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The effect of educational games using educandy on elementary school students' learning motivation

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Abstract

This research investigates the effect of utilizing the Educandy educational game platform on the learning motivation of elementary school students at SD 035 Tarai Bangun, Tambang District, Kampar Regency. The study employed a quasi-experimental one-group pretest-posttest design to evaluate the effectiveness of Educandy in boosting students' motivation. The research subjects were selected using purposive sampling, and data were gathered through a validated motivation questionnaire. The results indicated a significant improvement in students' motivation, with post-intervention scores averaging higher than pre-intervention scores. The statistical analysis, using the Wilcoxon Signed-Rank Test, confirmed that the use of Educandy games had a positive influence on learning motivation, with an N-gain categorized as moderate. This finding suggests that Educandy games can serve as a practical alternative for enhancing students' learning motivation in elementary education.

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1. Introduction

Primary education plays a crucial role in laying the foundation for students' cognitive, affective, and psychomotor abilities. Students' learning motivation is one of the key components that determines the success of the educational process. Learning motivation is a psychological factor that influences the amount of effort students put into the learning process. Schunk et al. (Schunk, Pintrich, & Meece, 2014) explain that learning motivation is divided into intrinsic motivation, which comes from within the students, and extrinsic motivation, which is influenced by external factors such as rewards and praise. Similarly, Ryan and Deci (2000), in their work on Self-Determination Theory, state that learning motivation can be enhanced when students feel autonomous,

competent, and socially connected within their learning environment. In the learning process, motivation plays a crucial role in enhancing learning effectiveness, directing attention, and promoting active student engagement (Santrock, 2011). This is consistent with what Syafriafdi (2020) stated, emphasizing that motivation is crucial, especially for students, as it is closely related to learning outcomes. Learning motivation refers to the internal and external drives that influence students' desire to learn and achieve the expected outcomes (Santrock, 2011). High learning motivation enables students to be more active, engaged, and enthusiastic during the learning process, while low motivation can lead to unsatisfactory academic achievements. In the context of Sekolah Dasar 035 Tarai Bangun in Tambang District, Kampar Regency, various challenges persist in motivating students to remain enthusiastic and focused on their learning.

To address these challenges, one effective method is the use of educational games. Educational games are interactive learning media designed to enrich students' learning experiences while providing a fun and challenging atmosphere. Previous research has shown that educational games can enhance learning motivation by creating a more engaging learning environment (Prensky, 2003). Additionally, educational games can stimulate students' cognitive and affective engagement in the learning process (Gee, 2003). Various studies have demonstrated that the application of technology in education, including the use of educational games, has a positive impact on students' learning motivation (Mulyosari & Khosiyono, 2023; Nugroho & Ma'arif, 2022; Sutarman, Rahmanto, & Puspaningrum, 2022; Suwandi, Syafrinal, Lestari, & Turini, 2022).In the field of education, such innovations are increasingly favoured to overcome student boredom and improve the quality of learning.

In the current development of technology, various digital platforms have been designed to support game-based learning. One innovation in technology-based learning is the Educandy platform. Educandy is a web-based or app-based platform that serves as an interactive learning medium, combining elements of education and games. Teachers can utilize this platform as a quiz tool to make the learning process more engaging and prevent student boredom, while also increasing their motivation to learn and ultimately achieving learning objectives. Educandy offers three main features: Words, Matching Pairs, and Quiz Questions. The platform can be accessed via mobile phones or laptops, making it more flexible to use (Dewi, Setyorini, Zahro, & Wahyono, 2023). This means that Educandy is a digital tool that helps teachers create various interactive games for use in the classroom. The platform enables students to learn through engaging games, including word searches, matching games, and interactive quizzes. Educandy can help overcome learning challenges by offering engaging activities that simultaneously strengthen students' understanding of concepts (Nurhikmah, Madianti, Azzahra, & Marini, 2023; Widiastuti, Sayekti, & Eryani, 2021). However, although Educandy has excellent potential, its implementation and impact on students' learning motivation still require further study, particularly in local contexts such as Sekolah Dasar 035 Tarai Bangun.

Previous research has extensively discussed the use of educational games to enhance students' learning motivation. However, most studies have focused on games to improve character and learning outcomes, as seen in works by Nurhikmah et al. (2023). However, there are still few studies examining their impact on learning motivation at the primary education level in more specific contexts, such as at Elementary School 035 Tarai Bangun. Therefore, this study aims to fill the gap in the literature by examining the impact of educational games using Educandy on the learning motivation of elementary school students in this suburban area. The purpose of this study is to investigate the effect of educational games developed using the Educandy platform on the learning motivation of students at Elementary School 035 Tarai Bangun, located in Tambang Subdistrict, Kampar Regency. Furthermore, the study aims to evaluate the extent of motivational

improvement observed before and after the implementation of Educandy-based educational games.

2. Literature Review

Learning motivation is the drive that comes from within (internal) and outside (external) oneself, which encourages someone to engage in learning activities with enthusiasm and excitement. According to Santrock (Santrock, 2011), learning motivation encompasses the processes that influence how students initiate, sustain, and direct their activities to achieve academic goals. Schunk, Pintrich, and Meece (Schunk et al., 2014) explain that motivation can be intrinsic, originating from within the student, or extrinsic, triggered by external factors.

Indicators of learning motivation can be identified through several key behavioural and affective components. These include: (1) *persistence*, or the ability of students to continue learning even when faced with challenges or difficulties; (2) *active engagement*, reflected in the level of participation and involvement in the learning process; (3) *interest and enthusiasm*, shown through students' emotional investment and curiosity toward the subject matter; (4) *desire to achieve*, referring to students' intrinsic or extrinsic drive to attain optimal academic outcomes; and (5) *interest in tasks*, seen in the attention and focus students give to classroom tasks. These indicators are supported by the motivational frameworks proposed by Skinner and Belmont(Skinner & Belmont, 1993), Eccles and Wigfield(Eccles & Wigfield, 2002), and Ryan and Deci (Ryan & Deci, 2000), who highlight the role of engagement, expectancy-value beliefs, and intrinsic motivation in sustaining student learning behaviours.

Educational games are games designed for educational purposes, integrating game elements into the learning process. Prensky (2003) states that educational games can create an interactive, challenging, and enjoyable learning environment, which ultimately enhances student engagement and motivation. Game elements, such as challenges, rewards, and visually appealing designs, are created to motivate students and spark their interest in learning.

Educational games provide several notable benefits in the learning process. First, they can increase student engagement, as learners tend to become more enthusiastic and actively involved when learning activities are gamified (Gee, 2003). Second, games help enhance material understanding, as instructional content delivered through interactive and experiential formats is easier to comprehend and retain (Vlachopoulos & Makri, 2017). Third, educational games contribute to reducing learning anxiety by creating a more relaxed and enjoyable learning environment, which in turn improves students' emotional readiness to learn(Wang, Chen, Hwang, Guan, & Wang, 2022). Ultimately, many educational games foster critical thinking skills, as they frequently involve problem-solving, strategic planning, and logical reasoning tasks (Anastasiadis, Lampropoulos, & Siakas, 2018).

Educandy is a web and app-based learning platform that enables teachers to create a variety of educational games practically and effectively. It offers interactive game formats such as word searches, matching pairs, and quizzes, all designed to enhance student engagement and participation in the learning process. These features provide enjoyable learning experiences while reinforcing instructional content in a meaningful and contextualized manner (Alchorni, 2024). In language learning, for example, Educandy has been shown to effectively support vocabulary acquisition through game-based activities, such as puzzles and matching exercises (Arifatin, Mafruudloh, & Masruroh, 2025; Fitria & Roziqi, 2022). Other studies also indicate that the use of Educandy in both online and offline classrooms increases students' motivation and interest in learning(Aenurrifah, Widhiyanto, & Trisanti, 2025). With its interactive quiz features, this platform serves as an innovative learning tool that aligns well with the characteristics of today's digital-native

learners (Dwi Saputri, Rachmawati Putri, Aufa Yusuf Sabilla, Triwulan, & Susilawati, 2023). Therefore, the integration of Educandy into classroom instruction not only enriches teachers' pedagogical strategies but also reinforces student-centred learning through educational technology.

Educandy offers a suite of interactive features designed to support student engagement and enhance learning outcomes. One of its core tools is the Words feature, which enables teachers to create word-based games, such as word searches, anagrams, or crossword puzzles, that facilitate vocabulary acquisition and enhance students' linguistic skills. Another essential component is Matching Pairs, a game format that strengthens memory retention and conceptual understanding by prompting learners to associate related terms or ideas, thereby fostering cognitive connections through interactive matching activities. Additionally, the Quiz Questions feature serves as an effective formative assessment tool, enabling educators to gauge students' comprehension and provide immediate feedback through interactive quizzes (Alchorni, 2024; Arifatin, 2025; Fitria & Roziqi, 2022). These features collectively support differentiated instruction and promote active learning in various educational contexts..

Educandy provides several pedagogical benefits that support both educators and learners in the digital classroom. First, it facilitates teachers in developing interactive learning media without requiring advanced technical or programming skills. With its user-friendly interface, Educandy enables quick creation of educational games that can be tailored to lesson objectives (Fitria & Roziqi, 2022). Second, it contributes to increased student engagement by incorporating game-based elements that make learning more enjoyable and stimulate motivation among learners (Alchorni, 2024; Dwi Saputri, 2023). These games not only attract attention but also sustain focus during the learning process. Third, Educandy offers high flexibility of use; it is accessible on various devices, including smartphones, tablets, and computers, allowing teachers to integrate it into different classroom contexts and learning environments. These advantages highlight Educandy as a practical and inclusive educational tool, making it suitable for modern teaching practices.

3. Method

3.1 Research design

This study employs a quasi-experimental design with a one-group pretest-posttest approach. In this design, a single group of subjects is observed or measured before and after the implementation of a treatment. According to Fraenkel and Wallen (Fraenkel, Wallen, & Hyun, 2012), the one-group pretest-posttest design involves administering a pretest to participants prior to the treatment, applying the intervention, and concluding with a posttest to determine the treatment's effects. In this study, the pretest is conducted to measure students' initial level of learning motivation. Subsequently, the students participate in learning activities that incorporate educational games using the Educandy platform. After the intervention, a posttest is administered to assess any changes in their learning motivation. This design enables the researcher to determine whether the observed changes can be attributed to the applied intervention, although it does not include a control group for comparison (Creswell, 2014; Fraenkel & Wallen, 1993).

Table 1. The one-group pretest-posttest design

Pretest	Treatment	Posttest
O	*X*	*O*

3.2 Population and Sample

The population of this study comprises all students of Elementary School 035 Tarai Bangun, located in Tambang Subdistrict, Kampar Regency. The sample was selected using purposive sampling, a non-probability sampling technique that selects participants based on specific characteristics relevant to the study's objectives (Sugiyono, 2018). In this case, the criteria included students who were actively involved in learning activities utilizing the Educandy platform, had access to supporting digital devices such as smartphones or tablets, and demonstrated consistent attendance and participation during the implementation of the intervention. Based on these criteria, a total of 28 students from a single class were selected as the research sample. This group was considered representative for assessing the impact of Educandy-based educational games on learning motivation, as they met the practical and pedagogical requirements for conducting the quasi-experimental design employed in this study.

3.3 Research instrument

The primary instrument used in this study is a learning motivation questionnaire adapted from a validated motivation scale widely utilized in previous research, particularly based on the Self-Determination Theory framework developed by Ryan and Deci (Ryan & Deci, 2000). The questionnaire is designed to measure various indicators of learning motivation, including persistence in facing challenges, active engagement in the learning process, interest and enthusiasm toward subject matter, the desire to achieve optimal outcomes, and students' attention to assigned tasks. Responses are assessed using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree," which enables a standardized and quantitative evaluation of students' motivational levels. The content validity and clarity of the indicators have been refined to suit the context of elementary-level learning.

3.4 Research procedure

The study consists of three phases: first, the preparation phase, which involves identifying students who will be the research sample, developing and validating the learning motivation questionnaire through a limited trial, and conducting training for teachers on using the Educandy platform in teaching. Second, the implementation phase involves conducting a pretest to measure students' learning motivation prior to the intervention, implementing learning sessions using Educandy-based educational games, and conducting a posttest to assess students' learning motivation after the sessions. Finally, the data analysis phase involves analyzing the pretest and posttest data using statistical tests, such as a paired sample t-test or Wilcoxon test, to determine significant differences in learning motivation before and after using Educandy (Sugiyono, 2018).

3.5 Data analysis technique

The data analysis will begin with descriptive statistics, including the calculation of the mean and standard deviation, to provide an overview of the central Tendency and spread of students' learning motivation scores during the pretest and posttest phases. This initial step helps to illustrate the general patterns and changes observed before and after the intervention. Following this, the Kolmogorov-Smirnov test will be conducted using SPSS to assess whether the data are normally distributed. If the p-value is greater than 0.05, the data will be considered normally distributed and analyzed using a paired sample t-test. If the p-value is less than 0.05, indicating a non-normal distribution, the Wilcoxon Signed Rank Test, a non-parametric alternative suitable for paired data, will be used instead.

The purpose of this inferential analysis is to determine whether the intervention has led to a statistically significant change in students' learning motivation. All statistical procedures will be

carried out using SPSS or equivalent data analysis software. A significance level of 0.05 will be applied, meaning that any result with a p-value below this threshold will be considered statistically significant (Creswell, 2014). Additionally, the improvement in students' motivation will be measured using the normalized gain (N-gain) formula, as proposed by Hake (1998), which offers a more nuanced understanding of the intervention's effectiveness. Interpretation of N-Gain Categories: High: n-gain ≥ 0,7; Medium: 0,3 ≤ n-gain < 0,7; Low: n-gain < 0,3.

$$N - Gain = \frac{\text{Posttest} \ - \ \text{Pretest}}{\text{Maximum Score} \ - \ \text{Pretest}}$$

4. Results

Based on the processed results of the pretest and posttest learning motivation questionnaires, the data analysis results are as follows:

4.1 Descriptive statistical analysis of pretest-posttest

The descriptive statistical analysis of the Pretest-Posttest can be presented in Table 2 below.

Table 2. Descriptive statistical results of the pretest and posttest learning motivation questionnaire

Results	Mean	Standar Deviasi (SD)
Pretest	71,68	3,38
Posttest	77,93	4,21

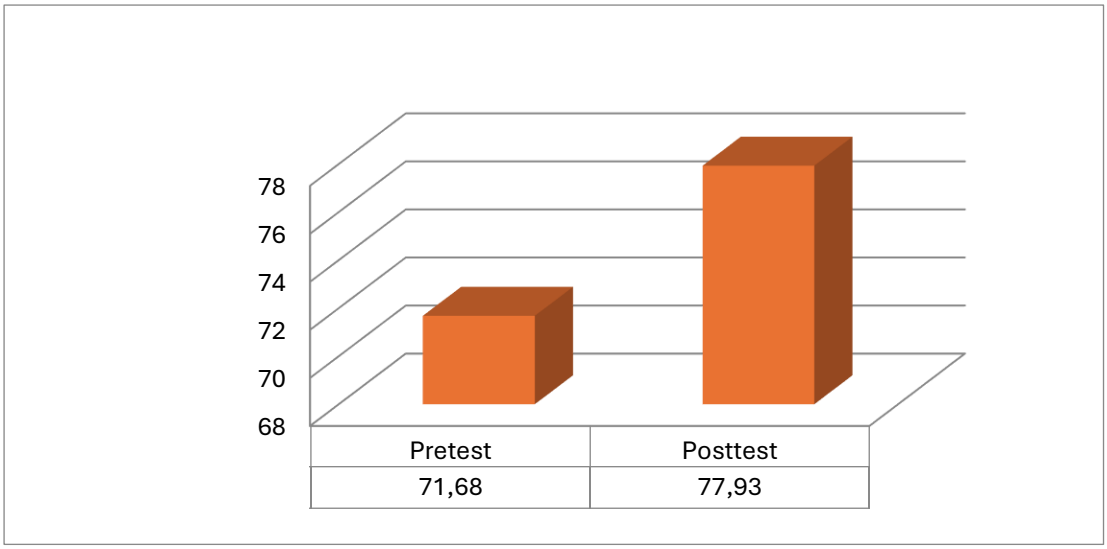

Figure 1. Graph of the average difference in learning motivation questionnaire results before and after the implementation of educandy games

4.2 Inferential statistical analysis

Next, the researcher conducted further testing, specifically inferential analysis, to determine whether the use of educational games with Educandy had a significant effect on learning motivation. Before this, a prerequisite test, namely the normality test, was performed.

4.2.1 Data Normality Test

The data normality test was conducted using SPSS, and the results are presented in Table 3

below:

Table 3. Results of the data normality test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.167	28	.045	.895	28	.009
Posttest	.172	28	.034	.917	28	.029
a. Lilliefors Significance Correction						

Based on Table 3, the data normality test using the Kolmogorov-Smirnov test shows a p-value of 0.045 < 0.05 for the pretest results, indicating that the pretest data is not normally distributed. Similarly, the posttest data has a p-value of 0.034 < 0.05, indicating that the posttest data is also not normally distributed. Therefore, hypothesis testing was conducted using a non-parametric test, specifically the Wilcoxon Signed-Rank Test.

4.2.2 Wilcoxon Signed-Rank Test

The results of the Wilcoxon test using SPSS can be seen in Table 4 below:

Table 4. Wilcoxon Test Results from SPSS

Test Statistics[a]	
	Posttest - Pretest
Z	-4.549[b]
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Based on the results of the Wilcoxon test, which showed a p-value of 0.000 < 0.05, it can be concluded that the intervention using Educandy-based educational games had a significant impact on students' learning motivation.

4.3 Normalized N-gain

Based on the processed N-gain data, the average N-gain can be seen in Table 5 below:

Table 5. N-gain results

Student Name	Pretest Motivation	Posttest Motivation	Posttest-Pretest	Maximum Score - Pretest	N-gain
sis-1	70	88	18,00	20	0,90
sis-2	60	74	14,00	30	0,47
sis-3	75	88	13,00	15	0,87
sis-4	74	78	4,00	16	0,25
sis-5	75	79	4,00	15	0,27
sis-6	72	78	6,00	18	0,33
sis-7	78	80	2,00	12	0,17
sis-8	67	73	6,00	23	0,26
sis-9	72	78	6,00	18	0,33
sis-10	70	79	9,00	20	0,45

Student Name	Pretest Motivation	Posttest Motivation	Posttest-Pretest	Maximum Score - Pretest	N-gain
sis-11	70	72	2,00	20	0,10
sis-12	73	73	0,00	17	0,00
sis-13	69	82	13,00	21	0,62
sis-14	70	76	6,00	20	0,30
sis-15	75	85	10,00	15	0,67
sis-16	76	77	1,00	14	0,07
sis-17	73	75	2,00	17	0,12
sis-18	75	80	5,00	15	0,33
sis-19	72	78	6,00	18	0,33
sis-20	71	78	7,00	19	0,37
sis-21	74	75	1,00	16	0,06
sis-22	72	78	6,00	18	0,33
sis-23	70	82	12,00	20	0,60
sis-24	69	72	3,00	21	0,14
sis-25	72	74	2,00	18	0,11
sis-26	71	75	4,00	19	0,21
sis-27	72	77	5,00	18	0,28
sis-28	70	78	8,00	20	0,40
		Average N-gain			**0,33**

Based on Table 4, the average n-gain obtained is 0.33, indicating that, according to the interpretation of the gain value, the increase in learning motivation from before the intervention to after the intervention using Educandy educational games falls into the medium category. Although this increase is not considered high, these results provide important insight that educational games like Educandy are capable of providing a significant boost to motivation.

5. Discussion

Based on Table 2 and Figure 1, the descriptive statistical analysis reveals an increase in the average student motivation score, from 71,68 in the pretest to 77,93 in the posttest, indicating a positive effect of the Educandy-based intervention. This 6,25 point increase suggests that the use of interactive learning media significantly enhanced students' engagement and enthusiasm toward learning. Moreover, the increase in standard deviation, from 3,38 to 4,21, reflects a broader distribution of posttest scores, indicating varied individual responses to the game-based learning experience.

The Kolmogorov-Smirnov test results confirmed that the data were not normally distributed, necessitating the use of the Wilcoxon signed-rank test for further analysis. The test yielded a p-value of 0,000 (< 0,05), indicating a statistically significant difference between the pretest and posttest scores. Additionally, the normalized gain (N-gain) score of 0,33 falls into the medium category, indicating that the intervention yielded a meaningful impact on students' learning motivation, despite the fact that not all students experienced marked gains.

These findings support both established theories and relevant prior research. According to Prensky (Prensky, 2003), game-based learning creates engaging, interactive, and challenging environments that can significantly enhance student motivation. Gee (Gee, 2003) also highlights that educational games stimulate both cognitive and emotional engagement through elements such as challenge, feedback, and reward. From a theoretical perspective, Ryan and Deci(Ryan & Deci, 2000) explain in their *Self-Determination Theory* that intrinsic motivation increases when students feel a sense of autonomy, competence, and relatedness—elements that are naturally embedded in platforms like Educandy.

Empirical support for these results can also be found in studies by Suwandi et al. (2022) and Widiastuti et al. (2021), which emphasize that integrating technology in learning environments can significantly enhance student motivation. Similarly, Alchorni and Dewi et al. (Alchorni, 2024; Dewi et al., 2023) found that Educandy's interactive features effectively promote student participation and improve concept mastery by making the learning experience more enjoyable and student-centred.

In summary, the present study not only reinforces theoretical frameworks and previous research but also contributes practical evidence within a localized context. In a suburban elementary school setting like SD 035 Tarai Bangun, where access to technological resources may be limited, this research demonstrates that interactive educational tools, such as Educandy, can be successfully implemented and have a positive influence on students' motivation and learning quality. It affirms that even in resource-constrained environments, well-designed digital interventions can serve as effective pedagogical solutions. This is also evidenced by the implementation process of educational games using Educandy, as shown in Figure 2 below:

Figure 2. The Process of Using Educandy in Learning Activities

Based on Figure 2, which illustrates the learning process using the educational platform "Educandy," it is clear that students show high levels of enthusiasm and activity during the learning sessions. The use of educational games with Educandy has a positive impact on the learning motivation of elementary school students in several ways. For example, it increases their interest and enthusiasm, as students appear focused and excited when engaging with technology-based learning tools, making the learning experience more engaging. The interactive and enjoyable nature of the games enables students to actively participate in challenging yet engaging activities actively, thereby boosting their overall engagement. Additionally, incorporating game elements helps students better understand and retain the material through repetition and immediate feedback, thereby strengthening their memory and comprehension. The collaborative activities depicted in the image also foster teamwork and communication skills, while healthy competition motivates students to strive for better results. Finally, Educandy's game format fosters intrinsic motivation by driving students to learn for the enjoyment of completing challenges, rather than relying on external

pressure. Overall, the use of educational games like Educandy significantly enhances students' learning motivation, making learning more effective and enjoyable.

6. Conclusion and Implications

Based on the results and discussion, it can be concluded that the use of Educandy-based educational games had a statistically significant effect on students' learning motivation. The Wilcoxon Signed-Rank Test yielded a p-value of 0.000 (< 0.05), indicating a statistically significant difference in motivation between the pretest and posttest scores. The average score increased from 71.68 to 77.93, and the normalized gain (N-gain) score of 0.33 falls within the medium category, demonstrating that the intervention produced a meaningful improvement in students' learning motivation.

These findings align with the primary objective of this study, which was to evaluate the effectiveness of interactive learning media, specifically Educandy, in enhancing student motivation at SDN 035 Tarai Bangun, Kampar Regency. In addition to reinforcing theoretical frameworks, this study offers practical empirical evidence that technology-enhanced learning tools can be implemented effectively, even in schools with limited access to digital resources.

Therefore, Educandy presents itself as a viable and practical alternative to traditional teaching methods. Its successful application in a suburban school setting illustrates how well-designed digital interventions can provide engaging, inclusive, and effective learning experiences for young learners. Teachers and education policymakers are encouraged to explore and adopt interactive platforms, such as Educandy, as part of broader efforts to enhance student motivation and learning outcomes in primary education, particularly in resource-constrained environments where creativity and innovation are crucial for ensuring quality learning for all.

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