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Motivational Theories in Action: A Guide for Teaching Artificial Intelligence Prompts to Support Student Learning Motivation

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This conceptual study explores how motivational theories can guide the use of generative Artificial Intelligence (AI) tools, such as ChatGPT, to enhance student learning motivation. Drawing on Self-Determination Theory (SDT), Expectancy-Value Theory (EVT), and Mindset Theory (MT), we introduce the Motivation Construction Model (MCM), a theoretical framework consisting of three interrelated phases: contemplation, goal setting & planning, and action. We demonstrate how MCM can be applied in AI-driven learning environments to support personalized prompts, targeted feedback, and adaptive guidance to motivate learning. We propose that MCM is a strategic and holistic approach to equip educators with actionable guidelines to use AI for motivating students while adhering to ethical pedagogical principles. Although the MCM framework is grounded in established motivational theories, its real-world application remains to be explored. Future research should examine the effectiveness of MCM in authentic classroom contexts to better understand its potential for enhancing student motivation and informing evidence-based instructional practices.

Keywords: motivation, self-determination theory, expectancy-value theory, mindset theory, artificial intelligence (AI), Generative AI, ChatGPT, prompting in ChatGPT

INTRODUCTION

In teaching and learning environments, student engagement, persistence, and achievement are key indicators of motivation (Martin, 2008; Saeed & Zyngier, 2012). Motivated learners actively participate in educational activities, stay focused on

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challenging tasks, and persist despite obstacles. This connection between motivation and learning is evident in students' choices to engage with educational opportunities, their sustained effort in completing assignments, and their resilience in overcoming difficulties (Guay, 2022; Jang, 2008; Sedden & Clark, 2016). Understanding how motivation develops and is maintained is therefore essential for designing effective learning environments that support student academic success.

Motivation is shaped by a wide range of factors, including individual characteristics, sociocultural influences, contextual conditions, instructional support, and the availability of learning resources (e.g., Alvandoudi et al., 2023; Chen, 2023; Hidajat et al., 2020; Munawaroh et al., 2022; Nugraha et al., 2021; Suanto et al., 2023; Tiang-uan, 2024). Many educators recognize the importance of initiating, directing, and sustaining goal-oriented learning behaviours (Murphy & Alexander, 2000; Radil et al., 2023). However, there is still a lack of theory-based practical strategies to effectively nurture motivation and address the challenges that arise in diverse learning environments (Lai, 2011; Patrick, 2023; Radil et al., 2023). A search for "motivation" reveals numerous definitions, with each theory offering a unique perspective to understand this complex construct. For example, some theories emphasize factors such as physiological needs as well as external and internal reinforcements, while others mostly consider personal beliefs, cultural values, and social expectations (Pekrun & Marsh, 2022). Despite this multiplicity of definitions and functions, motivation has always been universally conceptualized as an innate desire that drives individuals to participate in an activity or become involved in a decision or a plan (Lai, 2011; Motha & Lin, 2014). Lai (2011) argues that "motivation involves a constellation of beliefs, perceptions, values, interests, and actions that are all closely related" (p.5).

Numerous studies (e.g., Maslow, 1943; Ryan & Deci, 2017; Weiner, 1985; Wigfield & Eccles, 2000; Yeager & Dweck, 2020) have enriched our understanding of motivation by exploring various assumptions and strategic approaches in the context of learning. Early theories of motivation predominantly focused on behavioural factors, needs, and instincts. For example, Hull's Drive Theory (Hull, 1943) proposed that behaviour is primarily driven by the need to satisfy biological urges and enhance survival, while Maslow's Hierarchy of Needs (Maslow, 1954) suggested that individuals must first fulfill basic, lower-order needs before being motivated to pursue higher-order goals (Lester et al., 1983).

With the emergence of the cognitive revolution in the latter half of the 20th century, the science of learning shifted its focus toward conscious cognitive processes (Dember, 1974). This paradigmatic shift led scholars to explore motivation more comprehensively by focusing on factors such as autonomy, goal setting, self-efficacy beliefs, and available learning opportunities for growth and mastery (Miller & Brickman, 2004; Ryan et al., 2019). Researchers began to investigate how setting specific, challenging goals can enhance motivation, how a learner's belief in their own abilities (self-efficacy) influences their motivation and performance, and how different instructional environments can either support or hinder motivational processes. Notable theories that have emerged from this approach include Self-Determination Theory (Benware & Deci, 1984; Deci & Ryan, 2012; Ryan & Deci, 2000, 2020), Expectancy-Value Theory

(Atkinson, 1957; Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), and Mindset Theory (Dweck, 2016; Dweck & Leggett, 1988).

This article integrates three key motivational theories, Self-Determination Theory (SDT), Expectancy-Value Theory (EVT), and Mindset Theory (MT), to develop a practical framework for fostering student learning motivation. While motivational theories offer valuable insights into the complexities of motivation for instructional purposes, research indicates that they often lack specific and practical recommendations for educators, particularly in the context of AI-oriented learning environments (Patrick, 2023; Radil et al., 2023; Williamson & Eynon, 2020). Therefore, we propose applicable guidelines that integrate insights from motivational theories with actionable strategies employing generative AI tools such as ChatGPT to address this need. Our suggested guidelines, which we present later, are specifically designed to help educators construct learners' motivation by promoting key factors such as autonomy, mastery, relatedness, growth mindset, and self-efficacy through personalization. These personalization configurations include delivering timely feedback, providing dynamic content, and creating adaptive assessments using appropriate AI-assisting prompts that can be explicitly taught by instructors. Research has shown that AI-supported personalized learning plans improve student self-regulation and academic success by providing adaptive learning experiences, targeted interventions, predictive analytics for performance assessment, and dynamic content delivery (Chang et al., 2023; Lin & Chang, 2020; Ng et al., 2024; Vorst & Jelicic, 2019).

To provide a clear overview of the paper's structure and objectives, we begin by introducing the key theoretical perspectives of three motivational theories, followed by a brief review of the role of AI in education. Next, we integrate these theories using a conceptual synthesis approach and propose the Motivation Construction Model (MCM), which consists of three phases: contemplation, goal setting and planning, and action. Finally, we provide practical guidelines based on the MCM, demonstrating how educators can design and implement AI prompts to harness the full potential of generative AI such as ChatGPT to enhance student motivation and improve learning outcomes. Our comprehensive review not only highlights the potential of generative AI in education but also offers actionable insights for educators seeking to integrate motivational theories into their teaching practices.

Part I: Theoretical Foundations of Motivation

Self-Determination Theory (SDT)

According to self-determination theory proposed by Ryan and Deci (Deci & Ryan, 1985, 2012; Ryan & Deci, 2000, 2017), intrinsic motivation is significantly influenced by the fulfillment of three fundamental psychological needs: autonomy, competence, and relatedness.

Autonomy, the first of these psychological needs, refers to the feeling of having choice and controlling over one's own behaviours and goals. When individuals experience a sense of autonomy, they feel empowered and capable of making choices aligned with their values and preferences. Autonomy-driven motivation enhances engagement with

tasks and activities, as individuals are more likely to invest effort and persevere when they feel a sense of personal agency (Reeve et al., 2004; Ryan & Deci, 2017).

The second psychological need, competence, emphasizes the innate human tendency to pursue mastery and proficiency in various skills and tasks. When individuals are given opportunities to develop skills, acquire relevant experience, and experience meaningful progress, their intrinsic motivation becomes strengthened. The pursuit of competence not only enhances the individual's confidence and efficacy but also contributes to a heightened enjoyment of the activities they undertake (Deci & Ryan, 2012).

The third psychological need, relatedness, centers around the fundamental human desire to connect with others and cultivate a sense of belonging. Fulfilling this need involves forming meaningful relationships and experiencing a sense of connection within social groups. This sense of connection acts as a powerful catalyst for personal and psychological growth and motivates individuals to explore their interests, take on challenges, and pursue their goals with enthusiasm and determination (Ryan & Deci, 2000; Derakhshan & Noughabi, 2024).

It is crucial to recognize that these three needs are interconnected and mutually reinforcing, creating a synergistic effect on an individual's overall well-being and motivation. The SDT, through its emphasis on these psychological needs, provides valuable insights into understanding and cultivating intrinsic motivation across diverse contexts, ranging from educational settings to workplace environments and personal pursuits.

Research has consistently demonstrated the critical role of instructors in supporting student autonomy and competence (Black & Deci, 2000; Yang et al., 2022). This role involves equipping students with essential domain-specific and inquiry-based knowledge, as well as providing appropriate feedback to help them solve problems and tackle challenges in their own unique ways (Black & Deci, 2000; Hajian Moghadam, 2021; Hajian et al., 2019, 2021; Orsini et al., 2015). However, implementing this student-centered approach in traditional classrooms can be difficult due to factors such as limited time, resources, and support (Mosier, 2018).

AI has the potential to enhance learner intrinsic motivation in alignment with the principles of SDT. For example, AI technologies provide personalized instruction and feedback that support students in learning independently, developing self-regulation skills, and taking ownership of their learning (Chang et al., 2023; Dai et al., 2023; Lin & Chang, 2023). In addition, AI fosters the development of competence by offering adaptive learning experiences and real-time performance feedback (Choung et al., 2023). Furthermore, AI enables social platforms and virtual environments to foster meaningful connections and a sense of relatedness among users (Zhai et al., 2021).

Expectancy-Value Theory (EVT)

Why do students have variability in goal setting, problem-solving approaches, and perceptions of achievement? And why do some learners display higher levels of intrinsic motivation than others? According to EVT, these differences largely arise from two fundamental psychological constructs: expectancy and value (Atkinson, 1957;

Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000; Loh, 2019). An individual's motivation is strongly influenced by the value they attribute to a task and their belief in achieving desirable outcomes and expected rewards.

The theory breaks down task value into four parts: how important it is for individuals to do well (attainment value), how much they enjoy it (intrinsic value), how useful it is for future goals (utility value), and whether it presents any obstacles or conflicts (cost) (Leaper, 2011). According to this model, beliefs about success and task value are influenced by personal factors, such as one's abilities, past experiences, and goals and external factors, such as culture, social standards, and norms. Research shows that students are more likely to engage in academic tasks or pursue learning goals when they perceive them as achievable (Bong, 2004; Schunk & DiBenedetto, 2020). When individuals find a goal achievable and have confidence in their ability to achieve the desired outcome, they are more motivated to take action and work towards that goal (Schunk & DiBenedetto, 2020). The interplay between expectancy and value significantly impacts learning motivation, academic performance, and activity choices (Atkinson, 1957; Wigfield & Ponnock, 2020).

Several studies propose that students' perceptions of negative consequences associated with task completion, termed as cost, also affect academic outcomes (Flake et al., 2015; Y. Jiang et al., 2018; Madigan & Curran, 2020). Eccles et al. (1983) argued that expectancies primarily relate to one's self-perceived ability, perceptions of task difficulty, expectations from others, and level of control. Task value components are categorized into intrinsic value (based on interest), attainment value (importance of performing well), and utility value (integral to future goals). Cost, acting as a mediator, influences perceived effort (students' perception of the effort required for task success), opportunity costs (when engaging in one activity prevents participation in other valued activities), and psychological costs of failure (anxiety related to potential task failure). Cost serves as a negative motivational factor that can significantly diminish the overall value students assign to a task (Flake et al., 2015).

We argue that generative AI tools can play an important role in enhancing learners' expectancy and task value by providing personalized insights, real-world applications of academic content, and adaptive support. AI can increase expectancy by offering tailored explanations, scaffolded prompts, and instant feedback that help students develop competence and confidence in their abilities. Moreover, generative AI may increase task value by connecting learning materials to students' interests, future career aspirations, and real-world challenges. In the practical guidance section, we will demonstrate a series of AI prompts designed to exemplify how these interventions can effectively address pertinent motivational issues among learners.

Mindset Theory (MT)

Carol Dweck's Mindset Theory (Dweck, 2016; Dweck, 1986) proposes two primary mindsets: a fixed mindset, where individuals believe their abilities are innate and unchangeable, leading to a desire to appear competent without much effort; and a growth mindset, where individuals believe abilities can be developed through dedication and hard work. Dweck's research emphasizes the impact of these mindsets

on motivation, resilience, and overall achievement, with the idea that fostering a growth mindset can positively influence learning outcomes by encouraging a belief in the malleability of intelligence and the value of effort in the learning process. MT or the implicit theory of intelligence (Dweck & Leggett, 1988) argues that our beliefs about intelligence and personal abilities can have a profound influence on our approach towards learning motivation and academic achievement. For example, if a student's primary goal is to achieve high grades in a science course as a way to gain external validation of their abilities, their motivation may decrease once they have reached that goal. This decline in motivation toward performance goals (i.e., short-term target performance objectives) often occurs when the desired level of performance is significantly challenged throughout the process.

Dweck and Leggett (1988) noticed that children responding to a challenge revealed two patterns of performance: mastery-oriented and helpless responses. The helpless response often was characterized by avoidance of challenges and difficulty facing obstacles. In contrast, the mastery-oriented pattern involved seeking challenging tasks and persistence after failure (Dweck & Yeager, 2021; Yeager & Dweck, 2020). In a study conducted by Burnette et al. (2018), it was demonstrated that a growth mindset intervention had a significant positive impact on academic performance as the students who received the intervention exhibited noticeable improvements in motivation and self-efficacy. The mindset that learners adopt significantly influences how they approach challenges, setbacks, and learning opportunities (Campbell et al., 2020; Kapasi & Pei, 2022). It also shapes their resilience and impacts their academic achievement.

We believe generative AI tools can foster a growth mindset by providing targeted support and encouragement across different subjects. For example, ChatGPT can frame challenges as opportunities to apply knowledge, but students must learn how to ask the right questions to receive meaningful insights. By teaching students to use AI prompts strategically, instructors help them persist through challenges, view setbacks as part of learning, and develop stronger problem-solving skills. This approach not only enhances students' understanding of the material but also reinforces the belief that effort and continuous learning are essential for success.

Part II: The Role of AI in Education

Current research on Generative AI in education emphasizes its transformative potential while also highlighting challenges that need to be addressed for academic purposes (Chang et al., 2023; Uppal & Hajian, 2025). AI applications in education have shown potential to facilitate personalized learning, increase efficiency, enhance student engagement and motivation, and support students in developing a growth mindset (Harry, 2023; Luckin & Holmes, 2016; Neji et al., 2023). These advancements are evident in areas such as adaptive content delivery, automated learner profiling, and intelligent user interfaces, all of which contribute to more tailored and interactive learning experiences (Barrera Castro et al., 2024; Tahiru, 2021).

However, one notable gap in the field is the lack of research on human-AI collaboration and learner control within educational contexts (Ji et al., 2022; Echeverria et al., 2020).

While significant progress has been made in advancing personalized learning and intelligent tutoring systems, limited studies have investigated how students can collaboratively engage with AI to enhance learning outcomes (Brusilovsky, 2024). For example, a framework for integrating self-regulated learning (SRL) principles, such as goal setting and feedback, have been proposed but remain underexplored in practice (Chang et al., 2023). Similarly, the conceptualization of AI as a collaborative "learning mate" requires further empirical validation to ensure its scalability and effectiveness (Kim et al., 2022). Moreover, educators' competencies in guiding students to use AI tools remain a pressing concern (Barrera Castro et al., 2024). While AI's contributions to personalization and engagement are well-documented and theorized, its capacity to foster intrinsic motivation through theoretical frameworks is underdeveloped (Barrera Castro et al., 2024; Zhai et al., 2021).

The potential of AI to support and sustain motivation over time remains largely underexplored due to the absence of a structured, theory-driven approach. While curriculum design and content development provide foundational support (Kickert et al., 2022), they do not fully address how AI can actively help construct motivation in a student-centered learning environment. A key gap in current research is the lack of explicit strategies that empower students to use AI tools effectively, particularly through well-designed prompts that promote deeper engagement, autonomy, and mastery (Neji et al., 2023). Without clear instructional support, students risk interacting with AI passively rather than as an active learning partner. To address this gap, a theoretical framework is needed to integrate motivational principles into AI-supported learning and provide instructors with practical strategies to guide students to engage meaningfully with appropriate AI tools.

Part III: Developing a Motivational Model for Effective AI Integration

Rationale for Integrating SDT, EVT, and MT

Research indicates that existing motivational theories remain fragmented and lack a cohesive structure for application in learning contexts (Martin, 2008, 2023; Bembenutty et al., 2022). While SDT, EVT, and MT each offer valuable insights into different aspects of motivation (Figure 1), none of them fully capture the diverse and dynamic process through which student motivation is constructed. Each theory is limited in isolation: SDT emphasizes autonomy and intrinsic needs, EVT focuses on expectancy and task value, and MT highlights the role of beliefs about intelligence and persistence. However, motivation is a dynamic process that evolves in phases and is influenced by various factors such as personal beliefs, goal orientations, self-regulation skills, and both internal and external incentives (Walter & Hart, 2009; Williams & Williams, 2011).

To bridge these gaps, the Motivation Construction Model (MCM) integrates SDT, EVT, and MT into a cohesive framework that explains how motivation is initiated, sustained, and regulated. Aligned with Dörnyei's (2000) argument that motivation governs choice, persistence, and effort, MCM structures motivation into three phases: contemplation, goal setting & planning, and action. This integrated approach moves beyond isolated theories to provide a structured model that helps educators design learning

environments that actively support student learning motivation at every stage – from initial engagement to sustained effort and the completion of action.

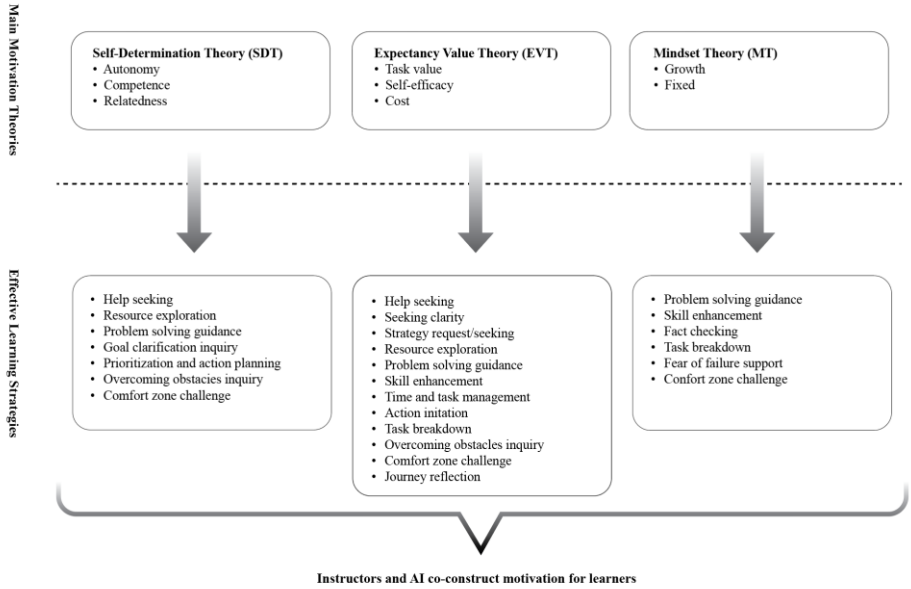

Figure 1
Summary of Motivational Theories and the Associated Learning Contexts.

Note. This diagram provides a concise summary of three key motivational theories – SDT, EVT, and MT– and outlines several effective learning strategies derived from these theories. Additionally, it highlights how these theories inform certain learning contexts that can take place in today's classrooms. This integration of theory and learning scenarios drives the development of our motivation construction framework.

MCM for Enhancing Motivation in AI-Driven Learning Contexts

Despite the wealth of research on various motivational theories, one of the greatest challenges in education remains translating these theories into effective classroom practice (Van der Putten, 2017). This challenge is further amplified in today's AI-driven classrooms, where Generative AI (GAI) presents new opportunities for engagement, personalized feedback, and adaptive learning (Chiu et al., 2023). AI-powered tools have the potential to enhance student motivation by providing just-in-time, theory-driven support tailored to individual learners (Chang et al., 2023; Fauzi et al., 2023; Lin & Chang, 2023). For instance, AI chatbots can analyze student responses, offer constructive feedback, and generate adaptive prompts, ensuring that students remain appropriately challenged yet capable of success (Chang et al., 2023; Chiu et al., 2023). AI can also facilitate self-regulated learning through reverse prompting, a process in which students initiate a task, and the AI provides subsequent guidance. This approach has been shown to enhance learning engagement (Chang et al., 2023) and sustain motivation (Mohamed et al., 2024).

While AI offers potential benefits, educators currently lack a structured framework to effectively integrate AI into learning environments that foster student motivation. Without clear guidance, AI tools may be underutilized or misaligned with pedagogical goals, leading to inconsistent support for student motivation (Chiu et al., 2023). While AI can enhance motivation (Mohame et al., 2024; Neji et al., 2023), it does not inherently explain how to construct and sustain it across different phases of learning.

We developed the MCM, to bridge the gap between motivational theories, AI tools, and classroom implementation. The MCM provides educators with a cohesive framework that explains how motivation is built over time and how AI can be strategically integrated to support each phase. Rather than using AI in an aimlessly fragmented way, MCM enables educators to purposefully design AI-driven interventions that promote autonomy, competence, and persistence in learning. By adopting MCM, educators can effectively enhance motivation while ensuring that AI technological tools are grounded in established motivational principles. This approach not only addresses the long-standing disconnect between theory and practice but also equips educators with a practical, theory-backed model for fostering motivation in promoting AI-enhanced education.

MCM Phases and the Role of AI-Generated Prompts in Enhancing Each Phase

To address how educators can effectively cultivate motivation of learning for learners, we propose the MCM depicted in Figure 2. This practically oriented model comprises three interacting phases: (a) Contemplation, (b) Goal setting & Planning, and (c) Action. Within the MCM, each phase plays a dynamic and interactive role in shaping individuals' motivation throughout the learning process. Here, "dynamic" refers to the continuous interactions and mutual influences among the three phases. For example, ineffective goal setting can lead students to revisit the contemplation and action phases to reassess and adjust their approach. When goals are not clearly defined or realistic, students may struggle to make progress, leading to frustration and disengagement. Revisiting these phases provides an opportunity to reflect on initial intentions, identify shortcomings, and refine goals to be more realistic. This iterative process of reassessment and adjustment is crucial for developing effective motivational strategies. This back-and-forth interaction is expected to create a continuous cycle of motivation and improvement. By presenting these phases, the MCM offers a structured framework that supports individuals' motivation to initiate, sustain, and complete learning activities. We advocate for this process-oriented motivational approach, as we believe it holds substantial practical value for educators in effectively supporting learners' motivation throughout their educational journey.

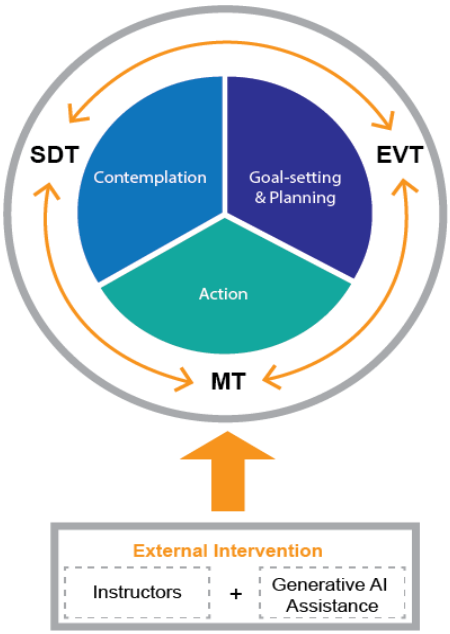

Figure 2
Motivation construction model (MCM)

Note. The MCM consists of three interacting phases: (a) Contemplation, (b) Goal setting & Planning, and (c) Action. Each phase influences the others, creating a continuous cycle of motivation and improvement. This model provides a practical framework for educators to effectively support and enhance learners' motivation throughout their learning process.

Contemplation

Contemplation, as the initial step in this model, offers individuals an opportunity to evaluate their current situation and recognize areas where change may be desired or needed. This concept aligns with the definition provided by Kuhn and Lao (1998), who described contemplation as engaging in mental activities related to learning a specific topic. When learners engage in contemplation, they exercise autonomy by exploring their own thoughts, feelings, and aspirations independently, without external pressure or influence (aligning with the autonomy aspect of SDT). Contemplative practices allow students to shift their mindset and put more effort into activities they perceive as valuable and expect to succeed in. When learners contemplate the value and significance of an activity, they are more likely to perceive it as personally meaningful. This perception, in turn, can lead to greater intrinsic motivation and effort, as suggested by EVT. Additionally, the contemplation phase allows learners to strengthen their self-efficacy by reflecting on their past achievements and imagining future successes. This process aligns with the principles of MT, as it encourages learners to develop a positive belief in their abilities and embrace challenges with confidence. Together, these theories

highlight the importance of contemplation in shaping learners' motivations and behaviours toward achieving academic success.

During this phase, AI-generated prompts should focus on helping learners identify their needs and explore possibilities. Specifically, prompts should encourage help-seeking behaviours, such as asking for clarification on concepts, seeking clarity by breaking down complex ideas, strategy requests for approaching learning tasks, resource exploration to discover relevant materials, problem-solving guidance to tackle challenges, and skill enhancement by identifying areas for growth.

Goal setting and planning

A goal, as conceptualized by Fishbach and Ferguson (Fishbach & Ferguson, 2007), is essentially a mental representation of a desired state of an outcome. A goal encapsulates learners' cognitive vision of how they hope for things to unfold or the specific outcome they aspire to achieve. In educational contexts, goal setting is defined as the process of establishing clear and productive targets, or objectives, for teaching and learning (Moeller et al., 2012). Therefore, a goal serves as a guiding framework that influences learners' thoughts, actions, and decisions, and shapes their behaviour as they work towards it. This cognitive aspect emphasizes the importance and value of learners' efforts and aspirations toward particular outcomes. Studies have shown that appropriate goal setting, along with appropriate, timely, and specific feedback, can lead to higher achievement, better performance, and a higher level of self-efficacy, self-regulation, and motivation in learners (Hajian Moghadam, 2021; Hajian et al., 2019, 2021; Hidajat et al., 2020; Moeller et al., 2012). Planning, on the other hand, involves developing a systematic approach or roadmap to reach goals. Through effective planning goals are broken down into smaller, manageable tasks, resources are used effectively, and timelines are established. The relationship between goal setting and planning lies in their mutual reinforcement: goal setting provides the target, while planning outlines the steps needed to reach it. Without effective planning, goals may remain distant aspirations lacking a concrete path forward. Similarly, without clearly defined goals, planning efforts may lack direction and coherence (Locke & Latham, 2006).

Students benefit from support and guidance during goal setting and planning for several reasons. First, many students may lack experience or confidence in setting realistic and achievable goals, requiring assistance to identify meaningful objectives aligned with their abilities and aspirations. Additionally, guidance from educators (or knowledgeable others) helps students navigate the complexities of planning, such as brainstorming effective strategies, evaluating previous strategies, breaking down large goals into manageable tasks and prioritizing activities. Furthermore, support during goal setting and planning can empower students to overcome challenges, stay motivated, and persist in the face of setbacks, fostering resilience and self-efficacy.

In this phase, AI prompts should support learners by clarifying goals, anticipating challenges, ensuring information accuracy, managing time and tasks, and identifying necessary resources. By integrating these elements, AI can guide learners to create actionable plans that foster motivation and support progress toward their desired outcomes.

Action

In the final phase of the MCM, learners transition from contemplation, goal setting and planning to action, where they convert their aspirations and agendas into tangible actionable steps. Actions can be conceptualized as observable behaviours, internal cognitive and metacognitive processes, and the strategic use of knowledge or resources developed in earlier phases. This phase requires learners to actively apply their understanding of the task to real-world scenarios, draw on prior experiences to navigate challenges, have confidence in their skills, and be able to employ the appropriate resources and skills they have obtained during earlier phases. The value of teaching learners how to act on internalized strategies to achieve their goals has been supported in prior studies (e.g., Robillos & Bustos, 2022). We argue that by deploying these resources, learners can execute their plans more effectively and increase the likelihood of achieving meaningful outcomes.

Motivation for action following goal setting and planning is influenced by a multitude of intrinsic and extrinsic factors. Extrinsic factors include receiving immediate feedback on a completed task from the instructor, peers, or an AI chatbot (e.g., earning virtual badges or points for solving problems, or receiving praise for making progress). And intrinsic factors involve experiencing the satisfaction of learning something new, feeling engaged in a stimulating conversation with ChatGPT, or finding joy in the process of exploring and discovering information. Murayama et al. (2019) highlight the significance of such factors in fostering motivation and enhancing learning outcomes.

AI prompts can play a key role in this phase by supporting learners to take action, set priorities, and break complex tasks into manageable steps. These prompts can also address emotional barriers, such as fear of failure, by building resilience and encouraging adaptive problem-solving. By guiding learners through challenges, AI supports them in stepping out of their comfort zones and embracing growth. Reflective prompts further enable learners to assess their progress, celebrate milestones, and refine strategies where needed. By integrating these prompts, AI helps learners stay focused, maintain motivation, and effectively align their actions with their broader aspirations and values, ensuring purposeful goal attainment.

Part IV: Practical Guidance for AI Integration

AI-Supported Strategies for Each Phase of MCM

In our exploration of the three phases of the MCM, we examined how learners can progress through these stages with structured support. We proposed that generative AI tools, when used as virtual companions, can help co-construct learners' motivation by offering personalized feedback, fostering engagement, and deepening understanding of content. Additionally, we emphasized that AI prompts, when combined with educator guidance, can enhance motivation for learning. Table 1 illustrates how strategically designed AI interactions can actively build and sustain student motivation across the different phases of the MCM. To provide further practical support, Table 2 outlines specific types of AI prompts that educators can teach students to use in various learning scenarios to make them engaged in each phase of the MCM.

Table 1
Recommended prompt features and contexts for MCM

Phases	Features of prompts	AI Prompt contexts
Contemplation	(a) Emotions about learning (b) Perception of the task (c) Judgment of ability to fulfill the task (d) Expectation(s) for learning	1. Help-seeking 2. Seeking clarity 3. Strategy request 4. Resource exploration 5. Problem-solving guidance 6. Skill enhancement
Goal setting & planning	(a) Emotional state (b) Nature of the task (c) Context of the learning	1. Goal clarification inquiry 2. Problem-solving 3. Fact checking 4. Time/Task management 5. Resource exploration
Action	(a) Concrete actions for learning (b) Learning strategies analysis (c) Critical evaluation of learning	1. Action Initiation Assistance 2. Prioritization and action planning 3. Task Breakdown request 4. Fear of failure support 5. Overcoming obstacles inquiry 6. Comfort zone challenge 7. Journey reflection

Note. This table presents an overview of the different phases of the MCM, the key features of AI prompts, and their contextual applications that educators can use to guide students in interacting with generative AI systems.

AI Prompts and Theoretical Alignment

To effectively support student motivation through the Motivation Construction Model (MCM), it is essential for instructors to teach students how to craft and use AI prompts strategically at each phase of the model. Prompts, defined as statements, questions, or instructions input into generative AI tools, play a central role in determining the relevance and quality of AI-generated output. As Kulkarni and Tupsakhare (2024) argue, prompt engineering is a critical skill in natural language processing (NLP), where well-designed inputs lead to more accurate and useful outputs. Similarly, Liu et al. (2024) emphasize that thoughtful prompts can enhance AI performance and increase the precision of generated content.

Incorporating prompt instruction into the MCM framework not only supports motivation but also encourages the ethical use of AI in education. As Cain (2024) notes, appropriate prompts can help reduce algorithmic bias, promote fairness, and align AI use with students' learning goals and institutional values. By equipping students with this skill, instructors can foster both effective learning and responsible technology use.

To demonstrate how the MCM can be applied in educational practice, we present a set of hypothetical case scenarios that illustrate the use of generative AI tools at each phase of the model. These examples are intended to show the MCM's potential for guiding instructional design and enhancing learner engagement. However, as these scenarios are conceptual in nature, we acknowledge the need for future empirical research to evaluate the model's effectiveness in real-world classroom environments.

Table 2
Practical guidelines: AI prompts and their theoretical alignment at various phases of MCM

MCM Phase	Learning Context	Example Prompts to GAI tools	Theoretical Alignment
Contemplation	Help-seeking	Can you help me brainstorm ideas for my upcoming research project	SDT and EVT. This prompt aligns with SDT as it reflects the learner's autonomy in seeking assistance for their learning. It also resonates with EVT, as the learner's request indicates a belief in their ability to generate ideas with support and a recognition of the value of brainstorming for knowledge construction.
Contemplation	Seeking Clarity	I'm feeling stuck on a concept in my textbook. Can [GAI tool] explain it to me in simpler terms?"	EVT. This prompt reflects expectancy by seeking clarification and assistance in understanding a specific concept.
Contemplation	Strategy Request	I've been feeling stressed lately. Can [GAI tool] provide some tips for relaxation and stress management	EVT. This prompt reflects expectancy by seeking strategies to alleviate stress and improve well-being.
Contemplation	Resource Exploration	Can you recommend some books or articles related to a topic I'm passionate about, such as climate change, renewable energy, or conservation?	EVT and SDT. This prompt demonstrates value by encouraging students to seek additional resources to explore deeper into a topic of personal interest. It also reflects the learner's enthusiasm for learning and desire for mastery
Contemplation	Problem-Solving Guidance	I'm struggling to understand a complex math problem. Can [GAI tool] walk with me through the steps to solve it	SDT, EVT, and MT. This prompt illustrates the learner's intrinsic motivation and autonomy, consistent with SDT, while also revealing their perception of the task's value and their expectancy of success, in line with EVT. Furthermore, their proactive approach to seeking guidance highlights an orientation toward mastery and competence development, as outlined in MT
Contemplation	Skills Enhancement	I'm interested in improving my writing skills. Can [GAI tool] provide feedback on a short essay I've written	EVT and MT. This prompt aligns with the concept of the EVT and MT, where learners believe that their abilities can be developed through practice and learning. By seeking feedback, the learner demonstrates a proactive approach to skill development, showing their commitment to continuous improvement and their willingness to learn from others' perspectives and expertise.
Goal Setting & Planning	Goal Clarification Inquiry	Can you help me set a specific goal for my upcoming psychology exam? I feel like I have too much to study and too little time to plan anything	SDT. This prompt focuses on the student's desire for autonomy and intrinsic motivation in setting their own learning goals and plans.
Goal Setting & Planning	Problem-Solving	I am in a hurry! My teacher asked us to estimate how much garbage a household produces in a year as a group project with Emily and Sam. I'm not sure how to start this	EVT and SDT. This prompt underscores the student's desire for guidance in crafting a strategic plan to reach their goals, highlighting the significance of expectancies (confidence in one's ability to succeed within a limited timeframe) and values (the importance attributed to achieving the desired goal). Additionally, it aligns with SDT by

			demonstrating the learner's commitment to success in a group project through relatedness and collaboration
Goal Setting & Planning	Fact Checking	I'm feeling a bit overwhelmed by my upcoming science project about photosynthesis. I don't think I can get a good grade. There are so many smart students in my class	MT. This prompt addresses the student's mindset by encouraging them to embrace a growth mindset, perceiving challenges as opportunities for learning and growth rather than as obstacles.
Goal Setting & Planning	Time and Task Management	My essay is due next week. I need to write a 500-word essay analyzing Hamlet's uncle. I am stressed and I feel like Hamlet's uncle is bad because he wants to kill Hamlet. I only have 7 days to finish this essay. How do I do this? Help!	EVT. This prompt reflects the student's need for guidance in creating a written piece in a short time frame, emphasizing the importance of expectancies (belief in one's ability to succeed in a short period of time).
Goal Setting & Planning	Resource Exploration	Can you give me some websites with a summary of Hamlet? I have not read the works by Shakespeare. How should I make use of these websites to write a 500-word essay	EVT. This prompt demonstrates that the learner believes that accessing summaries will contribute to their success in essay writing. By seeking guidance on how to effectively use these resources, they indicate both their expectations for assistance and the perceived value of the task.
Action	Action Initiation Assistance	I need to write an essay for my science class. I've been researching ways to reduce my carbon footprint, but I'm struggling to get started. Can you provide some guidance?	EVT and SDT. This prompt reflects the student's need for guidance in initiating action towards their goal. It emphasizes the importance of expectancies (belief in one's ability to succeed) and values (the importance attached to achieving the goal) in motivating behaviour. Additionally, the student's acceptance of struggling to get started reflects their need for competence, as they seek to develop the necessary skills and knowledge to complete the assignment effectively (SDT)
Action	Prioritization and Action Planning	Here's my plan for studying for my final exam on Shakespeare: read Hamlet, remember words, memorize Hamlet plots, and understand the play. I want to do well on the exam. Can you help me prioritize my studying plan and maybe tell me what my action plan should be?	SDT. This prompt focuses on the student's need for autonomy and competence in initiating action towards their goal. It emphasizes the importance of self-directed behaviour, effective time management, and effective planning to enhance motivation and performance.
Action	Task Breakdown Request	I'm planning to get an A on my upcoming circle geometry chapter test. Although I understand all the concepts and theories, I still cannot memorize many of them. I have spent two days on the chapter memorizing lots of theorems but still find it hard to remember. Can you help me in breaking down my studying plan into smaller, more manageable actions?	EVT and MT. This prompt addresses the student's belief in their own capabilities (self-efficacy) and seeks strategies to increase confidence in their ability to take action towards their goal. It emphasizes the importance of breaking down tasks into manageable steps to enhance self-efficacy and motivation
Action	Fear of	I'm a college student who's	MT. This prompt focuses on the student's

	Failure Support	super passionate about the environment. I've been dreaming of starting a recycling program in my neighbourhood to make a positive impact on the planet. But here's the thing: I've tried to start projects before, and they didn't always go as planned. I'm worried I'll fail again and disappoint everyone, including myself. Can you help me figure out where to start and how to overcome this fear of failing again?	mindset by addressing their fear of failure and seeking strategies to adopt a growth mindset. It emphasizes the importance of viewing challenges as opportunities for learning and development, rather than as obstacles.
Action	Overcoming Obstacles Inquiry	I keep telling myself I'll join the debate team in my school, but I always back out at the last minute. I've planned to do it so many times, but I just haven't been able to make it happen. Any tips to help me actually go through with it this time?	SDT and EVT. This prompt aligns with SDT as it reflects the learner's autonomy in seeking assistance and perseverance despite setbacks. It also aligns with EVT by addressing the student's belief in their ability to join the debate team (expectancy) and the perceived value of participating in the activity
Action	Comfort Zone Challenge	I've always been taking notes during my study sessions, but I feel like I can learn more effective ways to record my notes. Can you assist me in improving this habit to make my study skills more impactful and useful?"	This prompt aligns with SDT as it shows the learner's autonomy in seeking assistance to enhance their study skills. It also aligns with EVT and MT as it reflects the learner's belief in their ability to improve and their commitment to continuous improvement and growth in their study habits.
Action	Journey Reflection	I've been feeling a bit lost lately. I keep jumping from one goal to another without really feeling fulfilled. I don't know what I'm doing wrong. Can you help me take a step back?	This prompt aligns with SDT by addressing the learner's need for autonomy, competence, and relatedness. The learner expresses a desire to take control of their goals and actions (autonomy), understand why they may be struggling (competence), and seek guidance to align their goals with their personal values and aspirations (relatedness).

CONCLUSION

We synthesized the key principles of SDT, EVT, and MT to develop a unified conceptual model, which we have labelled as the Motivation Construction Model (MCM). This model not only provides a theoretical framework but also offers practical applications for educators to better understand and address motivational challenges in AI-driven learning environments. The example prompts offered in our study demonstrated the various ways in which generative AI can assist learners in initiating, constructing, and maintaining motivation toward their learning goals and efforts. We argue that motivation for learning can be constructed collaboratively by both educators and AI technologies. While empirical research is required to validate our model's utility and effectiveness, we believe that the integration of generative AI in education, grounded in motivational learning theories, holds immense potential to enhance motivation, learning outcomes, and overall student success. With AI's personalized support, learners can break down complex tasks into manageable steps, prioritize

actions, overcome obstacles, and continuously improve their skills and engagement with the learning environment.

LIMITATIONS

Although our MCM model has yet to undergo full empirical validation, we suggest that student motivation should not be treated as a given state but rather as something that must be actively cultivated through intentional guidance by educators and potentially supported by AI-driven interventions. While SDT, EVT, and MT offer valuable insights into the motivational aspects of learning, it is essential to acknowledge certain limitations inherent in these frameworks. First, these theories may not fully account for the diversity of individual differences and cultural variations in the motivation-learning relationship. For example, the emphasis on autonomy and intrinsic motivation in SDT may not universally align with cultural contexts that prioritize collective goals (Hagger et al., 2014). In such cultures, individuals may derive motivation from their roles and responsibilities within their social groups, seeking approval and validation from others rather than solely pursuing personal goals (Jiang & Gore, 2016). Similarly, EVT may oversimplify the complexity of individual motivations, neglecting the impact of emotional and social factors. Additionally, MT, while influential in shaping attitudes toward challenges, may not capture the complex interplay of external influences on mindset development. Furthermore, learners' motivational patterns can shift over time based on their evolving experiences and changing contexts.

One major concern regarding the incorporation of AI in education is the accuracy of its generated content. For example, generative AI tools such as ChatGPT rely on large, imperfect datasets, which can lead to biases and misinformation. This limitation may pose risks, especially when students generate content using AI and depend on it for learning (Uppal & Hajian, 2025). Plagiarism is another significant issue, as students can use AI-generated content to bypass traditional plagiarism detection systems and challenge academic integrity. Furthermore, the rapid development of AI tools may outpace current regulations, leaving educators and institutions uncertain about what constitutes fair use. This regulatory gap raises ethical concerns about how such tools should be integrated into learning without promoting dishonesty (Alshahrani, 2023; Grassini, 2023).

Additionally, while AI offers personalized support and feedback, it cannot fully comprehend the complexity of human emotions and motivations. This missing element can sometimes lead to potential misinterpretations or oversimplifications of learners' needs and preferences. Reliance on AI assistance may also diminish students' self-efficacy and self-regulation if they become overly dependent on external prompts and guidance (Uppal & Hajian, 2025).

To address these limitations and further advance the theoretical contributions of the MCM model, we suggest that future research pursue rigorous empirical validation to evaluate the model's structural integrity and practical applicability. One possible approach is a multi-phase mixed methods study designed to examine the model's internal consistency, construct validity, and predictive utility across diverse educational settings. Specifically, a sequential explanatory design (Creswell & Plano Clark, 2011)

could be employed, beginning with a quantitative phase to collect and analyze numerical data, followed by a qualitative phase to interpret and elaborate on the quantitative findings to provide deeper contextual insight.

Conflicts of Interest

The authors declare no conflict of interest related to this study.

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