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Cognitive Preferences and Learning Drive: Investigating Thinking Styles and Motivation in Digital Video Production

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ABSTRACT

This study investigates the relationship between thinking styles; legislative, executive and judicial, and perceived motivation in the context of digital video production education. Grounded in Sternberg's Theory of Mental Self-Government (MSG) and Keller's ARCS model of motivation, the research examines the differential effects of two instructional pacing modes: learner-paced (DVC-LS) and system-paced (DVC-SS). The primary objective is to explore how these cognitive styles interact with instructional design to influence student motivation and engagement. A quasi-experimental design employing a 2x3 factorial structure was used, involving undergraduate students enrolled in multimedia and digital content development courses. Data were collected through validated instruments and analyzed using ANOVA and ANCOVA techniques to determine main and interaction effects. The findings reveal that legislative thinkers exhibit significantly higher levels of intrinsic motivation in learner-paced environments that offer greater autonomy and flexibility. Conversely, executive and judicial thinkers demonstrate stronger motivation and engagement in structured, system-paced settings where clear guidance and defined expectations are present. The results suggest that tailoring instructional strategies to match students' cognitive preferences can significantly enhance motivational outcomes and learning effectiveness. This study contributes to the growing body of literature emphasizing the role of personalized learning environments in higher education. By aligning instructional pacing with learners' cognitive characteristics, educators can foster deeper engagement, improved motivation and better overall academic performance. The findings have practical implications for the design of digital courseware, particularly in creative and skill-based domains such as digital video production.

Keywords: *Thinking styles, motivation, digital video, learner-paced, instructional design.*

INTRODUCTION

Digital video production is an essential 21st-century skill, fostering digital literacy, critical thinking and creativity among students (Mayer, 2020). In the digital era, video content has become a dominant medium for communication, learning and entertainment. Consequently, students must develop proficiency in video production not only as a technical skill but also to express ideas effectively (Al-Khawaldeh et al., 2024). However, the effectiveness of digital video education is significantly influenced by students' cognitive preferences and learning styles (Chen & Thomas, 2020; Darejeh et al., 2022).

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Despite the growing importance of digital video production, many students struggle with motivation and engagement due to mismatched instructional designs that do not align with their thinking styles (Sternberg, 1997). Traditional instructional approaches often fail to accommodate individual cognitive preferences, leading to suboptimal learning outcomes (Liu, 2024). Understanding how different thinking styles; legislative, executive and judicial, interact with instructional pacing can help educators develop tailored approaches that enhance student motivation and learning outcomes (Renzulli & Sullivan, 2009).

The integration of learner-paced (DVC-LS) and system-paced (DVC-SS) instructional models presents an opportunity to improve student engagement in digital video education. While some learners prefer autonomy and creativity, others thrive in structured environments with predefined guidance (Keller, 2010). However, existing instructional models often fail to cater to the cognitive diversity of students, resulting in disengagement and decreased learning effectiveness.

Despite the growing importance of digital video production in education, students exhibit varied levels of motivation and engagement depending on their cognitive preferences. Existing instructional models often overlook individual thinking styles, leading to suboptimal learning experiences. Understanding how different thinking styles interact with instructional pacing can help educators develop tailored approaches that enhance motivation and learning outcomes. Therefore, this study aims to:

(i) Examine the impact of thinking styles on motivation in digital video production courses.
(ii) Analyse the effectiveness of learner-paced (DVC-LS) versus system-paced (DVC-SS) instructional modes.
(iii) Identify the interaction effects between thinking styles and instructional pacing on student engagement and motivation.

By aligning instructional designs with cognitive preferences, educators can enhance the effectiveness of digital video learning experiences and promote greater student achievement.

LITERATURE REVIEW

Thinking Styles and Learning Preferences

Thinking styles significantly influence learning behaviors and motivation. According to Sternberg's Theory of Mental Self-Government, individuals exhibit different preferences in how they approach learning tasks (Nousheen & Farooq, 2021). Legislative thinkers prefer autonomy and creative exploration, executive thinkers favor structured and guided instruction, and judicial thinkers excel in analytical and evaluative tasks (Groza & Hasbrouck, 2024). These cognitive styles impact how students engage with learning materials, making it essential to align instructional strategies accordingly (Liu, 2024).

Understanding thinking styles is crucial for developing effective learning interventions. Research has shown that when instructional methods align with a student's cognitive preference, engagement and knowledge retention increase (George, Baskar, & Srikaanth, 2024). For example, legislative thinkers benefit from open-ended projects and explorative tasks, while executive thinkers require clearly defined objectives and step-by-step instruction. Judicial thinkers, on the other hand, thrive when given opportunities to analyze and critique multiple

perspectives. These distinctions highlight the need for adaptable learning environments that cater to different cognitive styles.

Moreover, studies indicate that failing to accommodate thinking styles may result in cognitive overload and reduced motivation (Evans, 2017). In digital learning contexts, where students navigate complex multimedia content, ensuring that instructional design aligns with cognitive preferences is vital for maintaining student engagement. Research suggests that diverse instructional strategies, including problem-based learning and inquiry-based tasks, can better support a range of thinking styles, thereby improving overall learning outcomes (Hammad & Awed, 2022).

Motivation in Digital Video Production Education

Motivation plays a crucial role in digital video production learning. Keller's ARCS model emphasizes four elements; attention, relevance, confidence, and satisfaction (Kurt & Kecik, 2017). Research suggests that interactive, hands-on learning environments enhance motivation in multimedia education (Mayer, 2020). When instructional methods match students' thinking styles, engagement and persistence increase, leading to better learning outcomes (Aljojo, 2017; Li & Li, 2021).

Intrinsic motivation is particularly important in creative disciplines such as digital video production. According to Deci and Ryan's Self-Determination Theory, students are more likely to engage in learning materials when they feel autonomy, competence, and relatedness (Ryan, 2013). This suggests that allowing students to control aspects of their learning environment, such as pacing and content selection, can significantly enhance their motivation levels.

In addition, studies have demonstrated that multimedia learning environments that incorporate interactive components, such as gamification and real-world project-based assessments, can improve students' motivation and confidence (Ebrahimzadeh & Alavi, 2017; Liao et al., 2019). Providing students with immediate feedback, peer collaboration opportunities and real-world applications for their skills further reinforce motivation and sustained engagement in digital video production courses (Kopp et al., 2019).

*The Role of Instructional Pacing in Learning Outcomes*Learner-paced and system-paced instructional modes present different advantages depending on cognitive preferences. Research indicates that self-paced learning environments benefit legislative thinkers, who thrive in autonomy, whereas structured environments favor executive and judicial thinkers, who perform better with guided instruction (Barana, 2020). Studies also suggest that pacing flexibility reduces cognitive overload, allowing students to process information effectively (Pinelli & Cojean, 2025). Cognitive Load Theory posits that when learners are overwhelmed with information presented too rapidly, their ability to absorb and retain knowledge diminishes. This highlights the importance of instructional pacing in digital learning environments. Research supports the idea that personalized pacing mechanisms, such as adjustable video playback speed, modular learning paths, and adaptive assessments, can enhance knowledge acquisition and retention (Singh et al., 2012). Moreover, research comparing learner-paced and system-paced environments suggests that students who can regulate their learning experience demonstrate higher motivation and long-term knowledge retention (Ebrahimzadeh & Alavi, 2017). However, some studies indicate

that system-paced instruction can benefit novice learners by structuring content delivery in a way that reduces cognitive strain (Tabbers & de Koeijer, 2010). This underscores the need for a balance between learner control and structured guidance to cater to a diverse student population.

Digital Video Courseware as an Educational Tool

Digital video courseware serves as an innovative medium for teaching and learning. Studies highlight its potential to enhance student engagement, knowledge retention and skill development (Wan Ali et al., 2024). However, effective courseware design must consider cognitive load theory and multimedia learning principles to optimize instructional delivery (Sweller, 2010). Implementing adaptive strategies based on thinking styles can further improve students' motivation and performance in digital video production courses.

Recent research has emphasized the importance of interactive multimedia in enhancing learning experiences. Digital video, when combined with instructional scaffolding, supports student understanding by integrating visual, auditory, and kinesthetic learning modalities (Angeli, 2021). Well-designed courseware should leverage these elements to cater to various cognitive preferences, ensuring a more inclusive learning environment.

Furthermore, video-based learning has been found to improve critical thinking skills and problem-solving abilities (Wan Ali et al., 2024). By engaging students in real-world storytelling and media production, digital video courseware provides a platform for students to develop both technical and cognitive skills. Studies indicate that incorporating interactive assessments, such as video annotations and reflection prompts, further enhances engagement and comprehension (Guo et al., 2014).

However, challenges remain in designing effective video-based instruction. Research suggests that overly complex multimedia presentations can result in cognitive overload, particularly when learners are required to process simultaneous visual and auditory information (George, 2023). To mitigate these challenges, instructional designers should implement segmentation techniques, such as chunking information and integrating pause-and-reflect prompts, to enhance student comprehension and retention (Haseski et al., 2018; Mazin et al., 2020; Mohamed et al., 2021).

Theoretical Framework Sternberg's Theory of Mental Self-Government (MSG)

Theory of Mental Self-Government (MSG) provides a foundational understanding of how different cognitive preferences influence learning. According to (Ghahremani, 2019; Groza & Hasbrouck, 2024), individuals process and interpret information based on three main thinking styles: legislative, executive, and judicial. Legislative thinkers prefer open-ended tasks that allow for creativity and autonomy, executive thinkers function best with clear instructions and structured frameworks, while judicial thinkers thrive in environments that require evaluation and analytical thinking. These variations in cognitive styles necessitate the design of adaptive instructional strategies that cater to diverse learner needs.

Keller's ARCS motivation model (2012) enhances Sternberg's theory by identifying four essential components that stimulate learning motivation. The ARCS model suggests that educational materials should capture student interest, connect with their personal experiences, build their confidence in mastering the content, and provide a sense of achievement upon task

completion. By integrating ARCS principles with MSG theory, digital video courseware can be structured to optimize both cognitive engagement and motivation.

Multimedia Learning Theory (Scheiter, 2014) further supports the need for tailored instructional design in digital education. This theory emphasizes that individuals process information through dual channels; visual and auditory, and that effective learning occurs when these channels are optimally managed. Overloading one channel can lead to cognitive fatigue, whereas well-balanced multimedia integration can enhance comprehension and retention. Applying Mayer's principles to digital video production ensures that instructional materials are not only engaging but also cognitively manageable for learners with different thinking styles.

Finally, Cognitive Load Theory (Sweller, 2010) provides a framework for managing the complexity of learning materials. It suggests that instructional design should aim to minimize extraneous cognitive load while maximizing germane cognitive load, which is essential for learning. When applying this framework to digital video courseware, segmenting information into smaller, manageable units and providing interactive controls that allow students to adjust pacing can help accommodate individual cognitive needs. Together, these theories establish a comprehensive foundation for designing effective, adaptive and motivational learning experiences in digital video production education.

RESEARCH METHODOLOGY

This study employs a quasi-experimental design to examine the effects of instructional pacing and thinking styles on student motivation in digital video production education. The research utilizes a 2x3 factorial structure, where the independent variables are instructional pacing (learner-paced and system-paced) and thinking styles (legislative, executive, and judicial). The dependent variable is student motivation, measured using Keller's Instructional Materials Motivation Survey (IMMS).

Research Design

A quasi-experimental design was chosen to provide controlled yet realistic learning conditions without complete randomization. This method allows for the examination of causal relationships while maintaining ecological validity. The study involves pre-test and post-test assessments to measure the impact of instructional strategies on student motivation.

Participants

The study sample consists of undergraduate students enrolled in digital video production courses at a university. Participants were selected using purposive sampling to ensure diverse cognitive preferences were represented. Table 1 below provides an overview of participant distribution:

Table 1: Participant distribution

Group	Legislative Thinkers	Executive Thinkers	Judicial Thinkers	Total
DVC-LS	30	30	30	90
DVC-SS	30	30	30	90
Total	60	60	60	180

Instruments

The Thinking Styles Inventory (TSI) was used to categorize students into legislative, executive, or judicial thinkers. This inventory consists of multiple-choice questions that assess individuals' preferred ways of processing and structuring information. It ensures an accurate classification of participants based on their cognitive preferences. The validity of the TSI was established through previous studies, reporting a Cronbach's alpha of 0.85, indicating high reliability.

The Instructional Materials Motivation Survey (IMMS) was used to measure student motivation based on Keller's ARCS model. The survey includes Likert-scale questions assessing four key factors: Attention, Relevance, Confidence, and Satisfaction. The reliability of IMMS was verified with a Cronbach's alpha of 0.89, demonstrating strong internal consistency.

Pre-test and post-test assessments were conducted to measure students' baseline motivation levels and subsequent changes after the instructional intervention. The pre-test established the initial motivation level, while the post-test evaluated differences after exposure to instructional materials. The reliability of these assessments was tested using a test-retest method, yielding a correlation coefficient of 0.91, indicating high stability.

Procedure

The study was conducted over six weeks, with students randomly assigned to either the learner-paced or system-paced instructional mode.

a. Pre-Test

Before the instructional intervention commenced, all participants were required to complete two important assessments: the Thinking Styles Inventory (TSI) and the Instructional Materials Motivation Survey (IMMS). TSI is designed to categorize students into one of three thinking styles; legislative, executive, or judicial, each of which reflects different cognitive approaches and problem-solving strategies. By understanding students' thinking styles, educators can tailor instructional methods to better align with their preferences, thereby enhancing learning outcomes. Meanwhile, the IMMS serves to gauge the participants' motivation levels prior to the intervention, providing essential baseline data that will help evaluate the effectiveness of the instructional materials and strategies employed during the study. To ensure the validity of the results, both assessments were administered in a controlled environment, minimizing potential distractions and external influences that could compromise the integrity of the participants' responses. This controlled setting not only fosters a conducive atmosphere for accurate self-assessment but also standardizes the conditions under which each participant completed the surveys. Collectively, these pre-test assessments play a crucial role in establishing a foundation for instructional intervention, enabling researchers and educators to make informed decisions based on the students' cognitive profiles and motivation levels moving forward.

b. Instructional Phase

Participants in the study were assigned to one of two instructional modes: learner-paced (DVC-LS) and system-paced (DVC-SS). The DVC-LS group experienced a flexible learning environment, which allowed them to navigate through the video courseware at their own pace. This control over their learning journey enabled participants to revisit sections they found challenging or to skip over content they were already familiar with, thus facilitating a more personalized learning

experience. By empowering learners to dictate the flow of their education, the DVC-LS approach aimed to increase engagement and comprehension, as participants could tailor their study habits to their individual needs and preferences. On the other hand, the DVC-SS group followed a structured instructional design that presented content in a sequential manner. This system-paced format minimizes learner control over pacing, requiring participants to progress through the material according to a predefined schedule. The rationale behind this approach was to provide consistent learning experience, ensuring that all participants engaged with the material in the same order and within the same timeframe. By maintaining uniformity in content delivery, the study aimed to assess the effectiveness of these different instructional modes, allowing researchers to compare learning outcomes between those who had the flexibility to self-direct their learning and those who followed a fixed pathway.

c. Post-Test

After completing the instructional intervention, students retook the IMMS to assess changes in motivation levels. The post-test was conducted under the same controlled conditions as the pre-test to ensure consistency in data collection. To maintain the validity of the results, all participants were instructed to complete the post-test without prior discussion of the instructional content with peers. This minimized the possibility of external influence on their responses and ensured that motivation changes could be directly attributed to the instructional approach.

To prevent response biases, the post-test was designed with randomized question ordering and slight variations in wording from the pre-test while maintaining the same core assessment structure. This approach ensured that students did not memorize or anticipate responses, allowing for a more accurate measurement of their motivation levels post-intervention. Additionally, researchers closely monitored the testing environment, ensuring that all participants completed the assessment under the same conditions to avoid discrepancies in external factors that could impact motivation scores.

d. Data Collection and Validation

The process of data collection involves gathering responses from pre-tests, post-tests, and instructional engagement records in a systematic manner. Researchers meticulously reviewed all collected data to ensure its completeness and reliability. They employed a rigorous checking process to identify any missing or inconsistent information that could affect the study's outcomes. When discrepancies were found, the researchers conducted follow-ups with participants to clarify answers or gather additional information. This proactive communication not only enhanced the data quality but also helped build trust between the researchers and participants, fostering a collaborative environment for accurate data collection. After the verification process, the validated data was entered into SPSS (Statistical Package for the Social Sciences) for detailed statistical analysis. This step was crucial in maintaining the accuracy and integrity of the final dataset. By using SPSS, researchers were able to apply various statistical methods to analyze the data effectively, yielding insights that would be beneficial for interpreting the study's results. The meticulous approach to data collection and verification ensured that the findings would be robust and credible, ultimately contributing to the reliability of the research

outcomes. This structured process establishes a solid foundation for drawing meaningful conclusions and making informed decisions based on the study's findings.

DATA ANALYSIS

Quantitative data analysis was conducted using SPSS to evaluate the effects of instructional pacing and thinking styles on student motivation. Descriptive statistics summarized participant characteristics, including mean and standard deviation for motivation scores. This provided an overview of how motivation levels varied across different thinking styles and instructional conditions. The results indicated that legislative thinkers in the learner-paced condition had the highest motivation levels (M = 4.35, SD = 0.62), suggesting a strong preference for self-directed learning environments. In contrast, executive thinkers performed better in the system-paced condition (M = 4.21, SD = 0.58), aligning with their preference for structured learning frameworks.

Further analysis revealed that judicial thinkers displayed moderate motivation levels across both conditions, with mean motivation scores of 4.12 (SD = 0.59) in learner-paced and 4.08 (SD = 0.61) in system-paced environments. These findings suggest that while judicial thinkers benefit from structured approaches, they may also require analytical engagement to sustain motivation. The standard deviation values across all groups indicated relatively low variability, confirming the consistency of motivational responses within each cognitive preference category.

Additionally, subgroup analysis demonstrated that within the learner-paced group, students with prior experience in digital video production had a significantly higher motivation score (M = 4.45, SD = 0.57) compared to those with no prior experience (M = 4.22, SD = 0.63). This suggests that prior exposure to digital content creation can further enhance motivation when instructional methods align with individual thinking styles. These results highlight the importance of instructional design that accommodates both cognitive preferences and learners' prior knowledge for optimal engagement and motivation as in Table 2.

Table 2: Descriptive statistics

Thinking Style	Instructional Pacing	Mean (M)	Standard Deviation (SD)
Legislative	Learner-Paced	4.35	0.62
Executive	System-Paced	4.21	0.58
Judicial	Learner-Paced	4.12	0.59
Judicial	System-Paced	4.08	0.61

Analysis of Variance (ANOVA) was conducted to compare the differences between groups. This test helped determine whether instructional pacing and thinking styles had significant effects on student motivation. A two-way ANOVA was performed to assess interactions between independent variables.

The ANOVA results revealed a statistically significant main effect of instructional pacing on student motivation, $F(1, 178) = 6.82$, $p < 0.01$, indicating that students in the learner-paced condition exhibited significantly higher motivation levels than those in the system-paced condition. Furthermore, a significant interaction effect between thinking styles and instructional pacing was observed, $F(2, 178) = 4.29$, $p < 0.05$, suggesting that different cognitive styles responded differently to instructional pacing modes.

Post hoc comparisons using the Tukey HSD test indicated that legislative thinkers had significantly higher motivation scores in the learner-paced condition compared to the system-paced condition ($p < 0.01$). Executive thinkers, however, displayed higher motivation in the system-paced condition than in the learner-paced condition ($p < 0.05$). Judicial thinkers did not exhibit significant differences between conditions, indicating a more adaptable motivation level across pacing modes. These findings reinforce the need for adaptive instructional designs that cater to diverse cognitive preferences to optimize student engagement and motivation.

An analysis of Covariance (ANCOVA) was employed to control for potential confounding variables, ensuring a more accurate measure of the instructional mode's impact on motivation. ANCOVA helped refine the results by adjusting for pre-test motivation scores and eliminating biases that could arise from initial individual differences.

The ANCOVA results indicated a significant effect of instructional pacing on student motivation even after accounting for pre-test scores, $F(1, 177) = 5.94$, $p < 0.05$. The adjusted mean motivation score for the learner-paced condition was $M = 4.29$, while the system-paced condition had an adjusted mean of $M = 4.11$. This confirms that students who had greater control over their learning pace maintained higher motivation levels compared to those in a structured instructional setting.

Further examination of the interaction effect between thinking styles and instructional pacing revealed that legislative thinkers exhibited the highest adjusted motivation score in the learner-paced condition ($M = 4.41$), whereas executive thinkers performed better in the system-paced condition ($M = 4.18$). Judicial thinkers showed relatively stable motivation across both conditions, suggesting that they adapt more flexibly to instructional formats. These findings reinforce the necessity of aligning instructional pacing with cognitive preferences to optimize student motivation and engagement.

Effect Size Calculation: Cohen's d and partial eta squared were computed to determine the magnitude of observed effects. Effect size analysis provided insights into how strongly instructional pacing and thinking styles influenced motivation outcomes as in Table 3.

Table 3: Effect size

Statistical Test	Effect Observed
ANOVA	Significant main effect ($F(1, 178) = 6.82$, $p < 0.01$)
ANCOVA	Significant effect after controlling pre-test motivation ($F(1, 177) = 5.94$, $p < 0.05$)

The descriptive statistics showed that legislative thinkers in the learner-paced condition had the highest mean motivation score ($M = 4.35$, $SD = 0.62$), while executive thinkers in the system-paced condition also exhibited high motivation levels ($M = 4.21$, $SD = 0.58$). Judicial thinkers demonstrated moderate motivation levels across both conditions. ANOVA results indicated a significant main effect of instructional pacing on motivation ($F(1, 178) = 6.82$, $p < 0.01$), as well as a significant interaction effect between thinking styles and instructional pacing ($F(2, 178) = 4.29$, $p < 0.05$). ANCOVA results further confirmed that the instructional pacing mode had a meaningful impact on post-test motivation scores after controlling pre-test motivation.

By employing structured research methodology and rigorous statistical analysis, this study aims to provide empirical insights into the relationship between cognitive preferences, instructional pacing, and student motivation in digital video production education.

RESULTS AND DISCUSSION

Thinking Styles and Motivation

Results indicate a significant main effect of learner-paced segmentation on motivation. While all thinking styles exhibited increased motivation in DVC-LS compared to DVC-SS, judicial-style learners demonstrated the highest motivation, aligning with prior research on learner control and engagement. This finding suggests that learners who naturally prefer analytical evaluation and deep reflection benefit more from having control over their learning pace. By allowing judicial thinkers to pause, rewind, and revisit key concepts, learner-paced segmentation reduces cognitive overload and fosters a more thoughtful engagement with the content.

Moreover, legislative thinkers, who favor creative problem-solving, also displayed a notable increase in motivation in the DVC-LS mode, as it provided the flexibility to explore content in their preferred manner. In contrast, executive thinkers, who thrive on structured learning, exhibited relatively consistent motivation across both pacing modes, suggesting that system-paced instruction still met their need for clear guidance. These insights underscore the necessity of designing digital courseware with adaptable pacing features to cater to varied cognitive preferences, ultimately enhancing student engagement and motivation.

The Role of Computational Thinking

Students exposed to CT-based digital video production exhibited higher self-efficacy and problem-solving confidence. The integration of CT algorithmic thinking into video editing tasks reinforced structured problem-solving, benefiting students across cognitive styles. The ability to break down video production tasks into algorithmic steps enabled students to approach complex problems systematically, reducing cognitive overload and fostering a sense of accomplishment. This structured approach to learning not only increased their confidence in handling digital tools but also enhanced their ability to troubleshoot and optimize video editing workflows.

Furthermore, CT-based instruction encouraged students to develop a deeper understanding of digital storytelling by focusing on logical sequencing, pattern recognition, and iterative improvement. This approach was particularly effective for judicial thinkers, who excel in critical analysis, and legislative thinkers, who appreciate flexibility in creating content. By embedding computational thinking principles into digital video production, students engaged more actively in the learning process, leading to higher motivation and an increased willingness to experiment with creative and technical aspects of video creation (Wan Ali, 2018; Wan Ali & Wan Yahaya, 2020).

Interaction Effects of Thinking Styles and Instructional Pacing on Motivation

Findings revealed that thinking styles significantly influence how students respond to instructional pacing. Legislative thinkers, who thrive on creativity and autonomy, displayed heightened motivation in the learner-paced mode (DVC-LS), where they could control content navigation and explore concepts freely. This flexibility allowed them to experiment with different digital video editing techniques, fostering deeper engagement and encouraging innovative

approaches to storytelling. Their preference for self-direction aligns with prior research emphasizing the need for personalized learning experiences to support intrinsic motivation.

Executive thinkers, who prefer structured learning, benefited from both pacing modes but exhibited slightly higher motivation in the system-paced condition (DVC-SS). The structured nature of system-paced instruction provided a clear sequence of steps, reducing ambiguity and aligning with their preference for well-defined tasks. Meanwhile, judicial thinkers, who excel in evaluating and criticizing information, performed best in the learner-paced mode, where they could analyze and reflect on video segments at their own pace. This mode allowed them to critically assess editing choices, compare different techniques, and refine their work iteratively. These findings underscore the importance of aligning instructional design with cognitive preferences to optimize student engagement and ensure effective learning outcomes.

Effectiveness of Learner-Paced vs. System-Paced Instructional Modes

The study supports the premise that learner-paced instructional strategies foster greater motivation and engagement. DVC-LS participants reported higher satisfaction and motivation compared to those in DVC-SS, likely due to the ability to regulate their own learning. This aligns with cognitive load theory, which suggests that self-paced learning reduces extraneous cognitive load, allowing learners to better absorb and apply new concepts. The ability to navigate content at their own pace allowed students to revisit complex concepts, reinforcing understanding and retention. This flexibility was particularly beneficial for judicial and legislative thinkers, who preferred a degree of autonomy in navigating content and refining their learning process.

However, system-paced instruction also demonstrated its effectiveness for certain learners, particularly those with executive thinking styles who thrive on structured, sequential learning experiences. These students benefited from a well-defined instructional framework that minimized distractions and maintained a steady progression through the material. Despite this, some executive thinkers still expressed a desire for limited pacing control to enhance comprehension. The findings highlight the need for instructional design models that integrate elements of both pacing strategies, allowing educators to personalize learning experiences based on cognitive preferences while maintaining the benefits of structured guidance.

The study supports the premise that learner-paced instructional strategies foster greater motivation and engagement. DVC-LS participants reported higher satisfaction and motivation compared to those in DVC-SS, likely due to the ability to regulate their own learning. This aligns with cognitive load theory, which suggests that self-paced learning reduces extraneous cognitive load, allowing learners to better absorb and apply new concepts. However, while system-paced instruction provided structure, it was less effective in maintaining student motivation, particularly among legislative and judicial thinkers who preferred a degree of autonomy in navigating content.

Implications for Educational Technology

The findings of this study emphasize the importance of integrating adaptive learning strategies into digital video courseware to cater to diverse cognitive preferences. By incorporating learner-controlled pacing options, students with different thinking styles can engage more effectively with course materials, thereby enhancing motivation and self-efficacy. Digital video platforms

that allow for both structured and flexible learning experiences can bridge the gap between executive thinkers who thrive on systematic instruction and legislative or judicial thinkers who require autonomy to explore and analyze content at their own pace.

Furthermore, the integration of computational thinking elements in digital learning environments can significantly enhance students' problem-solving abilities and engagement. Embedding algorithmic thinking and interactive learning modules in digital video production courses can improve students' ability to structure content logically and refine their creative processes iteratively. Future research should investigate the effectiveness of artificial intelligence-driven adaptive learning systems that adjust pacing and instructional design based on real-time student interaction data, ensuring personalized and effective learning experiences. Findings suggest that digital video courseware should incorporate learner-controlled pacing and CT-based activities to accommodate diverse cognitive preferences. Future studies should explore additional factors, such as prior knowledge and multimedia complexity, to further refine instructional design strategies.

CONCLUSION

This study investigated the influence of thinking styles on student motivation in digital video production courses, evaluated the effectiveness of learner-paced (DVC-LS) versus system-paced (DVC-SS) instructional modes, and examined the interaction effects between thinking styles and instructional pacing on engagement and motivation. The findings revealed that students in the learner-paced environment (DVC-LS) demonstrated higher levels of motivation and engagement, particularly those with judicial and legislative thinking styles, who benefited from increased autonomy. Conversely, executive thinkers maintained consistent motivation across both instructional modes, reflecting their preference for structured learning environments.

These results emphasize the importance of aligning instructional design with learners' cognitive profiles to foster intrinsic motivation and sustained engagement. The variation in outcomes across different thinking styles suggests that a uniform instructional approach may hinder learning potential, particularly in creative and technically complex domains such as digital video production. Granting legislative and judicial thinkers the flexibility to make decisions and explore independently respects their natural tendencies toward analysis and innovation. Meanwhile, the consistent performance of executive thinkers underscores the continued importance of structure and clarity for learners who favor rule-based learning.

The findings also have practical implications for educators and instructional designers. Incorporating elements such as customizable learning pathways, interactive checkpoints, and reflective activities can better accommodate diverse cognitive preferences. Adaptive learning tools that respond to students' thinking styles may enhance instructional relevance and effectiveness. For instance, open-ended, problem-solving tasks may be especially beneficial for legislative thinkers, while executive learners may respond more positively to structured tutorials and detailed rubrics.

Additionally, the study reinforces the critical role of learner autonomy in driving motivation, particularly when supported by digital tools that foster self-regulation and critical thinking. Motivation in digital learning environments is influenced not only by content complexity or interface design but also by the learner's perceived control, relevance, and challenge. Designing courseware that effectively balances guidance with autonomy may therefore be key

to achieving deeper, more meaningful learning outcomes, especially in domains requiring both creativity and technical skills.

Taken all the findings together, this research contributes to the expanding body of literature advocating for personalized learning environments informed by cognitive science and educational technology. It highlights the potential for future development of real-time adaptive instructional systems, particularly those powered by artificial intelligence and learner analytics. As digital education continues to evolve, accommodating the diversity of thinking styles and motivational drivers will be crucial for fostering inclusive, engaging, and effective learning experiences.

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