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From Self-Determination to Automaticity: Integrating SDT and Habit Theory to Explain Students' Use of Surface Learning Strategies

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Abstract

University students often persist with surface learning strategies—such as rereading and highlighting—despite knowing that deep strategies like self-testing and spaced practice are more effective. This gap between knowledge and action challenges purely cognitive explanations and calls for an integrated motivational and behavioral account. This manuscript reviews student learning behavior through the combined lens of Self-Determination Theory (SDT) and Habit Theory. Prior research has treated motivation and study habits in isolation, leaving their interaction insufficiently theorized. We propose a three-dimensional integrative model linking (a) the educational context, (b) the quality of motivation (autonomous vs. controlled), and (c) learning strategies (deep vs. surface). The model's core contribution is a dual-pathway framework distinguishing between the initiation of a strategy—governed by motivational quality—and its long-term persistence, which becomes increasingly governed by habit mechanisms. When basic psychological needs for autonomy, competence, and relatedness are satisfied, autonomous motivation leads students to adopt deep strategies; through repeated enactment in stable contexts, these strategies become automatized effective study habits. Conversely, need frustration fosters-controlled motivation or amotivation, favoring surface strategies that crystallize into maladaptive habits via the same cue–response mechanisms. The paper concludes that sustainable academic success requires aligning a need-supportive environment, high-quality motivation, and habit-formation processes. Practical recommendations extend beyond standard SDT prescriptions to include restructuring contextual cues and disrupting automatized surface routines. The model opens new avenues for longitudinal research and evidence-based interventions targeting the motivation–habit interplay.

Keywords: *Self-Determination Theory (SDT), Habit Theory, Study Habits, Autonomous Motivation.*

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1-Introduction:

Academic success in higher education rests substantially on the learning strategies students adopt and the study habits they cultivate throughout their academic journey.

In their pursuit of academic goals, students rely on a range of study methods, from planning and time management to the deliberate use of specific learning strategies (Guo et al., 2023; Kumar et al., 2021; Winne & Nesbit, 2010). Importantly, when students experience a loss of autonomy, they often turn to easy, habitual behaviors that demand less conscious effort and are automatically triggered by familiar contexts (Mazar & Wood, 2018). Consequently, study habits become tightly linked not only to the effectiveness of the strategies students use but also to their psychological well-being (Manandhar et al., 2024).

Educational research has consistently shown that the most effective strategies are those involving active cognitive engagement, such as practice testing, self-explanation, and spaced learning (Bisra et al., 2018; Dunlosky et al., 2013). When adopted, these strategies do not remain isolated acts; over time, they can crystallize into stable, automatized study habits (Wood & Rünger, 2016). Yet, paradoxically, many students avoid these beneficial strategies, perceiving them as too effortful or time-consuming, and instead resort to surface methods like rereading, highlighting, and verbatim summarizing (Krause & Freund, 2014; Lambojon, 2018). What makes this paradox particularly intriguing is that it is not primarily attributable to a lack of metacognitive knowledge: students often know which strategies work best, but they still do not use them (Carpenter & Sanchez, 2025).

This gap between knowledge and action signals that strategy selection is not merely a cognitive matter. Rather, it is deeply embedded in personal choices governed by underlying motivations. Students tend to favor strategies that feel easier, more familiar, and less costly in terms of effort and time—even when they offer lower academic returns (Macaluso et al., 2022). Unsurprisingly, those who consistently adopt deep, effortful strategies are typically propelled by autonomous forms of motivation, whereas students driven by controlled motivation or amotivation gravitate toward surface strategies, with negative consequences for their perseverance, performance, and adjustment (Siddiqui & Malik, 2024).

A clear discrepancy thus emerges between what students know, what they intend to do, and what they actually do when they study—a gap that widens under the pressure of deadlines and competing demands (Blasiman et al., 2017; Carpenter & Sanchez, 2025; Dimal & Salva, 2025). As study behaviors are repeated over time, they become patterned and follow the same trajectory across educational stages, yielding the same results. In this way, a student's academic effort oscillates between motivation-driven learning—which requires conscious cognitive and metacognitive effort—and automatic, habitual routines. The educational environment, in turn, influences this relational structure by either stimulating deeper motivation or reinforcing existing habits.

Self-Determination Theory (SDT; Ryan & Deci, 2000a) provides one of the most robust frameworks for understanding the motivational forces behind academic performance. It argues that the satisfaction of basic psychological needs—autonomy, competence, and relatedness—fuels intrinsic motivation and deep learning. Conversely, Habit Theory demonstrates that human behavior, including learning behavior, is not exclusively governed by conscious motivations: through repetition in stable contexts, actions become automatized into habits. In educational practice, we frequently observe students investing considerable effort without achieving desired results, a situation that weakens their motivation and pulls them toward procrastination or persistent use of ineffective strategies. This scenario reveals an explanatory gap that calls for a theoretical model capable of linking motivational patterns and automatic behavioral patterns (i.e., study habits) within a shared educational context.

However, SDT alone does not fully explain why even autonomously motivated students sometimes fail to use deep strategies consistently, or why surface strategies persist despite their known ineffectiveness. This is because SDT focuses primarily on the quality of motivation that initiates behavior, but does not specify the mechanisms by which repeated behaviors become automatized and thus resistant to motivational shifts. Habit Theory fills this gap by demonstrating that behaviors repeated in stable contexts gradually become triggered by environmental cues with minimal conscious oversight (Wood & Rünger, 2016)

The two theoretical perspectives have largely been applied in isolation: SDT explains the "why" of strategy adoption (motivation quality), while Habit Theory explains the "how" of behavioral

persistence (cue-driven automaticity). Yet, to understand why students continue to use superficial strategies—and why interventions focused solely on enhancing motivation often yield disappointing results—we need a framework that integrates both processes.

The psychological literature has largely addressed these two constructs in isolation: some studies examine autonomous motivation as a predictor of academic success, while others investigate study habits as correlates of performance. The interface between the motivational-psychological level and the behavioral-habitual level remains unclear. Their interconnections appear fragmented and do not yet offer a convincing account of how study habits are formed and sustained. The fundamental question driving this paper is therefore: How do motivational patterns, as conceptualized within SDT, contribute to shaping study habits? In parallel, how do conscious deep or surface cognitive strategies transform, over time, into entrenched habits? And what role does the educational context play in supporting or hindering this transformation? And, crucially, what does this integration imply for educational practice that differs from what SDT already prescribes?

To answer these questions, we review the core tenets of Habit Theory and SDT, and propose an integrative three-dimensional model that links the educational context, motivational quality, and learning strategies to the formation of study habits. The model advances the theoretical conversation by showing that the habit-formation mechanism is not merely an add-on to SDT but a distinct process that explains the persistence of suboptimal strategies even under supportive motivational conditions. This, in turn, generates novel practical implications—such as the need to restructure contextual cues and disrupt automatized routines—that extend beyond the traditional SDT emphasis on need satisfaction alone.

2-Habits and Their Formation:

Study habits are commonly understood as stable, recurring patterns of study behaviors that encompass planning, time management, choice of learning environment, and the consistent application of particular study strategies (Credé & Kuncel, 2008; Zhou & Ahmad, 2025). While these patterns vary across individuals in both quality and quantity, their defining feature is the automaticity that develops through repeated performance in stable contexts.

Habits are fundamental to human behavior: most daily practices are driven by habits that recur regularly in specific contexts and at particular times. Far from being innate, habits are acquired through repetition—they represent a behavioral response that stabilizes over time within a given environment. They form most readily when the behavior is easy to perform and fits comfortably into daily routines. When contextual stimuli remain stable, the repeated behavior becomes increasingly familiar, and a mental association gradually develops between the context (the cue) and the response. Eventually, merely perceiving the cue is sufficient to automatically activate a mental representation of the behavior, which is then performed with minimal conscious oversight (Gardner et al., 2020).

Consistent with this perspective, habits often originate from goal-directed behavior. People intentionally pursue goals, and the context in which these pursuits occur shapes how they respond. In familiar situations, individuals draw on stored cognitive and behavioral information from past experiences to select appropriate actions. When these goal-directed actions are repeatedly performed in the same stable context, they gradually transform from deliberate, intentional behavior into automatic habits (Wood & Rünger, 2016).

Importantly, habits can either support or hinder the achievement of valuable long-term goals, including academic success and psychological well-being. Many students struggle to develop and maintain effective study habits, and consequently tend toward less desirable, counterproductive ones (Blasiman et al., 2017).

A particularly instructive insight comes from (Avni-Babad, 2011), who found that continuing with habitual behavior—even when it is objectively ineffective—can enhance feelings of trust, contentment, and security. This helps explain why students may persist with suboptimal study habits: familiar routines provide psychological comfort, even if they yield poor academic results.

More broadly, prior behavior is one of the strongest predictors of future behavior. However, this prediction is not absolute; behavior results from an interplay of neurophysiological, psychological, and environmental factors. When an intentional behavior is repeatedly performed and proves effective in a given context, it solidifies into an established pattern that individuals later transfer to similar situations (Ouellette et al., 1998). Initially, this process requires deliberate cognitive and physiological effort: contextual cues trigger thinking about task demands and possible actions, leading

to the formation of an intention and the conscious implementation of the behavior perceived as most likely to succeed. Over time, as the behavior is repeated in stable contexts, it transitions from effortful, intentional action to automatic, habitual response.

In contrast, once a habit has formed, behavior unfolds rapidly and efficiently. Contextual cues automatically activate a network of cue–response associations, triggering impulses to act without the need for a salient goal, and with minimal awareness or volitional control (Gardner et al., 2014, 2024). Perceiving the relevant cue—such as sitting at one's desk and opening a textbook—automatically activates the mental representation of the associated routine, like initiating a study session. Indeed, exposure to cues can be intentional, as when students deliberately sit at their desks to trigger study-related thoughts and behaviors (Mazar & Wood, 2018; Wood & Rünger, 2016).

At the neurocognitive level, habits are maintained by associative learning and reward systems (Mazar & Wood, 2018). Each repetition subtly alters the cognitive and neural mechanisms involved in procedural memory, progressively strengthening the link between contextual stimuli and the associated response. Theoretically, this process is straightforward: repeated performance of a behavior in a stable context builds strong cue–response associations, gradually automating the behavior and reducing its dependence on conscious deliberation. As a result, the mental effort and extended decision-making once required to initiate the behavior decrease significantly (Hagger & Rebar, 2020). Over time, the behavior shifts from being directed by conscious goals and intentions to being directly triggered by the surrounding context (Fiorella, 2020).

In sum, the spatial context—and the stable cues it provides—is a decisive factor in both the formation and the persistent repetition of habitual behavior over time.

3-Habits and Environmental Contexts:

Habits grow and develop in environments that reinforce them. They become ingrained in the person, forming a defining part of their characteristics and daily routines. They are shaped by the repeated response of behavior that arises from forming associations between the context surrounding the individual, the form of response stored in memory, and the performance of automatic, customary behavior that is relatively unaffected by changes in the value or likelihood of response outcomes. The

individual produces this behavior regardless of its feasibility. This leads us to distinguish between effective habits and less effective habits.

The contextual circumstances influencing individuals have considerable effects on habit formation. The familial context, educational setting, and instructor impact are crucial determinants in the formation of kids' learning habits. (Bano et al., 2018; David et al., 2024) revealed that these external factors greatly influence students' actions and study habits, consequently affecting their academic achievement. (Tus, 2020) proved that study habits and successful tactics positively and significantly influence the academic performance of university students, as well as their psychological well-being. Individuals devoid of adequate knowledge regarding study tactics will fail to implement efficient and enduring learning practices, regardless of the time invested in studying (Rezaie Looyeh et al., 2017) . Moreover, individuals who maintain healthy exercise routines and participate in sports-related physical activities exhibit superior study habits, enhanced academic performance, and allocate more time to familial interactions compared to their counterparts who do not engage in such activities (Ngangbam, 2025). Consequently, habits interconnect and assimilate to represent the cognitive and neurological processes associated with habit memory, manifested in unique patterns of habitual response (Wood & Rünger, 2016).

In another context, (Gardner et al., 2020) indicate that lasting behavior change depends on leveraging the fundamental mechanisms through which habits are formed: context, repetition, and reward. Old habits also continue to be automatically activated by stable contextual triggers. Therefore, getting rid of bad habits that one wishes to change is not so much about the individual's intention to change their behavior, but rather about whether they will eliminate or limit exposure to the underlying triggers (Gardner et al., 2024; Wood & Rünger, 2016).

4-Study Habits and Autonomous Motivation:

In familiar academic contexts, strong study habits reduce the role of conscious intention, whereas in novel situations, students must rely on deliberate strategies to guide their behavior (Mazar & Wood, 2018). It is therefore important to distinguish between the cognitive construct of habituation and the behavioral manifestation of habit, as habitual tendencies do not always translate into overt action (Gardner et al., 2020, 2024).

In this paper, a study habit is operationally defined as the automatized, context-dependent behavioral pattern that emerges when specific learning actions—such as regular reviewing, self-testing, or rereading—are repeatedly enacted within a stable study environment (Lambojon, 2018; Mendezabal, 2013; Saranya, 2024). Once established, these habits form a stable framework that organizes how students plan their time, select their study environments, and deploy particular strategies (Zhou & Wang, 2020).

Crucially, the strategies that students employ routinely often represent habitual responses to familiar academic contexts, rather than deliberate choices informed solely by knowledge or motivation (Fiorella, 2020). When confronted with cognitively demanding tasks, students' motivation may wane, prompting them to fall back on familiar but ineffective methods that have become ingrained through repetition (Liu et al., 2014) . Many students avoid deep strategies because of their perceived time and effort costs, defaulting instead to easier, more familiar methods—even when they possess adequate knowledge of what works best (Biwer et al., 2020; David et al., 2024). Furthermore, students may misinterpret the mental effort demanded by deep strategies as a sign of personal incompetence, further discouraging their use (Li & Lee, 2025) . Indeed, (Macaluso et al., 2022) found that habits shape students' decisions to prefer familiar strategies, even when alternative strategies may be more effective. Cognitive illusions and entrenched monotonous habits can also prevent students from selecting more effective strategies for self-regulated learning (Ocak & Yamac, 2013). Consistent with this, students who maintain well-organized study habits significantly outperform peers who rely on surface strategies or irregular methods (Sharma & Kumari, 2025).

Thus, while study habits organize behavior and reduce the cognitive burden of decision-making, their effectiveness ultimately hinges on the quality of the motivation that sustains them. When autonomous motivation weakens, even well-established habits can become futile—underscoring the need to examine how motivational and strategic factors interact within educational contexts.

5 Motivation through self-determination theory:

Motivation, as conceptualized within Self-Determination Theory (SDT), concerns not only the amount but also the quality of the drive behind behavior—the degree to which it is experienced as autonomous versus controlled (Ryan & Deci, 2000b, 2020). According to SDT, optimal

motivation and psychological well-being depend on the satisfaction of three innate basic psychological needs: autonomy, competence, and relatedness.

Autonomy refers to the need to experience volition and ownership over one's actions; it is supported by subjective experiences of value and self-endorsement, and undermined by externally controlling contingencies such as rewards or punishments. Competence concerns the need to feel effective and capable of mastering challenges; it is most effectively fulfilled in structured environments that offer optimal challenges, affirmative feedback, and opportunities for growth (Ryan & Deci, 2000b). Relatedness involves the need to feel connected, cared for, and to belong; it is enhanced through respectful and supportive relationships. Frustration of any of these three needs impairs autonomous motivation and leads students toward controlled motivation or amotivation, with negative consequences for engagement, performance, and well-being (Niemiec & Ryan, 2009; Ryan & Deci, 2000a). Therefore, the quality of the educational environment—whether it supports or thwarts these needs—directly shapes the type of motivation students experience.

SDT organizes motivation along a continuum of self-determination, from amotivation to intrinsic motivation, with extrinsic motivation situated between them(Ryan & Deci, 2017). This continuum reflects the degree to which behavior emanates from the self:

Intrinsic motivation represents the most autonomous form. It involves engaging in an activity for the inherent interest, enjoyment, and satisfaction it provides. It is the prototype of self-determination and is sustained when basic psychological needs are met (Deci & Ryan, 2008; Ryan & Deci, 2000a).

Extrinsic motivation involves performing an activity as a means to a separable end. Critically, SDT distinguishes four regulatory styles within extrinsic motivation that vary in their degree of autonomy: external regulation (driven by rewards or punishments), introjected regulation (driven by internal pressures such as guilt or ego-involvement), identified regulation (driven by personal valuing and conscious acceptance of the activity's importance), and integrated regulation (fully assimilated with the individual's core values and identity). These regulations span from fully

controlled to highly autonomous, explaining how students can internalize the value of academic tasks over time (Deci & Ryan, 2008; Howard et al., 2025; Ryan & Deci, 2000a).

Amotivation represents a state in which intentionality is absent; students feel incompetent, perceive no meaningful link between their actions and outcomes, and may cease academic engagement entirely (Legault et al., 2006; Ryan & Deci, 2017).

The central theoretical distinction for our model is between autonomous motivation and controlled motivation, which cuts across the intrinsic–extrinsic divide. Autonomous motivation encompasses intrinsic motivation as well as well-internalized extrinsic forms—identified and integrated regulation—where the individual experiences volition and self-endorsement. Controlled motivation, by contrast, includes external and introjected regulation, where behavior is driven by external contingencies or internal compulsion (Ryan & Deci, 2000a). This distinction is pivotal: autonomously motivated students are more likely to adopt deep, cognitively demanding learning strategies, persist in the face of difficulty, and achieve superior academic outcomes, whereas controlled motivation or amotivation predicts the use of surface strategies, procrastination, and poor well-being (Howard et al., 2021; Siddiqui & Malik, 2024). Furthermore, motivation and metacognition alone cannot fully explain why certain study behaviors persist through repetition regardless of their effectiveness—an explanatory gap that habit theory can fill (Fiorella, 2020).

Learning strategies are commonly classified into deep strategies—such as self-testing, elaborative interrogation, and spaced practice—which require sustained cognitive effort and foster long-term comprehension and retention (Bisra et al., 2018; Dunlosky et al., 2013), and surface strategies—such as rereading, highlighting, and verbatim summarizing—which are characterized by lower cognitive demand and minimal engagement with the material (Biwer et al., 2020; Vermunt & Vermetten, 2004). Critically, the adoption of deep strategies is typically sustained by autonomous motivation, which enables students to bear the associated effort costs, whereas surface strategies tend to be favored under conditions of controlled motivation or amotivation, where minimizing perceived effort becomes the priority(Biggs, 1987; Siddiqui & Malik, 2024).This distinction links the motivational quality described above to the initial choice of strategies that, through repetition

in stable academic contexts, will eventually crystallize into established study habits—providing the foundation for our integrative model.

7-Study Habits and Motivation: Toward an Integrative Model:

Building on the motivational framework outlined above, this section examines how motivational dynamics interact with habit-formation processes to shape students' study behaviors—and why this interaction yields insights that neither SDT nor Habit Theory can provide alone. However, this ideal association is not a linear inevitability; it is subject to factors specific to students and to the educational environment, which may be unsupportive(Niemiec & Ryan, 2009). The more autonomous the motivation, the more positive students' performance (Guay, 2022) .

Scientific studies support this proposition. Autonomous motivation predicts students' efforts to enhance their skills and mastery goals, improving performance (Ciani et al., 2011). In contrast, intrinsic motivation and identified regulation are associated with achievement and well-being, whereas external regulation correlates with reduced well-being (Howard et al., 2021) .Moreover, students who set autonomous goals experience greater positive emotions than those who pursue controlled goal(Ketonen et al., 2018). These findings confirm the well-established link between motivation quality and educational outcomes. However, they do not explain why even autonomously motivated students may, under certain conditions, abandon deep strategies in favor of familiar surface routines—a gap our model directly addresses.

Consistent with this, social contexts and enduring individual differences affect the satisfaction of students' basic needs, thereby influencing their motivation, performance, and adjustment (Baard et al., 2004). Over time, motivational orientations are shaped through interactions between individuals and their contexts(Deci et al., 2002; Vansteenkiste et al., 2008). Learning behavior is influenced by the context in which it occurs: context represents elements of the performance environment—physical locations, other people, preceding actions—that recur with repetition(Wood & Neal, 2007). Since the educational process is continuous, students maintain stable study strategies suited to their experience and environment. This generates study habits that, over time, transform into automatic, repetitive behaviors. As noted earlier, when a student repeatedly enacts a chosen strategy—whether driven by intrinsic or extrinsic motivation—within

a stable context, the cue–response association transforms it into an automatic study habit. Consequently, study behavior is shaped by context, and students develop relatively stable patterns that recur within educational contexts (Hadwin et al., 2001). Nonetheless, distinguishing between habitual behavior and deliberate cognition can be challenging. Motivation and metacognitive methods significantly influence the development and sustenance of habits (Fiorella, 2020). For this reason, the current model distinguishes between the initial reliance on motivational strategies and subsequent strategies governed by habit mechanisms. Empirically, many students limit themselves to superficial strategies such as using study guides or peers' notes, patterns consistent with effort avoidance and procrastination (Berry et al., 2010; Sikorova et al., 2020). As argued in the introduction, this discrepancy is not primarily a knowledge deficit but relates to the quality of the motivational environment (Foerst et al., 2017). When students' motivation for autonomy is nurtured, they engage in self-regulation, (Brenner, 2022; Butler, 1998) . Learning processes remain stable within standardized environments, where integrated learning methods combine effective habits with quality motivation, fostering self-directed learning (Credé & Kuncel, 2008; Tus et al., 2020).

Autonomous individuals use deep learning strategies and achieve higher grades, whereas students with a surface approach fear failure and rely on instrumental regulatory processes(Fazey & Fazey, 2001; McCombs & Marzano, 1990). Controlled environments hinder engagement, restrict choices, and promote reliance on external regulation (Black & Deci, 2000; Liem & McInerney, 2018).Conversely, positive relationships with instructors enhance relatedness and foster constructive educational practices (Evelein et al., 2008).

Therefore, unsatisfied needs lead to negative emotions, self-protective behaviors, and decreased cognitive flexibility and autonomous motivation—factors associated with maladjustment (Brenner, 2022). This results in an absence of intention to act (Ryan & Deci, 2000b), chronic frustration of basic needs, perceptions of useless effort (Legault et al., 2006), and increased risk of academic procrastination and failure (Howard et al., 2021). In sum, study habits arise through repetition within educational contexts, transforming into default responses automatically activated in the absence of conscious intervention. This explains why students resort to surface strategies instead of deep ones (Hagger & Rebar, 2020). Habit disruption requires sufficient

motivation and regulatory capacity; external factors like stress may reinforce existing habits. Therefore, motivation determines the strategies that enter the habit-forming cycle, while habits explain why those strategies persist.

From this standpoint, motivation becomes a critical element in shaping the academic path. Based on SDT, the degree of satisfaction of basic needs determines the type of motivation that drives behavior. Autonomous motivation, characterized by conscious choice and internal commitment, directs students toward deep achievement and high-quality study habits. Controlled motivation or amotivation leads to surface strategies and ineffective habits. Thus, the integrative model posits that learning strategies—whether deep or surface—are repeated within a stable educational context. Over time, they transform into established habits. A supportive environment enhances need satisfaction, generating autonomous motivation that inclines students toward deep cognitive strategies, whereas a restrictive environment leads to controlled motivation or amotivation and surface strategies.

This dual-pathway framework is the core theoretical contribution of our model. It distinguishes between (a) the initiation of a strategy, governed by the quality of motivation as SDT predicts, and (b) the persistence of that strategy over time, governed increasingly by habit mechanisms. When a student adopts a deep strategy and repeatedly performs it in a consistent study environment, the context becomes associated with that strategy. Eventually, the context alone triggers the strategy automatically, reducing the need for sustained motivational effort(Gardner et al., 2020; Hagger & Rebar, 2020) . The same process applies to surface strategies: a student who habitually rereads textbooks in bed or scrolls through notes in a café may find those environments automatically trigger superficial behaviors, regardless of current motivation. This insight has direct practical implications differing from standard SDT recommendations: whereas SDT emphasizes fostering autonomous motivation through need-supportive teaching, our model adds that educators must also help students restructure their study environments to disrupt cue-driven surface habits and support the automatization of deep strategies. This dual-pathway framework resolves a persistent puzzle: why do some highly motivated students fail to sustain effective strategies, while some less motivated students maintain them? Autonomous motivation excels at initiating deep strategies, but without stable contexts and repeated practice, these strategies

remain vulnerable to disruption by stress, fatigue, or competing cues (Blasiman et al., 2017; Carpenter & Sanchez, 2025) . Conversely, even students with lower initial motivation can, through consistent environmental structuring and repetition, develop effective habits requiring less motivational effort. This reframes the challenge for educators: the goal is not merely to boost motivation, but to engineer conditions—both psychological and environmental—that allow effective strategies to become self-sustaining habits. Importantly, the relationship between habits and motivation is bidirectional. Effective habits that produce academic success enhance students' sense of competence, deepening autonomous motivation (Ryan & Deci, 2000b). Conversely, entrenched surface habits that yield poor results may erode perceived competence, pushing students toward amotivation. This feedback loop suggests that habits are not merely endpoints of the motivational process but active agents that can sustain or undermine the very motivation that initiated them.

To illustrate, consider a student who wishes to adopt spaced practice instead of last-minute cramming. An autonomy-supportive instructor can foster identified regulation, increasing the likelihood that the student will initially try the strategy. However, this initial motivation is necessary but insufficient. The student must also restructure their study context—for example, scheduling regular review sessions in a distraction-free library cubicle at the same time each day. Over weeks, the cubicle becomes a contextual cue that automatically triggers spaced practice, reducing reliance on conscious motivation. If the student later experiences a drop in motivation during a stressful exam period, the habit can sustain the effective strategy until motivation recovers. This example clarifies why purely motivational interventions often fail: they address only the first step of a two-step process.

Accordingly, Figure (1) presents a path model of the relationships between the educational context, the satisfaction or frustration of basic needs, the type of motivational regulation (autonomous, controlled, amotivated), and learning strategies (deep and surface), culminating in the transformation of strategies into study habits that influence academic outcomes and achievement. The reciprocal arrows indicate mutual influence among the components. Therefore, differences among students in study habits and strategy use reflect their differing degrees of need satisfaction, which is directly linked to the nature and type of motivation accompanying their

behavior. Improving the educational environment to support autonomy, competence, and relatedness fosters autonomous motivation, while the use of deep or surface strategies transforms over time into entrenched habits less dependent on conscious control.

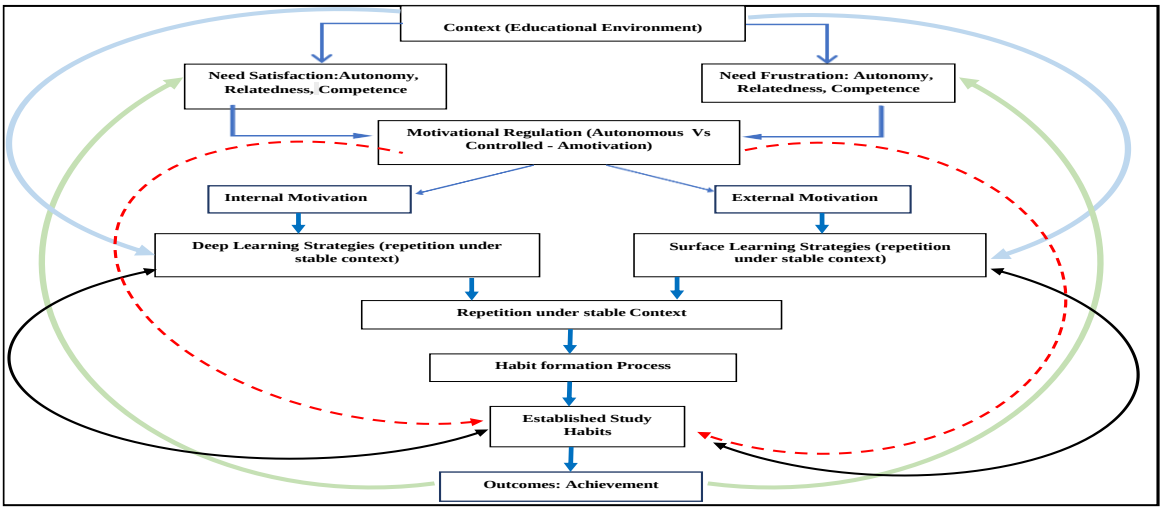


Figure (1): A Dual-Pathway Integrative Model of Study Habit Formation

8-Core Propositions of the Model :

The integrative model proposed here generates several specific, falsifiable theoretical propositions that can guide future empirical research. These propositions articulate the key pathways depicted in Figure (1) and specify the relationships that longitudinal or experimental studies could test.

Autonomous motivation predicts the sustained use of deep learning strategies. When students' basic needs for autonomy, competence, and relatedness are satisfied, they are more likely to initiate and maintain cognitively demanding strategies such as self-testing, elaborative interrogation, and spaced practice.

Controlled motivation and amotivation predict reliance on surface learning strategies. When basic psychological needs are frustrated, students tend to default to low-effort strategies such as rereading, highlighting, and verbatim summarizing, which minimize immediate cognitive load.

Repeated use of a learning strategy in a stable educational context leads to its automatization into a study habit. The habit-formation mechanism operates regardless of whether the strategy is deep or surface, explaining the persistence of both effective and ineffective study behaviors over time.

The educational context moderates the pathway from need satisfaction to strategy adoption. Supportive environments that foster autonomy, competence, and relatedness increase the likelihood of autonomous motivation and deep strategy use, whereas controlling environments push students toward controlled motivation and surface strategies.

Established study habits partially mediate the relationship between motivation and academic outcomes. Over time, habitual study behaviors become less dependent on conscious motivation and more directly triggered by contextual cues, making them resilient to change unless the context itself is altered

9-Conclusion and Recommendations:

This manuscript has argued that the persistent use of superficial learning strategies—despite students' awareness of more effective alternatives—cannot be fully explained by cognitive or metacognitive factors alone, nor by SDT's traditional emphasis on motivational quality. By integrating Self-Determination Theory and Habit Theory, we proposed a three-dimensional model that traces how the educational context shapes the satisfaction of basic psychological needs, thereby influencing the quality of motivation (autonomous versus controlled). This motivation, in turn, drives the initial adoption of deep or surface learning strategies. Critically, our model further specifies that through repeated enactment in stable contexts, these strategies—whether deep or surface—become automatized into study habits that are triggered by environmental cues with minimal conscious oversight. Once formed, these habits operate largely outside intentional control and prove resistant to change, even when motivation shifts.

The practical implications of this model extend beyond the standard SDT recommendation to foster need satisfaction. Three novel contributions emerge specifically from the habit-formation pathway. First, because established study habits are automatically triggered by contextual cues, interventions that seek to change maladaptive study behaviors should target the physical and temporal study environment—such as restructuring where and when students study—rather than relying solely on enhancing motivation or metacognitive instruction. Teaching students to modify their study contexts (e.g., relocating to a library, removing digital distractions) may be more effective at disrupting cue-driven surface habits than motivational appeals alone. Second, educators and institutions should

distinguish between the initial adoption of a strategy (which depends on motivational quality) and its long-term maintenance (which depends on contextual stability and repetition). This implies that even well-designed autonomy-supportive interventions may fail if they do not also help students build stable study routines that protect deep strategies from being overridden by competing cues. Third, the model identifies a critical intervention window: the transition phase during which a consciously chosen strategy begins to become automatized. Interventions delivered during this phase—such as cue structuring, implementation intentions, or habit-tracking—could help solidify effective strategies into enduring habits before maladaptive routines take hold.

For researchers, this integrative framework opens several promising avenues. Longitudinal studies are needed to empirically test the proposed pathways—particularly whether the repetition of strategies in stable contexts leads to their automatization, and whether cue restructuring can disrupt surface habits more effectively than motivational interventions alone. Future work could also develop and evaluate habit-based educational interventions that combine need-supportive teaching with contextual modification, measuring their long-term impact on both study habits and academic outcomes. Moreover, identifying the specific moments when students transition from deliberate strategy use to automatic habit execution could illuminate critical intervention windows.

Ultimately, improving academic performance is not the product of any single factor in isolation. It results from the dynamic interplay among a need-supportive educational context, high-quality autonomous motivation, and the habit-formation processes that either cement effective learning strategies into enduring routines or entrench superficial ones into maladaptive defaults. Recognizing this interplay—and designing interventions that simultaneously address motivation, context, and habit—is essential for fostering sustainable academic success.

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