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Cross-multimedia for Learning the Indonesian Language for the Development of Critical-creative Thinking: High School Teachers' Perspectives

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ABSTRACT

This study investigates high school teachers' perspectives on the use of cross-multimedia to develop students' Critical-Creative Thinking (CCT) skills in Indonesian language learning. Despite numerous studies on multimedia, research on how cross-multimedia aligns with the various cognitive stages of CCT is still limited. Using a quantitative descriptive design, this study investigates teachers' perspectives on cross-multimedia to develop CCT. Data were collected through a structured questionnaire that had been tested for content validity and reliability. Respondents consisted of 15 certified high school Indonesian language teachers in Malang City, Indonesia, selected using a purposive sampling method. The results showed that electronic modules and interactive videos were highly favoured (ranging from 93.3% to 100%) across all five stages of CCT: stimulation, exploration, response, production, and reflection. In contrast, animated media (motion graphics) consistently received the highest level of disapproval (up to 46.7%) across all learning phases. Based on Cognitive Load Theory (CLT), teacher resistance to animation is related to the transient effects of information, high development difficulties, and strict time constraints in formal classrooms. This study offers useful empirical guidance for learning to build effective multi-platform media in modern secondary English language education.

Keywords: cross-multimedia, critical-creative thinking, digital literacy, language pedagogy

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INTRODUCTION

Creative thinking is the cognitive capacity to generate new ideas, new perspectives,

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and solve problems effortlessly (Gafour & Gafour, 2020). This integration of creative thinking, aligned with critical thinking, is called Critical-Creative Thinking (CCT). In the modern educational paradigm, CCT is not an innate talent; rather, it needs to be explicitly fostered through structured pedagogical interventions.

In general, high school students' competency in critically evaluating texts remains low. Programme for International Student Assessment (PISA) data reinforces this crisis, showing that 9% of Indonesian students achieve reading proficiency at levels 5-6, while the remaining 77% remain at levels 1-2 (OECD, 2021). These findings confirm that the majority of high school students remain weak in higher-order thinking skills, such as comprehending complex texts, analysing unstructured ideas, or evaluating layered textual arguments (Nur'azizah et al., 2021; Wang, 2021). Language acquisition is linked to cognitive development, making Indonesian language learning in high school a strategic space for fostering CCT. Language learning requires students to decode, reconstruct, and synthesise semantic structures, making it an ideal domain to explicitly foster CCT through sophisticated instructional design (Škėrienė & Jucevičienė, 2020). To foster these higher-level competencies, current literature strongly recommends student-centred strategies, such as case-based learning, problem-based learning, web-based concept mapping, and explicit instruction (Garrouste & Le Saout, 2020). However, the success of these strategies depends heavily on the structure of the classroom environment and the scaffolding of task difficulty provided by educators (Brion, 2019). Classrooms have now undergone an accelerated transition toward digital learning environments and blended learning (Heritage, 2018). In this digitalised landscape, technology has evolved from a superficial instructional supplement into primary cognitive anchor for constructing knowledge. Educational media configurations have also shifted from single-medium delivery to multi-platform environments, opening the way for the implementation of cross-multimedia and transmedia.

To build a solid theoretical foundation for cross-multimedia, it is necessary to operationally describe its use in Indonesian language learning in high school. Historically, the term transmedia storytelling refers to a broad, decentralised narrative used by students across multiple platforms (Jenkins, 2006). This study explicitly operationalises the term cross-multimedia to define the systematic rotation of electronic modules, slides, infographics, animations, and videos as digital learning assets designed by teachers for Indonesian language learning. This concept differs from multimedia, which relies on multimodality: static text and visuals (Mayer, 2021).

Furthermore, the digital learning environment has undergone an exponential paradigm shift since 2022, following the widespread adoption of generative artificial intelligence (Hew et al., 2024; Ng et al., 2023). In modern educational environments, digital spaces are no longer simply passive

presentation screens but have become intelligent digital spaces that generate text tailored to students' needs. Investigating how teachers understand cross-multimedia in this evolving landscape is crucial to ensuring that technology acts as a primary cognitive catalyst capable of minimising extraneous cognitive load.

Previous research related to this study has shown how interactive technology and automated tools significantly boost student engagement and foster critical reasoning in digital learning environments (Hew et al., 2024; Ng et al., 2023). In the context of language literacy, visual and electronic supports such as infographics and digital texts be effective in optimising reading comprehension and reducing cognitive clutter (Capodieci et al., 2020; OECD, 2021). Furthermore, dynamic reading assessments and blended learning designs have been successfully implemented to simultaneously stimulate critical and creative skills in secondary education (Rofi'uddin et al., 2022; Syahrin et al., 2019). Although previous research has focused on the direct impact of media on learning outcomes, a gap remains regarding the digital assets rotated in cross-multimedia during the CCT phase. This study aims to address this gap by mapping high school Indonesian language teachers' perceptions of structured cross-multimedia, explicitly mapped across the five phases of CCT.

Despite the theoretical benefits of multi-platform digital learning environments, this study maps how high school teachers' perspectives on implementing specific media formats based on CCT are still rarely studied. Most studies only focus on the use of learning media to achieve general objectives. This study focuses on the perspectives of 15 high school Indonesian language teachers in Malang on the use of cross-multimedia for CCT development. This study focuses on teachers' perspectives on the use of cross-multimedia (electronic modules, interactive videos, infographics, presentation slides, and animations) for the CCT process (stages of stimulation, exploration, response, production, and reflection) (Rofi'uddin et al., 2022). Thus, this study is expected to provide an in-depth understanding of the use of cross-multimedia assets for each stage of the CCT process.

LITERATURE REVIEW

Critical-Creative Thinking (CCT) Skills in Language Pedagogy

In the context of learning, creative thinking refers to the cognitive capacity to generate new ideas to solve problems (Hadar & Tirosh, 2019). Conversely, critical thinking is the systematic evaluation of new ideas, comprehensive information, the use of credible sources, and the careful consideration of multiple perspectives (Syahrin et al., 2019). In practice, the critical thinking process consists of the following stages: stimulation, exploration, response, production, and reflection (Rofi'uddin et al., 2022).

In high school, language instruction, writing, and reading competencies are

interconnected. Indonesian language learning texts in high school are complex. Reading complex texts significantly enhances students' analytical and reflective cognitive capacities (Tabačková, 2015). To operationalise these competencies, activity-based reading instruction, combining guided questioning, group discussions, and reflective practice, has a significant positive effect on reading comprehension and critical engagement (Roohani & Shamsi, 2014). External factors, such as gender and economic status, can influence students' basic individual capacities for creative and cognitive flexibility (Aytug et al., 2018; DeWaelsche, 2015; Karwowski et al., 2016; Piaw, 2014). However, in modern pedagogy, teachers can determine appropriate digital learning strategies and media. Therefore, exploring teachers' perspectives is crucial to map which media are considered most effective for each cognitive phase of CCT.

The Conceptual Evolution of Cross-Multimedia Learning

To address the ambiguity of multi-platform digital learning, the following explains the concepts of cross-media, cross-multimedia, and transmedia. Historically, the concept of cross-media typically referred to the distribution of digital learning content across different platforms. Cross-multimedia is a strategic configuration of various modalities: text, audio, and visuals, arranged in such a way as to rotate the distribution of digital assets across various device platforms in a planned manner (Serrano-Tellería & Calvo-Rubio, 2021). Over time, transmedia emerged, which is the communication of narrative and non-narrative content across various digital platforms (Kinder, 1993). In the broader educational context, transmedia storytelling has been adopted to increase learner engagement by encouraging students to independently navigate various digital devices and open software ecosystems (Rodrigues & Bidarra, 2016).

Based on the Cognitive Load Theory (CLT) perspective, this cross-multimedia approach serves as an anchor that maps specific media types, minimising unnecessary cognitive load during the information transfer process (Mayer, 2021).

METHODOLOGY

This study adopted a descriptive quantitative survey design to map high school teachers' perspectives on the use of cross-multimedia to foster CCT. The study population was Indonesian language teachers in high schools located in Malang City, East Java, Indonesia. Purposive sampling was used to determine the research objectives. Fifteen professional teachers were selected based on three strict criteria: holding a professional teacher certification issued by the Ministry of Education, having at least five years of teaching experience, and actively using multi-platform digital media in their classrooms. Although a sample size of 15 may be considered small for broad statistical generalisations, in modern descriptive survey research targeting elite or specialist practitioners, this size is highly valid for achieving data saturation regarding the realities of cross-multimedia use to foster CCT.

Data were collected through a structured, closed-ended questionnaire designed to map the relationship between media formats and CCT activities. The instrument was divided into five main sections based on the CCT instructional phases. For each phase, teachers assigned digital learning media: e-modules, presentation slides, infographics, animations (motion graphics), and videos. Responses were recorded using a 3-point Likert scale to eliminate bias (1 = Disagree, 2 = Agree, 3 = Strongly Agree).

The instrument underwent a rigorous double validation process, with content validation conducted by three instructional media experts: two professors and one doctor, each with at least five years of teaching experience. The content validity index was calculated using Aiken's V formula, yielding coefficients ranging from 0.67 to 1.00, indicating highly valid and acceptable levels of item relevance.

Based on the content validity results in Table 1, Aiken's V coefficient for the 25-item questionnaire ranged from 0.67 to 1.00. All items exceeded the critical value threshold set by Aiken (1985) for three raters with three scale options, namely 0.60. The overall instrument mean was 0.86, confirming that the questionnaire has content validity suitable for primary data collection.

A preliminary pilot test was conducted with certified teachers who did not participate in the main sample of the study.

Table 1
Questionnaire content validity matrix using Aiken's V

No	Questionnaire Indicator	P1	P2	P3	Σ s	Aiken's V Coefficient	Status / Remarks
1	Electronic modules to stimulate students' critical-creative thinking.	5	5	5	12	1.00	Highly Valid / Accepted
2	Presentation slides to stimulate students' critical-creative thinking.	4	4	5	10	0.83	Highly Valid / Accepted
3	Infographics to stimulate students' critical-creative thinking.	5	4	4	10	0.83	Highly Valid / Accepted
4	Animation (motion graphics) stimulates students' critical-creative thinking.	5	4	4	10	0.83	Highly Valid / Accepted
5	Instructional videos to stimulate students' critical-creative thinking.	5	5	5	12	1.00	Highly Valid / Accepted
6	Electronic modules to explore students' critical-creative thinking.	5	5	5	12	1.00	Highly Valid / Accepted
7	Presentation slides to explore students' critical-creative thinking.	4	4	4	9	0.75	Valid / Accepted
8	Infographics to explore students' critical-creative thinking.	4	4	4	9	0.75	Valid / Accepted
9	Animation (motion graphics) to explore students' critical-creative thinking.	4	4	4	9	0.75	Valid / Accepted
10	Instructional videos to explore students' critical-creative thinking.	5	5	5	12	1.00	Highly Valid / Accepted

Table 1 (*continued*)

No	Questionnaire Indicator	P1	P2	P3	Σ s	Aiken's V Coefficient	Status / Remarks
11	Electronic modules to train students to respond to critical-creative thinking activities.	5	5	5	12	1.00	Highly Valid / Accepted
12	Presentation slides to train students to respond to critical-creative thinking activities.	5	4	5	11	0.92	Highly Valid / Accepted
13	Infographics to train students to respond to critical-creative thinking activities.	5	4	5	11	0.92	Highly Valid / Accepted
14	Animation (motion graphics) to train students to respond to critical-creative thinking activities.	4	4	5	10	0.83	Highly Valid / Accepted
15	Instructional videos to train students to respond to critical-creative thinking activities.	5	5	5	12	1.00	Highly Valid / Accepted
16	Electronic modules to train students to produce works reflecting critical-creative thinking.	5	5	5	12	1.00	Highly Valid / Accepted
17	Presentation slides to train students to produce works reflecting critical-creative thinking.	5	4	4	10	0.83	Highly Valid / Accepted
18	Infographics to train students to produce works reflecting critical-creative thinking.	4	3	4	8	0.67	Valid / Accepted
19	Animation (motion graphics) to train students to produce works reflecting critical-creative thinking.	4	3	4	8	0.67	Valid / Accepted
20	Instructional videos to train students to produce works reflecting critical-creative thinking.	5	4	4	10	0.83	Highly Valid / Accepted
21	Electronic modules to train students to reflect on their critical-creative thinking activities.	5	5	5	12	1.00	Highly Valid / Accepted
22	Presentation slides to train students to reflect on their critical-creative thinking activities.	4	4	4	9	0.75	Valid / Accepted
23	Infographics to train students to reflect on their critical-creative thinking activities.	4	4	4	9	0.75	Valid / Accepted
24	Animation (motion graphics) to train students to reflect on their critical-creative thinking activities.	4	3	4	8	0.67	Valid / Accepted
25	Instructional videos to train students to reflect on their critical-creative thinking activities.	5	5	4	11	0.92	Highly Valid / Accepted
	Overall Instrument Mean Aiken's V Coefficient	-	-	-	-	0.86	Highly Valid

Data obtained from this pilot test were analysed using Cronbach's alpha. The overall reliability coefficient for the 25-item questionnaire was 0.84, indicating excellent internal consistency and instrument stability.

Data collection was conducted through electronic forms distributed directly to selected respondents. Quantitative data collected from the closed-ended items (Items 1-25) were analysed using descriptive statistics, specifically frequency distributions, percentages, and mean scores.

RESULTS

To foster students' critical and creative thinking skills, teachers must optimise the use of cross-multimedia learning by aligning it with the CCT phases. From a teacher perspective, there are five media platforms in CCT: e-modules, presentation slides, infographics, animations (motion graphics), and videos. Meanwhile, the steps for fostering CCT consist of stimulation, exploration, response, production, and reflection (Rofi'uddin et al., 2022). The following is the cross-multimedia used in each CCT phase.

Media Utilisation to Stimulate Students' CCT

The stimulation phase involves a series of processes undertaken by the teacher to provide initial cognitive triggers during the CCT process. To provide this stimulus, the teacher rotates five digital media formats. The following is a perspective on the use of cross-multimedia in the CCT stimulation phase in Table 2.

Based on the perspective of high school teachers, in the stimulation phase, Table 2 shows that the utilisation of cross-multimedia that "Strongly Agree" using e-modules reached 53.3% (n=8) and those who "Agree" using presentation slides and videos reached 53.3% (n=8). This distribution indicates that high school teachers prefer e-modules as the main tool to stimulate students in developing CCT compared to presentation slides and videos. What is most rejected by teachers is animation (motion graphics).

Media Utilisation to Explore Students' CCT

Cross-multimedia utilisation in the exploration phase is shown in Table 3.

Based on the perspective of high school teachers, in the exploration phase, Table 3 shows that the cross-multimedia utilisation that "Strongly Agree" is used is video reaching 46.7% (n=7) and the "Agree" is used is e-modules (66.7%, n=10) and infographics (60.0%, n=9)). This distribution shows that in the exploration phase, high school teachers prefer e-modules and infographics as the main tools to stimulate students in fostering CCT compared to presentation slides and videos. What teachers most reject is animation (motion graphics).

Media Utilisation to Foster Students' Responses to CCT

Cross-multimedia utilisation in the foster phase is shown in Table 4.

Based on the perspective of high school teachers, in the fostering phase, Table 4 shows that the use of cross-multimedia that "Strongly Agree" using e-modules reached

Table 2
Media efficacy for stimulating students

Media	Strongly Agree		Agree		Disagree	
	%	Value	%	Value	%	Value
Electronic Module	53,3	8	40,6	6	6,7	1
Slideshow	40,0	6	53,3	8	6,7	1
Infographics	40,0	6	46,7	7	13,3	2
Animation	20,0	3	46,7	7	33,3	5
Videos	46,7	7	53,3	8	0,0	0

Table 3
Media efficacy to explore concepts

Media	Strongly Agree		Agree		Disagree	
	%	Value	%	Value	%	Value
Electronic Module	26,7	4	66,7	10	6,7	1
Slideshow	40,0	6	46,7	7	13,3	2
Infographics	40,0	6	60,0	9	0,0	0
Animation	20,0	3	46,7	7	33,3	5
Videos	46,7	7	46,7	7	6,7	1

Table 4
Media efficacy to train student responses

Media	Strongly Agree		Agree		Disagree	
	%	Value	%	Value	%	Value
Electronic Module	40,0	6	42,7	7	13,3	2
Slideshow	26,7	4	53,3	8	20,0	3
Infographics	33,3	5	66,7	10	0,0	0
Animation	13,3	2	60,0	9	26,7	4
Videos	33,3	5	66,7	10	0,0	0

40.0% (n=6). However, those who "Agree" using e-modules reached 42.7% (n=7), presentation slides and infographics reached 53.3% (n=8), infographics and videos reached 66.7% (n=10), and animations reached 60.0% (n=9). This distribution shows that high school teachers prefer infographics and videos as the main tools to explore students in developing CCT compared to animation (motion graphics).

Media Utilisation to Guide Students' Production in CCT

Cross-multimedia utilisation in the production phase is shown in Table 5.

Based on the perspective of high school teachers, in the production phase, table 5 shows that the use of cross-multimedia that "Strongly Agree" using video reached 40.0% (n=6). However, those who "Agree" using e-infographics reached 73.3% (n=11),

presentation slides reached 66.7% (n=10), videos reached 60.0% (n=9), e-modules reached 53.3% (n=8). This distribution shows that high school teachers prefer infographics, presentation slides, e-modules, and videos as the main tools to explore students in developing CCT compared to animation (motion graphics).

Media Utilisation to Facilitate Students' Reflection on CCT

Cross-multimedia utilisation in the reflection phase is shown in Table 6.

Based on the perspective of high school teachers, in the reflection phase, table 6 shows that the utilisation of cross-multimedia that "Strongly Agree" using e-modules reached 40.0% (n=6). However, those who "Agree" using videos reached 66.7% (n=10), presentation slides and infographics reached 60% (n=9), and e-modules reached 40.0% (n=6). This distribution shows that high school teachers prefer videos, presentation slides, and infographics, and e-modules as the main tools to explore students in developing CCT compared to animation (motion graphics).

In summary, empirical findings across the five phases of CCT reveal a highly systematic preference matrix among high school Indonesian language teachers. Cross-multimedia utilisation of e-modules, videos, presentation slides, and infographics is the primary choice in fostering CCT. Animation (motion graphics) is a medium teacher to avoid.

Table 5
Media efficacy for productive CCT activities

Media	Strongly Agree		Agree		Disagree	
	%	Value	%	Value	%	Value
Electronic Module	26,7	4	53,3	8	20,0	3
Slideshow	26,7	4	66,7	10	6,7	1
Infographics	20,0	3	73,3	11	6,7	1
Animation	26,7	4	40,0	6	33,3	5
Videos	40,0	6	60,0	9	0,0	0

Table 6
Media efficacy for reflective activities

Media	Strongly Agree		Agree		Disagree	
	%	Value	%	Value	%	Value
Electronic Module	40	6	40	6	20	3
Slideshow	26,7	4	60	9	13,3	2
Infographics	26,7	4	60	9	13,3	2
Animation	20	3	33,3	5	46,7	7
Videos	26,7	4	66,7	10	6,7	1

DISCUSSION

Media Utilisation to Stimulate Students' CCT

The results of this study indicate a clear trend among teachers when choosing cross-media to stimulate students' CCT. High school Indonesian language teachers overwhelmingly chose e-modules and videos to spark initial cognitive interest. This preference is driven by the fact that e-modules provide comprehensive, adequate, and structured content that aligns with the initial phase of CCT. E-modules are highly valued for their comprehensiveness; they facilitate teaching procedures and help high school students focus during the initial learning stimulus phase (Blayone et al., 2017).

Furthermore, slide presentations and videos received high approval ratings from teachers for this introductory phase. Educators continue to use slide presentations as a tool to stimulate student activity due to their accessibility, practicality, and capacity to accommodate relatively detailed learning material, second only to electronic modules (Brion, 2019). During the stimulation process, primary considerations are ease of information access and message efficiency. Furthermore, the cross-media chosen must be able to capture students' interest. Learning videos are an excellent choice alongside slide presentations and electronic modules because their audio-visual delivery is far more engaging than statistical text or traditional learning discourse, which students often find monotonous.

Conversely, animation is the least preferred medium among high school Indonesian language teachers. Although animation can be very impressive if managed optimally, empirical data shows that high school teachers rarely use it to engage students. This low adoption rate stems from the fact that animation remains challenging to develop. Even when teachers attempt to use existing animations, the content often fails to align with the intended learning objectives (Guinibert, 2022). This finding can be linked to the Cognitive Load Theory (CLT) lens (Sweller et al., 2019). At the beginning of the Critical-Creative Thinking (CCT) process, students' working memory is highly susceptible to cognitive overload because they must simultaneously process unfamiliar concepts and text structures. Structured tools, such as e-models and presentation slides, successfully minimise cognitive overload by adhering to the principles of spatial continuity and coherence (Mayer, 2021). In contrast, the low approval rate for animation (46.7%, n=5), and even the disapproval rate reaching 33.3% (n=5), revealed that dynamic motion graphics often introduce "seductive details"—highly engaging but irrelevant visual elements that interfere with content retention. This forces students to expend their limited working memory capacity processing unnecessary visual movement rather than activating cognitive schemas for critical reflection (Paas & van Merriënboer, 2020).

Furthermore, this empirical pattern becomes even more relevant when placed in the post-2022 digital landscape, transformed by generative artificial intelligence (GenAI) and automated multi-platform learning content (Hew et al., 2024). In today's AI-

driven educational ecosystem, multimedia assets can be synthesised instantly, providing high school students with easy access to a continuous stream of digital content. However, this digital delivery often leads to information fragmentation and shallow cognitive engagement. Recent studies in digital language pedagogy warn that unregulated, automated content can easily overwhelm learners, turning stimulating tools into classroom distractions (Ng et al., 2023). By prioritising cross-multimedia elements, teachers act as vital pedagogical filters, ensuring digital resources serve as efficient cognitive anchors rather than cluttered visual distractions, thus successfully shifting students' attention toward systematic, higher-order thinking from the beginning of the lesson.

Media Utilisation to Explore Students' CCT

The media format most preferred by teachers as the first rotation asset in the exploration phase is instructional video. According to Mayer (2021), instructional videos that effectively combine text, audio, and images can improve comprehension and information retention. Exploration activities require students to delve deeply into linguistic concepts to achieve language learning objectives, such as practicing listening and speaking skills (Al-Azzemy & Al-Jamal, 2019). Video presentations are used to facilitate students' fluent exploration of skills in line with the teacher's objectives.

After video, e-modules are the most preferred tool for subsequent rotations. On the other hand, animations are viewed by teachers as the least suitable tool for the exploration phase of CCT. This negative perception is related to the operational difficulties in producing animations quickly.

The very high preference for infographics (100%, Strongly Agree-Agree) and interactive videos (93.4%, Strongly Agree-Agree) during the exploration phase can be justified by the architecture of human cognition and the temporal effects of information (Castro-Alonso et al., 2019; Sweller et al., 2019). Exploration requires students to actively deconstruct texts to derive meaning. Infographics, which function as static visual configurations, provide a permanent display of instructional information. This permanent structure allows high school students to process linguistic hierarchies and rhetorical frameworks, thus supporting self-regulation of limited cognitive resources (Mayer, 2021).

In contrast, animations, which reached 80.0% (Agree-Disagree), involve movement that triggers a temporary information effect that disappears from the screen before students' memories can effectively engage and incorporate it into long-term schematic memory. Therefore, the high level of disagreement with animations (33.3%, n=5) suggests that teachers view motion graphics as cognitively counterproductive to careful data exploration, preferring visual stability.

Furthermore, this empirical alignment reflects critical pedagogical demands in the post-2022 digital environment, characterised by generative artificial intelligence and a saturation of multi-

platform textual artifacts (Hew et al., 2024; Ng et al., 2023). In today's world, students can instantly generate automated textual analyses or summaries using generative artificial intelligence tools. This presents an instructional challenge to shift from simply accessing data to in-depth exploration and authenticity verification. Guided multimedia elements—such as curated infographics and structured interactive videos—serve as a limited exploration platform. These elements prevent "cognitive drift," a common phenomenon in which high school students are distracted by superficial digital animations instead of focusing on textual semantics. By intentionally utilising teacher-selected interactive videos and stable infographics, educators build a safe framework that allows students' independent exploration without causing information fragmentation or unnecessary cognitive overstimulation, ensuring that multi-platform learning tools remain aligned with the analytical demands of fostering CCT.

Media Utilisation to Fostering Students' Responses to CCT

E-modules are the digital rotation assets most favoured by teachers when training students for CCT forestry. This preference stems from the fact that creative responses require high accuracy, core competencies, and tailored materials. Comprehensive information regarding competencies, learning materials, and assessments can be accessed in full through e-modules (Capodieci et al., 2020). E-modules are designed to provide multimodal input, support, and targeted tasks based on the difficulty level of the learning material, thereby facilitating communicative practice and task-based learning in language teaching-modules (Levy & Stockwee, 2016), teachers agreed to use infographics and learning videos, both of which had identical agreement metrics. Infographics facilitate student responses because the inclusion of prominent images and brief narratives helps students process the activities more easily. Learning videos further complement and strengthen the presentation of information infographics (Medentseva, 2019). As a result, students find it easier to find solutions to problems, develop various strategic options, and complete practical assessments.

On the other hand, animations are often disliked by teachers at this stage. In eliciting active responses, not only do teachers face difficulties in creating animations, but students also experience greater obstacles in accessing and responding to animated content. When new information is stored, the screen display disappears. This results in less than optimal CCT fostering.

Media Utilisation to Guide Students' Production in CCT

The most discussed cross-multimedia rotation asset among teachers during the production phase is instructional video. The integration of video into language learning provides an authentic social and cultural context (Chapelle & Sauro, 2017). To train students in producing concrete work, appropriate media is necessary because the

production phase inherently integrates the process of designing, adapting, and realising ideas into a final product (Nathan & Swart, 2020). Language teachers consider video to be the easiest tool to navigate this creative stage. Through video, students can observe highly detailed narratives and procedural steps.

This understanding can be further strengthened through the use of infographics. Infographics provide clear visual work steps and written information that students can review as much as they need during production (Cavanagh et al., 2016). The final medium, animation, faces widespread disagreement among teachers. Producing work through animation presents serious limitations compared to other formats. In addition to requiring advanced technical skills and sufficient time, animation development involves significant financial costs if not handled in-house.

The absolute convergence of teacher preferences for instructional videos (100% overall agreement, Strongly Agree-Agree) for the production phase can be strongly explained through Bandura's observational learning theory and the cognitive modelling framework (Bandura, 1986; Sweller et al., 2019). Videos serve as excellent modelling tools by presenting step-by-step procedures, real-world examples, and multimodal demonstrations, effectively minimising the intrinsic cognitive load of complex production tasks (Mayer, 2021). Infographics complement this process by serving as a permanent visual framework that outlines the workflow without cluttering working memory (Cavanagh et al., 2016). Conversely, substantial resistance to animations (33.3% disagreement, n=5) highlights a keen awareness of "production barriers" (Nathan & Swart, 2020).

Media Utilisation to Facilitate Students' Reflection on CCT

Teachers strongly favoured the use of e-modules in the reflection phase (80.0%, n=12, Strongly Agree-Agree). A structured instructional flow is necessary to facilitate learning, which is best achieved through e-modules (Das, 2020). Electronic modules provide comprehensive text-based notes that students can easily revisit, pause, and analyse at their own pace, minimising unnecessary cognitive load during intensive metacognitive tasks.

Teachers disliked animations in the reflection phase of CCT. Complex, lengthy animations, or animations that are not aligned with the objectives, can create additional cognitive load that distracts from the core material and reduces metacognitive effectiveness (Sweller, 2011). In contrast, teachers favoured instructional videos for the reflection phase because they were easy to use and did not take up excessive class time. Furthermore, free and easily accessible video platforms were available for continued use. Animation resistance faced the highest combined resistance (46.7% total disagreement)—can be evaluated comprehensively through Flavell's metacognitive theory and the cognitive principles of retrospective evaluation (Flavell, 1979; Sweller, 2011).

CONCLUSION

This study maps the perspectives of high school Indonesian language teachers regarding cross-multimedia integration for fostering students' CCT. Empirical findings reveal different preference matrices from teachers across the five phases of CCT learning: stimulation, exploration, response, production, and reflection. Electronic modules and interactive videos serve as the two main pillars, while presentation slides and infographics are the two supporting pillars for the utilisation of cross-multimedia in the KCK fostering phase. On the other hand, animation (motion graphics) is consistently rejected at every stage of the CCT learning process. This rejection suggests that dynamic visual animation creates an excessive cognitive load that is highly counterproductive to student learning.

Limitation and Recommendation

A limitation of this study lies in its relatively small sample size of 15 certified teachers. Therefore, generalising these findings nationally requires caution. Furthermore, this study subjectively measured teachers' perspectives on digital assets rotated within a cross-multimedia framework. Future research could conduct direct experimental testing to objectively measure the true impact of cross-multimedia implementation on CCT foresting.

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