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# SCREENS IN CLASSROOMS — SYSTEMATIC REVIEW ON EMOTIONAL AND STRATEGIC CONSEQUENCES OF STUDENT LAPTOP USE

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**Abstrak**
Penggunaan perangkat digital laptop dalam dunia pendidikan menghadirkan kekhawatiran emosional maupun strategis. Laptop telah menjadi instrumen yang esensial bagi aktivitas akademik. Di sisi lain, pemanfaatan perangkat digital berpotensi menimbulkan kontradiksi. Melalui tinjauan literatur sistematis, penelitian ini menganalisis bagaimana penggunaan laptop memengaruhi emosi, strategi belajar, dan keterlibatan akademik siswa. Dari aspek emosional, siswa sering kali mengalami implikasi negatif seperti distraksi atau tekanan digital. Meskipun demikian, fitur-fitur dalam laptop mempermudah berbagai aktivitas siswa sehingga membangun rasa percaya diri serta kemandirian dalam mengatur ritme kehidupan akademis. Secara strategis, peralihan ke lingkungan virtual menimbulkan konvergensi fungsional pada laptop. Sebagai konsekuensi, metode belajar konvensional perlahan terasingkan, sementara upaya siswa untuk menjauh dari perangkat sering gagal dan memicu gangguan konsentrasi. Kegagalan ini terjadi karena hadirnya *blind spot* siswa terhadap aktivitas digital yang mengganggu daya fokus. Namun ketika laptop dimanfaatkan secara produktif, seperti kuis interaktif atau dukungan aktivitas pembelajaran lainnya, hal ini dapat memperkuat keterlibatan aktif siswa di dalam kelas serta meminimalisir fase motivasi lemah. Dengan demikian, sintesis ini merujuk para pendidik untuk tidak hanya mengingatkan tetapi menanamkan strategi belajar mandiri yang tepat, membentuk integritas teknologi vital dalam memaksimalkan potensi penggunaan laptop, serta meminimalkan dampak negatif yang berkelanjutan.

**Kata Kunci**: Integritas Pemanfaatan Laptop; Emosi Siswa; Strategi Belajar

***Abstract***
*The use of laptops in educational life creates an emotional and strategic tension, as the device has become an essential tool for academic work, yet at the same time they also enable passiveness, such as distraction and psychological distress. This study investigates how laptops influence students' emotions, learning strategies, and academic engagement. Emotionally, students often face negative effects such as computer anxiety or technostress. Even though this decreases the engagement of usage, the strong features of laptops help ease many activities, building their independence and confidence in managing their academic life. Strategically, the shift to virtual environments led to a functional convergence onto the laptop for formal tasks, resulting in a strategic retreat from informal active learning methods, as attempts at device separation often fail and result in highly disruptive internal, off-task behavior. Such failure frequently happens because of a student blind spot regarding their digital activity disruption. When a student is trained to use a laptop for goods, to give an example by doing tasks like mobile quizzes, they actually help balance engagement, survive low motivation era and strengthen participation. Conclusionally, these findings propose that educators like teachers must come up with various methods than just warn students. Teaching students' self regulated learning including shaping technology integrity habits is vital to increase laptop strengths while minimizing distraction and technostress.*

***Keywords****: laptop use; students' emotion; learning strategies*

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## INTRODUCTION

Advancements in technology enable various learning techniques, including video based instruction, collaborative discussions, and text-based learning (Abdurrokhim et al., 2022; Abrar, 2024). The mentioned instruments permit students to observe their study rhythm and reconsider the ambitious material, therefore supporting the development of critical, creative, and collaborative thinking skills essential for the twenty-first century (Putra et al., 2022).

In the present learning environments, laptops have transformed from being nothing but supporting technologies to vital components of academic life. In higher education, these devices really change things up. Students get constant access to digital resources. They help with deep research and make instant teamwork possible. This supports the growing use of collaborative and blended learning models in higher education institutions. (Kumar N et al., 2024).

Indonesia's Social Affairs Minister, Saifullah Yusuf, has a big plan. He wants to hand out free laptops to hundreds of thousands of students. He previously stated that the laptop allowance was designed to support digital-based learning as an auxiliary facility for the “Sekolah Rakyat” program initiated by the President of the Republic of Indonesia, Prabowo Subianto, and other schools identified as in need. The provision of laptops is not just to supply facilities but is a strategic move to enhance elementary school learning quality, demonstrating the Ministry of Social Affairs' commitment to providing resources comparable to leading schools (Rosa, 2025).

Furthermore, the Minister of Primary and Secondary Education, Abdul Mu'ti, was also set to issue regulations on student device use. Mu'ti cited the experience of developed countries such as Australia and Sweden, which have implemented similar regulations, but will adapt them to suit Indonesia's interests. Mu'ti emphasized that these regulations will not entirely prohibit or restrict students' use of electronic devices. Another option, the policy will center on outlining the advantageous uses of devices. Instead of opting for a complete prohibition, the ministry is prioritizing education and regulation, highlighting the reality that technology has become fundamental tools for modern education. By regulating device use for constructive purposes, the ministry indirectly fosters students' abilities to evaluate information, communicate proficiently, and use technology as a productive learning resource (Yulianti, 2025). From these two circumstances, these conditions indicate that technological benefits, especially the use of laptops, has become essential in education and must be given serious attention.

The growing presence of personal technology into academic environments has shown many critical challenges, particularly concerning student focus and distraction. Research repeatedly demonstrates that the multitasking features of laptops, such as quick access to social media, entertainment, and non-academic browsing, often draw students focus on their main coursework and may compromise their academic performance (May & Elder, 2018). This case underscores between the productive potential of technology and the challenges of attention management.

Necessarily, the discussion must be outstretched past technical functionality to consider how laptop usage affects students' psychological aspects, including emotional states and learning strategies. Observing the correlation between laptop use and factors such as anxiety, including techno-stress, motivation, self-regulation, and the adoption of cognitive strategies is essential (Lazar et al., 2020a). Students' approaches to note-taking, material organization, and reflection on acquired knowledge are fundamentally shaped by their patterns of device usage (Limniou, 2021).

One crucial emotional component is Self-Efficacy—students' belief in their ability to succeed in digital environments. Structural modeling research shows that Self-Efficacy not only influences academic outcomes but also indirectly influences Self-Regulated Learning (SRL), an important

metric of higher-order learning strategies (Sui et al., 2023). There is a strong influence of technology-enhanced environments on students' SRL. This suggests that laptops/devices can directly trigger changes in how students plan, monitor, and evaluate their learning. The impact of laptops extends beyond the cognitive realm to the students' affective realm. Indeed, emotions are a strong factor that influence the decision-making on how to learn. For instance, use of technology can greatly contribute to students' motivation and also make them feel that they are in charge of the situation. However, that is not the only side of the story. On top of technical issues (like delays, loss of the Internet connection, or software malfunctions), continuous pressure to stay online can significantly add levels of digital anxiety and stress (Ge et al., 2025).

A comprehensive understanding of the complex psychological and pedagogical effects associated with laptop use enables educational institutions and students to develop effective strategies for maximizing its benefits. This article examines the negative effects of distraction in order to support the realization of laptops' full potential as transformative learning tools.

Drawing from the reviewed article, a theoretical understanding is developed regarding the role of laptop use in framing students' learning experiences, particularly concerning the emotional aspects and the strategies they implement during the learning process. The six articles analyzed and present varied perspectives on how technology, including laptops, can both facilitate and challenge the learning process in higher education. By synthesizing these findings, this study aims to develop a more comprehensive systematical interpretation of the relationship between learning technology, students' emotional dynamics, and their learning management patterns. Below is the research question that guides the discussion of the present research. How does laptop use influence students' emotions and learning strategies?

## METHOD

The current study uses a Systematic Literature Review method to investigate the impact of technology, mainly laptops, on students' emotions and learning strategies using frameworks in journals published from the year 2020 to the present. A systematic review strictly follows a collection of scientific methodologies. It specifically seeks to minimize bias, especially by striving to identify, evaluate, and integrate all suitable studies to address a specific question or a series of questions (Nugroho 2022).

This SLR followed a transparent four-stage process including identification, screening, eligibility, and inclusion to ensure a rigorous and unbiased synthesis of the literature. The challenge involved choosing a theory as the base of our research. Scholars have given many perspectives on the adoption of information technology (Lazar et al., 2020a). Upon reviewing the literature, one clear conclusion emerges: the theoretical model should be customized based on the specific characteristics of the subject under investigation (Venkatesh & Bala, 2008).

**Table 1. Inclusion and Exclusion Criteria**

| Criteria | Inclusion | Exclusion |
|---|---|---|
| Timeline | Timeline from year 2020 until 2025 | Timeline before year 2020 |
| Type of article | Journal article (full-text accessibility) | Books, book chapters |
| Focus study | Laptops, students' emotion, strategies | Irrelevant topics, unrelated to technology |
| Language | English or Indonesian | Other languages |

Following guidelines of systematic reviews (Page et al., 2021; Petticrew & Roberts, 2006) the contemporary analysis was systematically inspected thoroughly with a structured and transparent approach that incorporated screening and evaluating the literature relevant to the research question: How does laptop use affect students' emotions and learning strategies? At the identification stage,

all records were retrieved exclusively from https://www.lens.org, chosen to ensure accessibility, comprehensive classifying and open-access scholarship.

To ensure that this research is accessible for Indonesian readers, we use open access journal articles (Kadarisman et al., 2024). The search focused on ones that have both abstract and full-text format. Boolean search methods were implemented to retrieve studies examining both emotional and strategic aspects of laptop use in settings of education (Booth, 2016), based on the research question. The search started by applying three key words "laptop use" AND "emotion" AND "learning strategy", "laptop use" AND "emotion", and "laptop use" AND "learning strategy", with a total of 645 records.

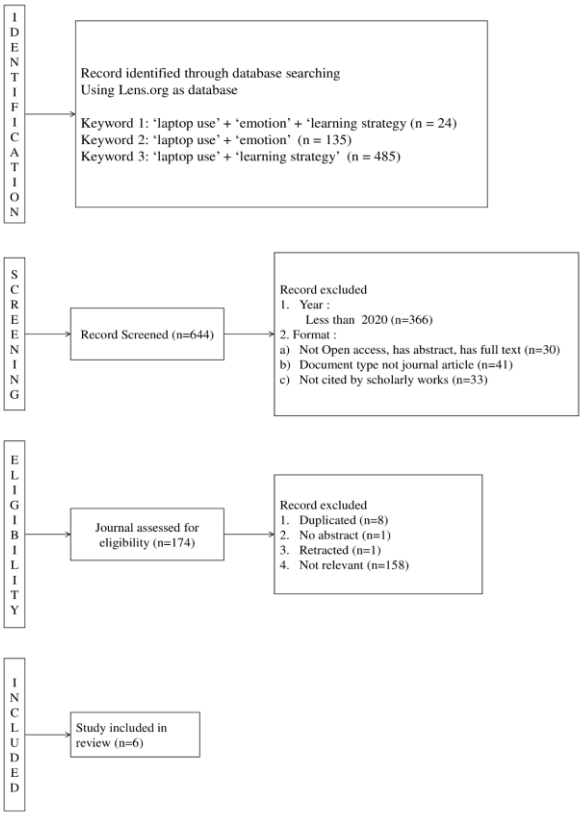



**Figure 2. Article Selection Process Based on PRISMA**

Records from earlier than 2020 (n = 366) were excluded from the screening stage to concentrate the review process on trends in technology-enhanced learning. Other exclusions were also applied to those studies that were not open access, did not include abstracts or full text (n = 30), were not journal articles (n = 41), or not cited in the academic literature (n = 33). The remaining 175 journals proceeded to the approaching phase of eligibility. During this phase, the titles, abstracts and relevance were evaluated manually to maintain consistency to the constructs of laptop use, emotions, and learning strategies. Following in order, a few data were excluded for several reasons. Some entries were removed because they appeared more than once in the database (n = 8). Others were excluded because they did not provide an abstract, which made it impossible to understand their purpose and content of the research (n = 1). Another one was taken out because it had been formally retracted (n = 1), In addition, a large sum of journals were excluded because they did not show meaningful or sufficient relevance to focus on the study (n = 158). Following all the stages of review, a total of 6 journals remained and were used as the final dataset for the synthesis. The complete sequence of introduction, screening, and eligibility procedures is outlined in the PRISMA flowchart (Figure 2).

## RESULT

**Table 2. Six Articles Key Characteristics**

| No | Study | Study Focus | Method | Sample | Outcomes Measured | Interventions |
|---|---|---|---|---|---|---|
| 1. | Messy Transitions: Students' perspectives on the impacts of the COVID-19 pandemic on higher education | Student emotions & experiences during digital transitions | Qualitative, open-ended survey | 1,267 undergraduate/graduate students (81% undergrads, 61% female, 79% White, ages 18-24) from 7 U.S. public universities, surveyed March-May 2020 . | Emotional responses, challenges, workload perceptions | Online survey with open-ended question on COVID-19 impacts, analyzed via conventional content analysis (inductive approach) on 1,514 quotes |
| 2. | Digital Technology Adoption Scale | Development of digital tech adoption scale | Quantitative scale development | 1028 university students (250+206+262 undergrads; 310 masters) from Romanian universities in blended learning courses | Digital tech proficiency & adoption items | Developed and tested a survey measuring students' acceptance of digital tools in blended learning. |
| 3. | Perceptions of Digital Device Use and Digital Interruptions in Blended Learning | Students' perceptions of digital device use and interruption in blended learning | Quantitative survey | 201 university students in Austria | Device use patterns, digital interruptions, self reported awareness, off task behaviour | No intervention: observational study of blended learning environment |
| 4. | Mobile Learning Integration (STEM) | Mobile learning in complex problem-solving | Quantitative survey, Chi-square analysis | 151 + 274 STEM students in Russia | Usage intensity, device usefulness, engagement | Mobile learning embedded in teaching |
| 5. | Mobile learning Acceptance Post-Pandemic: A Behavioural Study | Students' acceptance of mobile learning before and after the pandemic | Structural Equation Modeling (SEM): pre and post pandemic comparison | 326 pre-pandemic and 349 post-pandemic engineering undergraduate in Malaysia | Perceived usefulness, ease of use, social influence, intention to use mobile learning | Adoption of mobile learning platforms, comparison of usage before vs. after pandemic |
| 6. | Using Mobile Devices in Teaching Large University Classes How Does It Affect Exam Success | Effect of mobile based quizzes (SRS) and out of class activities on university students' exam performance | Experimental quantitative study using quizzes and out of class activities to examine their effect on exam performance | 294 undergraduates from Italy | Academic performance was measured through final exam scores | In-class mobile based quizzes and optional out of class activities like group reports, lab experience, and case studies |

Based on the analysis, we have resolved on the 3 keywords that we believe reflect our research best. After entering the keywords into Lens, we received a total of 645 articles. After applying the website's automatic filter based on our criteria, the primary 645 results were reduced to 175 articles. After succeeding a round of manual screening to remove the records that the system did not filter out further narrowed the dataset to 6 articles. Table 2 describes key characteristics of the six articles that we will apply in this research.

## DISCUSSION

It is natural that traditional tools contributed more because they are well-integrated and familiar in academic practices (Kay & Lauricella, 2011). Nonetheless, the dynamic rise of technology study skills suggest a change of situation where modern solutions could play a bigger part in forming new learning outcomes ((Ross & Lowther, 2003). Whether "modernization" drives digital adoption in higher education, it finds that familiarity with traditional digital tools (such as laptops, projectors, and basic presentation software) is a far more significant predictor of a student's intention to use digital resources than familiarity with high-tech tools (such as interactive boards, cloud services, and specialized software). This suggests that adoption is an evolutionary process where basic digital literacy serves as a necessary scaffold for more advanced engagement. Despite this, from the pedagogical point of view, many questions are yet to be answered. The response of the students when these technologies are used in the learning process is influenced by many factors (Lazar et al., 2020a).

This swiftly changed focus to the need to address issues related to quality and time managing in order to control technology usage wisely. Additionally, with diving an understanding towards students' emotional feedback to digital facilities through effective usage, particular understanding could possibly form in order to notify improvement of new materials as well as strategies (El Bahri et al., 2025). This includes teaching approaches that support students facing conflicting challenges, mainly emotion and creating learning environments that bring out positivity, which are essential for academic purposes (Ge et al., 2025).

The "messy transition" caused intense academic stress and loss of routine for many. At the same time, it provided some students an opportunity for slower living and become more independent with schedule management as they escaped the constant, fast-paced demands of campus life. This suggests that the future of higher education should incorporate more than just improving digital delivery. It should also prioritize the integration of more flexible approaches, by supporting independent study and balanced individual school life, rather than fully returning to a high-pressure system that some students unknowingly needed to escape (Sharaievska et al., 2022b)

An obstacle was found in the references discussing the relationship between psychological stress and the recognition of digital tools. Computer anxiety can possibly be a barrier that blocks students' perception of its usefulness (Lazar et al., 2020a). During the COVID pandemic online learning, isolation increased their anxiety, making them forget the benefits of digital tools. Physical tiredness from extended screentimes, like eye fatigue and headaches, can also reduce motivation (Nugroho, 2022). As a result, students' may resist digital tools due to the side effects (Sharaievska et al., 2022b).

Device separation in which students use laptops for coursework and smartphones for non-school activities enables them to handle academic and social demands. Although this tactic may compartmentalize activities, it is not efficient in preventing digital interruptions, especially in online learning environments. Students were given a significantly higher proportion of time for digital interruptions during webinars (15.06% of total time) in comparison with on-campus sessions (8.12%), even though on-campus sessions were longer. Consequently, online learning is linked to a

higher frequency of off-task behavior on secondary devices, which is mainly caused by internal cues such as boredom or curiosity (Pattermann et al., 2022a).

The post pandemic shift towards laptop use on students creates a significant effect on both study method and emotional response. This encourages formal learning tactics, for example navigating the Learning Management Systems and participation in video conferences. These factors contributed to reduced anxiety during the management of complex tasks. At the same time, students stopped using informal active learning methods, like educational games and mobile reading on personal devices, probably to cope with multitasking requirements and higher cognitive load typical of virtual class. The importance of the attitude to mobile learning even after the change was quite a significant factor next to the performance. The effectiveness of a laptop-centric approach depends not only on functional performance but also on maintaining a positive emotional state, as perceived usefulness alone may not sustain engagement (Kumar et al., 2022a).

The causes of these interruptions are inside the person, i.e. boredom, tiredness, or curiosity, and thus they need an explicit, aware decision to turn off attention to the main work (Fadilah et al., 2021). This type of interruption is considerably more disruptive than those caused by external factors. Off-task behavior that is self-generated, along with the facilitation of such behavior by an unrestricted laptop, is directly related to lower academic performance. Furthermore, this failure to manage one's strategies is being intensified due to a substantial deficiency of self-awareness because students very often find it difficult to make correct estimations of the total time that is spent on non-course-related (NCR) activities. The difference pointed out by this discrepancy is that there is a gap between students' instantaneous actions and their overall perception of learning engagement (Pattermann et al., 2022a).

Students have a considerable blind spot about the social consequences of digital distraction. About 70-72% of students said that digitally distracting activities of their peers that are not related to the course (NCR) had no effect on their own learning. However, more than three-quarters (75.66%) of them confessed that their own use of NCR was disruptive to their learning. Such detachment demonstrates, even though students understand the personal downsides of multitasking, they often forget the broader social effects on the learning community. Most students were announced with negative outcomes (Pattermann et al., 2022b). Nevertheless, a minor group mentioned positive responses, such as happiness increasing. As a result, academic approaches should seek beyond individual caution, and focus on digital citizenship, as well as shared responsibility for blended learning (Sharaievska et al., 2022a).

Laptop use is integrated into student learning strategies, not just for convenience, but for task-specific utility in complex problem-solving, notably along gendered lines. Students in STEM technical areas, specifically males, are more inclined to use laptops rather than handheld mobile devices. This represents a sensible learning strategy where the laptop is highly recommended to handle the mental effort required for complex problem solving. Basically, the powerful functionality of the laptop impacts the student's learning strategy by allowing them to carry out complex, discipline-specific tasks, which then enhances their emotions as it facilitates efficient work, alleviates potential frustration, and increases their confidence in solving difficult problems (Shchedrina et al., 2020).

The correlation between students' emotions and their learning strategies is dynamic, with emotions significantly influencing whether students adopt beneficial academic behaviors, and the success or failure of those strategies consequently affecting their emotional states (King & Areepattamannil, 2014). The pattern becomes more noticeable when students use laptops and other digital devices during their learning activities (Pattermann et al., 2022b). Positive sensibility and

high self efficiency is consistently linked to the selection of productive strategies, including the sustained use of device tools. Students with higher Mobile Self Efficacy, that is those who feel confident in handling laptop or other digital tools are typically more willing to participate in technology facilitated learning activities (Kumar et al., 2022b). This kind of self assurance is also associated with their motivation; students who find their work engaging, they tend to adopt effective learning strategies and maintain their focus for longer periods (Lazar et al., 2020b).

The learning strategy has undergone a significant change. Now, the laptop is the major tool used for formal digital learning, making the informal contact of students to be reduced. Students are no longer users of the smartphone hunting for new information or playing educational games. The rate of laptop use went down to 26.46% before the pandemic and then increased to 43.74% in the phase of the pandemic while the rate of smartphones went down from 73.54% to 56.26 % use. On the one hand, smartphones are convenient to use; on the other hand, they are not equipped with the features for the Learning Management System, and video conferencing. This suggests that students intentionally discontinued "active" mobile learning behaviors (Kahoot) not because they were ineffective, but because the cognitive load of multitasking between a formal video lecture and a handheld engagement tool was unsustainable in a virtual setting (Kumar et al., 2022b).

Contrary outcomes on laptop use demonstrates a strong combination between negative emotional states and damaging learning behaviors. Digital educational tools, including laptops, can increase stress, anxiety, and opposing effects. Computer anxiety can lower students' enthusiasm to use digital tools by creating the impression that technology is demanding and gives an unenjoyable moment ((Pattermann et al., 2022b). Throughout the transformation from traditional learning to online learning, students regularly reported exhaustion, decreased motivation, and hardness in maintaining their focus, alongside technostress and physical discomfort caused by extended laptop use (Kumar et al., 2022b).

These emotional obstacles directly affect students' learning styles. Feelings of boredom or concentration difficulties frequently guide students to engage in non course related (NCR) activities on their laptops, which can increase unproductive multitasking and distraction (Fried, 2008). These actions have been repeatedly associated with diminished academic performance: Multitasking leads to significantly lower scores, note taking on laptops results in weaker outcomes compared to paper note taking (Hembrooke & Gay, 2003). Found that students who multitasked on laptops during lectures received lower on test scores, and even nearby students were negatively affected (Wood et al., 2012).

It was also demonstrated that students who took notes on laptops usually performed worse on conceptual questions than handwritten note takers, as they pay attention more on typing everything down than on understanding the content (Mueller & Oppenheimer, 2014). Overall, laptop use can contribute to emotional strain and encourage poor learning behaviors, which may harm students' academic performance (Mueller & Oppenheimer, 2014; Sana et al., 2013).

## CONCLUSION

Laptops create an emotional paradox, while technostress hinders engagement, the device's functionality enhances self-efficacy for complex tasks. Consequently, schools must move beyond simple device management to fostering metacognitive skills. However, the strong features of the laptop were able to lift the student's mood by increasing Perceived Ease of Use, thus giving them more freedom and facilitating the Self-Efficacy necessary for difficult tasks. Strategically, a lot of students came up with ways that failed to achieve the desired effect. For example, separating oneself from the device seemed to be a meaningless effort in the online context because this approach still did not fix the problem of self-interruptions and consequently, it led to longer periods of wasted time

and lower educational performance. The students' not understanding the collective disruption to which they themselves were contributing is another factor that contributed to the occurrence of this disaster. And to add to it, students chose a post-pandemic strategy of functional convergence by mainly using the laptop for online learning and then, they dropped the informal, active learning methods as a way of reducing their cognitive overhead in virtual multitasking. In order for a laptop to achieve its potential, there is a shift in the focus of educational approaches that is necessary. According to the studies, structured, required interaction (e.g., quizzes) not only does it work as an equalizer, but it also fights low motivation and high anxiety through active retrieval. Consequently, people's future through banning devices topics seem to be irrelevant in the context of the discussion. Instead, it is more important to take them through the necessary steps of Self-Regulated Learning (SRL) and digital citizenship, firstly using the laptop as the best tool, and secondly giving students the metacognitive skills to address issues of digital distractions and emotional challenges.

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