31	7	3	9	1	11	54.84
Moral Values	31	2	1	12	1	15	70.97
Moral Lessons	31	2	1	13	1	14	69.35
Social Setting	31	12	2	6	1	10	45.97
Setting of Place	31	8	1	9	1	12	56.45
Overall							41.36

These findings indicate that although students have been exposed to KOMSAS in accordance with the DSKP, they have not yet mastered the more abstract literary aspects such as theme and issues. This result highlights the

need to develop more visual and systematic learning materials to support students' understanding of complex literary concepts.

Students' Learning Styles

Students' learning styles were analysed using an instrument adapted from the VARK Questionnaire (Fleming, 1987), which categorises learning preferences into four main styles: Visual, Auditory, Reading/Writing, and Kinesthetic. The results indicate that the majority of students demonstrate a preference for the Visual learning style (96%), followed by Auditory (81%), Kinesthetic (68%), and the lowest preference for Reading/Writing (58%). The dominance of visual and auditory learning styles suggests that students respond more positively to graphical stimuli, animated visuals, and audio-based explanations compared to learning that relies solely on text-based materials.

Overall, the needs analysis indicates a clear requirement for the development of teaching and learning materials that are more visual, interactive, and aligned with students' preferred learning styles.

Phase 2: Establishing Learning Objectives (*State Objectives*)

This phase addresses Research Question 3, which concerns the learning objectives to be achieved after students watch the AI-based animated video of the novel *Chot*. In line with the ASSURE Model, the learning objectives were formulated to serve as clear and measurable learning outcomes. These objectives were developed based on Learning Standard 4.1.1 of the Form Three Malay Language *Dokumen Standard Kurikulum dan Pentaksiran* (DSKP), which emphasises students' ability to understand and appreciate prose works through rational responses to the synopsis, themes, and issues presented in the text (DSKP, 2016).

After watching the AI-based animated video, students are expected to be able to:

- a. Explain at least 8 out of 10 key events in the synopsis of the novel *Chot* accurately, including the characters, conflicts, and relationships between characters;
- b. Explain the main theme of the novel by providing at least two relevant and accurate examples of events;
- c. Describe at least two issues or underlying messages in the novel, each supported by one appropriate example of an event.

Phase 3: Development Process of the AI-Based Animated Video (Select & Design Methods, Media & Materials)

This phase addresses Research Question 4, which concerns how the AI-based animated video of the novel *Chot* was designed based on Mayer's Cognitive Theory of Multimedia Learning and the mastery learning strategy.

Content Planning

Based on the pre-test findings, three main aspects were selected to be included in the video: synopsis, theme, and issues. The synopsis was chosen as the foundation for understanding the storyline, while the theme and issues were emphasised because students' level of mastery in these two aspects was found to be relatively low.

The content was organised according to the mastery learning strategy into three modules: Module 1: Synopsis; Module 2: Theme; and Module 3: Issues. Students were required to master the earlier module before progressing to the next. The synopsis module introduces the storyline, characters, and conflicts as the foundation for understanding the theme and issues. The theme module guides students in identifying the main idea along with relevant examples of events, while the issues module emphasises students' ability to relate issues to appropriate events in the story.

The content design adheres to the principles of Mayer's Cognitive Theory of Multimedia Learning, particularly the principles of segmenting, signalling, coherence, and modality. The content was presented progressively using concise text and visual emphasis to reduce cognitive load and enhance students' comprehension.

The following are the links to the three videos developed in this study:

1. Module 1 Video: Synopsis – <https://youtu.be/0s7XraSbCEg>
2. Module 2 Video: Theme – <https://youtu.be/5bk4AYRgAo>
3. Module 3 Video: Issues – <https://youtu.be/h1-1OQ-vqKA>

Use of AI Technology in Video Development

The development of the video involved three main stages: (i) storyboard preparation, (ii) image and animation production, and (iii) final editing.

The storyboard was developed based on the text of the novel *Chot* and KOMSAS reference books to ensure the accuracy of the content. The selected graphic concept adopted a *Pixar-style 3D* design with a 16:9 aspect ratio to produce expressive and visually engaging scenes. The text-based storyboard included scene descriptions, narration scripts, visual instructions, as well as text-to-image and text-to-video prompts. The *Animation Script Builder* via the *ChatGPT* interface was used to generate animation scripts systematically. The scripts were structured concisely to comply with the coherence and redundancy principles, thereby avoiding excessive information.

Images were generated using *Generative AI* technology through *ChatGPT* based on text prompts. These static images were subsequently converted into animations using *PicVerse AI* to produce dynamic character movements and background scenes. This approach enabled the creation of high-quality animations without requiring advanced technical skills, while also reducing development time.

In terms of editing, the animation clips were compiled using the *CapCut* application to arrange scenes according to the storyline, add voice narration, emphasised text, and background music. The *ElevenLabs* application was used to generate an authentic Bahasa Malaysia voice-over. The final output was a high-definition video that integrates visual, audio, and textual elements cohesively.

Overall, the development process of the AI-based animated video demonstrates a systematic integration of learning theories, mastery learning strategies, and AI technologies, thereby supporting the achievement of the predetermined learning objectives.

Phase 4: Utilisation of Media and Materials (*Utilize Media & Materials*)

This phase addresses Research Question 5, which concerns how the AI-based animated video of the novel *Chot* was implemented using the mastery learning strategy within an actual teaching and learning context. The developed videos were fully utilised together with the research instruments to evaluate their usability and preliminary effectiveness before statistical analysis was conducted.

The implementation was carried out systematically according to the planned procedures. At the initial stage, the teacher introduced the learning objectives and provided a brief explanation of the aspects that students needed to focus on, particularly the synopsis, theme, and issues. The teacher ensured that students were prepared and that the audio-visual equipment functioned properly.

Each viewing session lasted approximately five to ten minutes for each module. Students watched the videos in full without interruption in order to maintain the modality and coherence principles of Mayer's Cognitive Theory of Multimedia Learning. After watching the videos, students answered questions or completed tasks related to the module studied.

The teacher acted as a facilitator, guiding students to connect the visual information presented in the video with the textual content of the novel and providing clarification when necessary. This approach ensured that students progressed through the learning process step by step, in line with the mastery learning strategy, where mastery of one module served as the foundation for proceeding to the next module.

Phase 5: Learner Participation (*Require Learner Participation*)

This phase emphasises active student participation throughout the use of the AI-based animated videos. To reinforce students’ understanding, several supporting activities were provided, including interactive quizzes using the Wayground (Quizizz) and Wordwall applications. These quizzes helped assess students’ immediate understanding while also enhancing motivation through gamification elements.

In addition, students were provided with structured worksheets after each module (synopsis, theme, and issues). The worksheets were designed based on the mastery learning principles, which require students to demonstrate mastery before progressing to the next level.

Phase 6: Material Evaluation (*Evaluate and Revise*)

This phase aims to address Research Objective 4 as well as Research Questions 6 and 7, which involve evaluating students’ perceptions of the usability of the AI-based animated video and determining whether there is an improvement in students’ knowledge after the intervention. The evaluation involved the analysis of the usability questionnaire and the comparison of pre-test and post-test scores.

Students’ Perceptions of the Usability of the AI-Based Animated Video

The Material Usability Questionnaire was used to assess students’ level of acceptance of the AI-based animated video of the novel *Chot*, particularly in terms of content, multimedia design, and overall usability. The findings indicate very positive evaluations from the students.

For the content aspect, the overall mean score was 4.27 (SD = 0.52), indicating a high level of usability. Students rated the content as easy to understand (Mean = 4.29), accurate (Mean = 4.39), and helpful in answering examination questions (Mean = 4.23). The language used in the video was also evaluated as clear and appropriate (Mean = 4.16).

Table 4. Respondents’ Perceptions of the Content of the Learning Material

No	Item	STD	D	SLA	A	STA	Mean	SD	Level
1.	The video content is easy to understand.	-	-	13.2%	2064.5%	1032.3%	4.29	0.53	High
2.	The information presented is accurate.	-	-	13.2%	1764.5%	1332.3%	4.39	0.59	Very high
3.	The language used is easy to understand.	-	26.5%	26.5%	1651.6%	1135.5%	4.16	0.82	High
4.	The content presented helps me answer examination questions.	-	-	39.7%	1858.1%	1032.3%	4.23	0.62	High
	Overall						4.27	0.52	High

In terms of visual and audio design, the mean score recorded was 4.08 (SD = 0.50). The animations were evaluated as creative and engaging (Mean = 4.16), appropriate to the storyline (Mean = 4.19), and capable of bringing the characters to life in a realistic manner (Mean = 4.03). The background music and narrative voice were also rated as clear and appropriate (Mean ≈ 4.00). These findings indicate that the multimedia elements support students’ comprehension, in line with the modality and coherence principles of Mayer’s Cognitive Theory of Multimedia Learning.

Table 5. Respondents’ Perceptions of the Visual and Audio Design of the Learning Material

No	Item	ST D	D	SLA	A	STA	Mean	SD	Level
1.	The AI animation used is creative and engaging.	-	13.2%	516.1%	1364.5%	1232.3%	4.16	0.82	High
2.	The AI animation used is realistic and brings the characters in the story to life.	-	-	516.1%	2064.5%	619.4%	4.03	0.61	High
3.	The AI animation produced is appropriate to the storyline of the novel.	-	-	39.7%	1961.3%	929.0%	4.19	0.60	High
4.	The background music is appropriate and helps bring the atmosphere of the story to life.	-	13.2%	516.1%	1754.8%	825.8%	4.03	0.75	High
5.	The narration voice is delivered with appropriate tone and intonation.		13.2%	516.1%	1858.1%	722.6%	4.00	0.73	High
	Overall						4.08	0.50	High

In terms of overall usability, the mean score recorded was 4.15 (SD = 0.52). Students agreed that the video helped them understand the storyline more clearly (Mean = 4.32), including improving their understanding of the theme and issues of the novel (Mean = 4.13). They also agreed that the video increased their confidence in answering questions related to the novel (Mean = 4.00).

Table 6. Respondents’ Perceptions of the Usability of the Learning Material

No	Item	STD	D	SLA	A	STA	Mean	SD	Level
1.	This video helps me understand the storyline of the novel more clearly.	-	-	-	2167.7%	1032.3%	4.32	0.48	High
2.	This video helps me understand the theme and issues of the novel more clearly.	-	-	412.9%	1961.3%	825.8%	4.13	0.62	High
3.	After watching the video, I feel more confident in answering questions about the novel.	-	13.2%	619.4%	1661.3%	825.8%	4.00	0.78	High
	Overall						4.15	0.52	High

Overall, the high mean scores across all three constructs indicate that the AI-based animated video demonstrates a very good level of usability and has the potential to be used as an alternative instructional material in KOMSAS teaching and learning (PdP).

Pre-Test and Post-Test Analysis

The knowledge test was used to evaluate students' level of mastery before and after the intervention. Overall, the results indicate a substantial improvement in post-test scores.

The overall mean score for the pre-test was 23.30 (SD = 23.28), whereas the post-test mean increased to 89.25 (SD = 8.83). In terms of percentage scores, Synopsis increased from 22.58% to 90.32%, Theme from 12.90% to 81.45%, and Issues from 35.48% to 94.35%. These findings demonstrate a consistent improvement across all three aspects assessed.

Table 7. Pre-Test and Post-Test Results

Aspect	N	Pre-Test		Post-Test	
		Mean Percentage	SD	Average Mean	SD
Synopsis	31	22.58	35.96	90.32	10.48
Theme	31	12.90	22.24	81.45	26.60
Utilities	31	35.48	40.71	94.35	15.42
Overall	31	23.30	23.28	89.25	8.83

The paired-samples t-test revealed a significant difference between the pre-test and post-test scores, $t(30) = -17.08$, $p < .001$. The mean difference in scores was -65.95 (SD = 21.50), with a 95% confidence interval ranging from -73.84 to -58.06 . These results confirm that the observed improvement is statistically significant and not attributable to random factors.

Furthermore, these findings indicate that all three learning objectives established in Phase 2 were successfully achieved. Students were able to describe the key events in the synopsis, explain the theme with relevant examples, and elaborate on the issues with appropriate supporting events after participating in the intervention.

Overall, the findings from Phase 6 demonstrate that the AI-based animated video of the novel *Chot* was not only well received in terms of usability but also proven to be effective in significantly enhancing students' mastery of the synopsis, theme, and issues.

DISCUSSION AND RECOMMENDATIONS

Students' Knowledge Level of Literary Aspects

The pre-test results revealed that students' level of mastery of literary aspects was low, with an overall mean of only 41.36%. Students were found to be weakest in understanding the theme and issues, which are abstract literary elements that require higher-order thinking skills. This finding is consistent with studies by Rafiza Abdul Razak (2013) and Abdul Rasid (2023), which reported that students often face difficulties in understanding the KOMSAS component due to teaching approaches that remain teacher-centred and overly dependent on textual materials. The difficulty in understanding these abstract concepts can also be explained through Mayer's Cognitive Theory of Multimedia Learning (2009), which suggests that learning that relies solely on text may increase students' cognitive load. Therefore, the integration of visual and audio elements through animation can help students construct clearer mental representations of the learning content.

Students' Learning Styles and the Need for Visual Materials

The analysis of learning styles indicated that the majority of students tend to prefer visual and auditory learning styles. This finding suggests that visual-based learning approaches, such as animations and videos, are more aligned with the learning preferences of contemporary students. These findings are also supported by studies conducted by Putri Ningsi et al. (2024) and Hanny and Ika (2023), which found that the use of animated videos can enhance students' comprehension and interest in learning. In the context of this study, the use of AI-generated animations that integrate moving visuals, audio narration, and emphasised text helped students

understand the storyline in a more systematic manner. This approach aligns with the dual-channel processing principle in Mayer's theory, which emphasises the simultaneous use of visual and auditory channels to enhance learning effectiveness.

Usability of the AI-Based Animated Video

The questionnaire findings indicate that the developed AI-based animated video demonstrated a high level of usability, with overall mean scores exceeding 4.00 across the three main constructs: content quality, multimedia design, and overall usability. Students reported that the video content was easy to understand, the language used was clear, and the animations produced were engaging and appropriate to the storyline of the novel. These findings suggest that the integration of multimedia elements, such as animation, narration, and background music, can enhance students' learning experience. This result is consistent with the study by Berney and Bétrancourt (2016), which demonstrated that animation can improve conceptual understanding when applied systematically and guided by multimedia learning principles.

Effectiveness of the AI-Based Animated Video on Students' Achievement

The comparison between pre-test and post-test scores revealed a substantial improvement in students' level of mastery. The mean score increased from 23.30 to 89.25 after the intervention. The paired-samples t-test further indicated a statistically significant difference between the two tests. This improvement demonstrates that the AI-based animated video developed in this study successfully helped students understand the content of the novel more effectively. The use of the mastery learning approach, which divided the learning content into several smaller modules, also contributed to this improvement as students learned the material progressively and systematically. These findings are consistent with studies by Sunami and Aslam (2021) and Febriani et al. (2022), which reported that the use of animated videos in learning can enhance students' motivation and academic achievement.

Study Limitations

Several limitations should be considered when interpreting the findings of this study. First, the sample size was relatively small ($N = 31$) and involved only students from a single tuition centre, which limits the generalisability of the findings to other school contexts that may differ in terms of student background, academic ability, technological infrastructure, and teaching and learning culture. Second, the study focused on only one literary genre, namely the novel *Chot*. Therefore, the effectiveness of the AI-based animated video developed in this study cannot be assumed to apply equally to other genres such as short stories, drama, poetry, or traditional prose. Third, the intervention covered only three KOMSAS aspects (synopsis, theme, and issues), while other aspects such as characters and characterisation, setting, values, and moral lessons were not examined. As a result, the scope of the material's usability cannot yet be considered comprehensive for the entire novel component. In addition, this study employed a purely quantitative approach without incorporating qualitative components such as interviews, classroom observations, or students' reflective feedback. Consequently, students' learning experiences, motivational factors, and potential implementation challenges could not be explored in depth. Finally, the study did not conduct a specific expert validation on the application of Mayer's Multimedia Learning principles, the ASSURE model, and the mastery learning strategy within the instructional design of the video, which may affect the objectivity in determining the validity of the instructional design.

RECOMMENDATIONS FOR FUTURE RESEARCH

Based on these limitations, several directions for future research are recommended. First, future studies should involve larger sample sizes across multiple schools or learning contexts to enhance the reliability and generalisability of the findings. Second, the development of AI-based animated videos should be extended to other KOMSAS aspects such as characters and characterisation, setting, values, and moral lessons, in order to produce more comprehensive learning materials. Third, future research should consider employing a mixed-method approach, incorporating interviews, classroom observations, or students' reflective journals to gain deeper insights into students' learning experiences. Fourth, future studies could explore the effectiveness of AI-based animated videos across different literary genres, such as short stories, drama, and poetry. Finally,

comparative studies between AI-generated animated videos and non-AI animated videos could be conducted to evaluate the added value of AI technology in enhancing learning outcomes.

CONCLUSION

Overall, this study demonstrates that the development and implementation of AI-based animated videos have the potential to enhance students' understanding and knowledge of the literary aspects of the novel *Chot* within the Malay Language KOMSAS component. The findings show that students' level of mastery of the synopsis, theme, and issues was initially low prior to the intervention but improved significantly after the use of the AI-based animated video developed based on Mayer's Cognitive Theory of Multimedia Learning, the ASSURE Instructional Model, and the mastery learning strategy. In addition, students provided positive evaluations regarding the usability of the learning material, particularly in terms of content quality, multimedia design, and its effectiveness in supporting their understanding of the storyline. These findings suggest that the integration of AI technology through visual animation and audio narration can support learning that is more engaging, interactive, and meaningful. Therefore, the use of AI-based animated videos has the potential to serve as an innovative pedagogical alternative in enhancing KOMSAS teaching while supporting the national digital education agenda.

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