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Internet addiction and network identity:
Features of development in student youth

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Abstract
The purpose of the study is to detect the level of Internet addiction in student youth, identify the features of network identity formation, and substantiate the relationship between personality traits and addictive behavior. The paper reports on the results of an empirical study of pedagogical university students (n=248) utilizing a battery of diagnostic techniques and secondary analysis. The results show a moderate level of Internet addiction in most surveyed students and confirm its association with personality traits – extroversion/introversion, neuroticism and psychoticism, manipulative behavior, openness to experience, a situational attitude to norms and values to achieve one's goals, approval of one's actions by reference users of the social network, and the formation of one's image and Internet reputation. Among the causes of Internet addiction are the lack of time management, the uncontrollability of online staying; psychological dependence; the unwillingness to interrupt other activities and deliberate avoidance; and verbal aggression in case of inability to use online resources. Authors conclude that targeted secondary prevention programs, such as educational interventions and awareness activities, can effectively reduce Internet addiction and its associated risks among university students, as evidenced by improvements in network identity metrics and lower addiction levels during the control stage.

Keywords
Internet dependence; Internet addiction; young people; university students; personal qualities.

Vício em Internet e identidade de rede:
características de desenvolvimento em jovens estudantes

Resumo
Atualmente, há um grande interesse no surgimento, uso e domínio das tecnologias da Internet e seu impacto na vida social das pessoas. O objetivo do estudo é detectar o nível de dependência da Internet em jovens estudantes, identificar as características da formação da identidade da rede e comprovar a relação entre os traços de personalidade e

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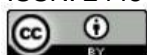
o comportamento de dependência. O artigo relata os resultados de um estudo empírico de estudantes universitários de pedagogia (n=248) utilizando uma bateria de técnicas de diagnóstico e análise secundária de dados obtidos por pesquisadores contemporâneos. Os resultados mostram um nível moderado de dependência da Internet na maioria dos alunos pesquisados e confirmam sua associação com traços de personalidade - extroversão/introversão, neuroticismo e psicoticismo, comportamento manipulador, abertura à experiência, atitude situacional em relação a normas e valores para atingir os objetivos, aprovação das ações pelos usuários de referência da rede social e formação da imagem e da reputação na Internet. Entre as causas do vício em Internet estão a falta de gerenciamento do tempo, o descontrole da permanência *online*, a dependência psicológica, a falta de disposição para interromper outras atividades, a evitação deliberada e a agressão verbal em caso de incapacidade de usar recursos *online*.

Palavras-chave
dependência da Internet; vício em Internet; jovens; estudantes universitários; qualidades pessoais.

Adicción a Internet e identidad en la red:

características del desarrollo en jóvenes estudiantes

Resumen
En la actualidad, existe un gran interés por la aparición, el uso y el dominio de las tecnologías de Internet y su impacto en la vida social de las personas. El propósito del estudio es detectar el nivel de adicción a Internet en los jóvenes estudiantes, identificar los rasgos de la formación de la identidad en la red y corroborar la relación entre los rasgos de personalidad y la conducta adictiva. El artículo informa sobre los resultados de un estudio empírico de estudiantes universitarios de Pedagogía (n=248) en el que se utilizó una batería de técnicas de diagnóstico y un análisis secundario de datos obtenidos por investigadores contemporáneos. Los resultados muestran un nivel moderado de adicción a Internet en la mayoría de los estudiantes encuestados y confirman su asociación con rasgos de personalidad - extroversión/introversión, neuroticismo y psicoticismo -, comportamiento manipulador, apertura a la experiencia, actitud situacional ante normas y valores para alcanzar los propios objetivos, aprobación de las propias acciones por usuarios de referencia de la red social y formación de la propia imagen y reputación en Internet. Entre las causas de la adicción a Internet se encuentran la falta de gestión del tiempo, la incontrolabilidad de la permanencia en línea, la dependencia psicológica, la falta de voluntad para interrumpir otras actividades, la evitación deliberada y la agresión verbal en caso de incapacidad para utilizar los recursos en línea.

Palabras clave
dependencia de Internet; adicción a Internet; jóvenes; universitarios; cualidades personales.

1 Introduction

The transition from a post-industrial society to an information and digital society is associated with the creation and use of new information and communications technologies (ICT) in all spheres of social life, which influence the organization of space, the individual's

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relationship with the state and other social institutions, and the interpersonal communication of people online and offline, allowing them to satisfy their growing needs.

According to Datareportal, in 2023, there were 127.6 million registered Internet users in Russia, and Internet accessibility amounted to 88.2% of the total population. Most ICT consumers are usually young people and people of working age who use gadgets with Internet access for professional purposes, communication, education, self-education, entertainment, online shopping, paying bills, ordering online and using online services, ordering groceries to save time, etc.

Despite the advantages of Internet technologies, the scientific community's attitude to their use is ambiguous, as it is associated with several negative consequences of staying online for a prolonged time. Long-term exposure to the Internet is associated with a negative impact on physical and psychological health, obesity, insomnia, impaired vision and posture, hypodynamia, loss of interest in self-development, limited aspirations to achieve goals, increased levels of aggression and anxiety, and the emergence of deviant forms of behavior, particularly Internet addiction. In the context of education, Internet addiction among student teachers poses challenges to their ability to manage classroom dynamics, engage effectively with students, and model appropriate online behaviors. Understanding and mitigating these risks is essential for fostering competent educators who can navigate the digital age (Hinkel; Fronza; Assis, 2024).

The term "Internet addiction" was coined by American psychiatrist A. Goldberg at the end of the 20th century. Goldberg (1993) understood Internet addiction as a maladaptive pattern of Internet use that leads to clinically significant disorders and distress and highlighted several indicators for its identification: 1) increased time spent online by the user to achieve satisfaction; 2) reduced effect of staying online for the same amount of time; 3) deterioration of well-being when the person stops or minimizes their use of an Internet-connected gadget.

Young (1996, p. 900) defines Internet addiction as "[…] any compulsive use of the Internet that interferes with normal life and puts severe pressure on the patient's family members, friends, loved ones, and professional environment". Young (1996) proposes to diagnose Internet addiction using the following signs: a compulsive desire to constantly check one's e-mail; an irresistible urge to log on to the Internet; excessively long periods spent online; and spending large sums of money on Internet services.

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Chen *et al.* (2003) point to the following signs in diagnosing Internet addictive behavior: an irresistible desire to be online at all times; frustration at the inability to use the Internet; an increased amount of time spent on the Web; deterioration of physical and psychological health after being online for long periods; difficulties with time management.

The classification of Internet addiction types put forward by Voyskunsky (2015) includes gaming addiction; addiction to watching movies online; compulsive web surfing; cybersex addiction; addiction to virtual communication and online dating; and compulsive financial needs, including shopping, gambling, etc.

2 Literature review

In recent years, the body of research into the impact of digital technologies on the life activities of people of all ages has been growing steadily. Most publications concentrate on the pedagogical and psychological sectors and less frequently relate to sociology and medical sciences (Garcia; Santos; Trindade, 2024).

Contemporary authors have been paying close attention to various aspects of Internet addiction, including the specifics of its development and course among young people in megacities (Drepa, 2010; Varlamova; Goncharova; Sokolova, 2015); in adolescence and young adulthood as the most susceptible to the risks of deviant forms of behavior and impact on their physical (Loskutova, 2004; Luchaninova *et al.*, 2017; Smolentseva, 2021) and mental health (Shutova; Baranova, 2017); personality development (Zhukova *et al.*, 2023); communication practices and the position of the individual in the digital environment, network identity (Chernavin, 2022; Grishaeva; Klyuvaev, 2019); information consumption in the Internet space (Kameneva *et al.*, 2023), etc.

The bulk of modern dissertation research on Internet addiction falls into the period from 2003 to 2010, followed by some interruption and a resumption in 2019, predominantly defended in pedagogy and psychology (Kolmogortseva, 2021; Koryagina, 2019; Merkuryeva, 2022; Petrova, 2022; Semenyak, 2022).

Outside of Russia, research on behavioral addictions has been carried on for more than a decade. Behavioral addictions are distinguished into chemical (alcohol, narcotic substances) and non-chemical addictions (gambling, ludomania, Internet addiction). The number of recognized addictions is growing every year, although their

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causes are still not entirely clear. In the case of Internet addiction, research emphasizes the importance of personality and behavioral traits that predispose an individual to addiction, such as depression, anxiety, hostile attitudes, aggressiveness, impulsivity, psychotic behavior, shyness, and self-esteem disorders.

As pointed out by Duong, Liaw and Augustin (2020), the phenomenon of Internet addiction varies in prevalence across different countries: most addicted Internet users are concentrated in Asia (6.3-37.9%), the USA (0.3-8.2%), and Europe (1.0-21.3%). In several countries, including South Korea and China, Internet addiction is recognized as a threat to national security.

Proceeding from an analysis of articles from international citation databases, Chew (2022) and Mak *et al.* (2021) analyzed the relationship between Internet addiction and seven personality traits: openness, conscientiousness, extraversion, agreeableness, neuroticism, psychoticism, and deceitfulness. The studies established a positive relationship between Internet addiction and neuroticism and psychoticism and negative correlations with conscientiousness, extraversion, benevolence, and deceitfulness. The researchers concluded that the personality traits of respondents with Internet addiction differ from those without addiction.

A study of the level of Internet addiction in pedagogical university students (n=111) by Russian researchers Zhukova *et al.* (2023) demonstrated the following: 81% of Internet-addicted students tend to manipulate people, 54% are selfish, and 45% have a low level of agreeableness. Spearman's t-test showed a close correlation between Internet addiction and some personality parameters – "Kantianism" (honesty, a respectful attitude to people, humanism) (rs = -0.422; p < 0.01), "Machiavellianism" (manipulation of people, cynicism, and deceitfulness) (rs = 0.309; p < 0.05), and "psychopathy" (impulsiveness, egoism, ruthlessness, thrill-seeking, anxiety, low empathy) (rs = 0.381; p < 0.05).

The specificity of the gender aspect is covered by Polish scientists Rachubińska *et al.* (2021). In their study conducted on a sample of 556 women aged 18 and older (mean age – 34), a quarter of respondents were found to have personality traits predisposing them to Internet addiction: openness to new experiences and neuroticism. A significant correlation was detected between Internet addiction and extraversion, while agreeableness showed no correlation.

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The findings of Akbari *et al.* (2021) including 17 studies with a total sample of 25,634 people (mean age = 26.55, males = 75%) indicate that agreeableness, extraversion, openness to experience, and neuroticism are not always related to online gaming and only conscientiousness has a strong negative correlation. Some differences in the data obtained by different researchers suggest the need for further exploration of the causes of Internet addiction and the identification of factors affecting its formation in young people as a social group at high risk.

The student age is one of the most important periods of socialization, during which the individual acquires and develops the most important personality traits and moral and ethical qualities, masters new knowledge, skills, and competencies, learns social, labor, and family roles, and is actively involved in educational, creative, and professional activities.

Excessive immersion in the Internet space can disrupt interpersonal communication, distort the hierarchy of moral and ethical values, cause health problems (physical and psychological), reduce motivation for learning, work, creative activities, and offline interaction with peers and representatives of other generations, and lead to the formation of addictive behaviors (Rostovtseva, 2019). It seems timely that in 2022, the World Health Organization officially classified addiction to computer games, which developed into Internet addiction, as an addictive behavior disorder and included it in the International Classification of Diseases (ICD-11, code 6C51).

The study aims to identify the level of Internet addiction, establish the features of network identity formation in student youth, substantiate the relationship between young people's personal characteristics and addictive behavior, and evaluate the effectiveness of the proposed Internet addiction prevention program.

3 Methods

The empirical study was conducted in the Balashov Institute (branch) of Chernyshevsky Saratov State University and involved 248 undergraduate students aged from 17 to 23 years old. The study adhered to ethical research principles, ensuring voluntary participation, informed consent, and confidentiality of the participants' data. Approval was obtained from the institutional ethics committee prior to data collection.

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Students were informed about the purpose of the research, its potential benefits, and their right to withdraw at any stage without consequences.

The main research methods employed in the study were: 1. K.S. Young's Internet Addiction Test (as adapted by Loskutova) as a self-diagnostic tool for pathological addiction to the Internet; 2. Toncheva's questionnaire "Diagnostics of Cyber-Communication Addiction" (the individual's dependence on social network communication). 3. the "Virtual Identity of Social Media Users" (VISMU) technique by Pogorelov, focused on three factors: risk of developing addiction, propensity to form destructive behavior, and self-image (Rostovtseva, 2019).

Quantitative data from the diagnostic tools were analyzed using descriptive statistics to determine the distribution of Internet addiction levels. Comparative analysis was employed to evaluate changes in cyber-communication addiction metrics before and after implementing the educational interventions (Fernández-Martínez; Sutil-Rodríguez; Liébana-Presa, 2023). Correlations between personality traits and Internet addiction indicators were assessed using Spearman's rank correlation coefficient.

As part of this study, the additional educational program "Security in Cyberspace" was developed and introduced into the educational process along with a series of measures focused on the secondary prevention of Internet addiction among students.

The main purpose of the proposed activities was to:

- Create psychologically comfortable conditions for interaction between participants in the implementation of the program;
- Develop students' communicative competence and information literacy;
- Develop students' skills and abilities in safe behavior on the Internet and social media;
- Foster an adequate position on Internet addiction in students;
- Reduce the number of students prone to this addiction.

As part of the proposed program of events, a lecture "Threats on the Internet" was held, aimed at improving students' information literacy regarding cyberthreats.

The round table "Addictive Behavior. Internet Addiction", was organized with the involvement of university teachers, psychologists, and cybersecurity specialists. In the course of the event, the participants actively discussed issues related to addictive behaviors among modern youth and the factors influencing the formation of addictive

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personality. These methods were tailored to address not only Internet addiction but also professional skills essential for future specialists, such as critical digital literacy, time management, and fostering positive online engagement.

The debate "Living on the Net" aimed to develop a correct perception of the content of Internet resources in students and expand their knowledge about the positive and negative impact of the Internet and social networks.

The discussion "Living on the Net" and the thematic evening "Let's Sit Down, Drink Tea, and Talk..." were devoted to developing students' communicative competence and teaching them constructive Internet communication. The key objectives of the events included:

- Identifying the differences between virtual and real communication;
- Identifying the pros and cons of online communication;
- Discussing the theme "Why do some people become 'boorish' on social media and how do we stand up to them?".

As part of the International Day of Safe Internet, the students took part in the interactive quest "Cyber Security and Cyber Hygiene" which aimed to form an active position on personal Internet safety using game technologies.

The next direction of efforts was students developing a project on preventing Internet addiction and an inter-university competition of drawings and booklets "Safe Internet". Insights on the levels and causes of Internet addiction guided the program's focus on promoting time management, reducing psychological dependence, and fostering positive online communication. The results of students' research work were presented at the student scientific-practical conference "Healthy and Safe Educational Environment as a Condition for Successful Life Activity" held at the Balashov Institute in April 2024.

In the future, we plan to improve the directions and forms of work in the secondary prevention of Internet addiction among student youth.

4 Results

The results of Young's Internet Addiction Test demonstrate that most respondents displayed average (52%) and low (35%) levels of Internet addiction and only 13% showed a high level demonstrated by a stable pattern. Similar results were acquired

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using Toncheva's questionnaire. Most respondents had average (56%) and low (28%) levels of cyber-communication addiction and 16% showed a high level. Overall, the results give evidence that Internet addiction is to varying extents present in 1st-4th-year undergraduate students.

Our findings are consistent with those of other researchers. Belozerova and Panferova (2024) conducted a study of individual psychological characteristics (extraversion, introversion, attachment, detachment, self-control, impulsiveness, emotional stability, emotional instability, expressiveness, and practicality) to detect Internet addiction in 76 pedagogical university students aged 18-20. Belozerova and Panferova (2024, p. 62) found that "[…] the largest percentage of respondents, 60.5%, has a propensity to the emergence of Internet-dependent behavior. The minimum risk of Internet addiction is noted in 22.4% of subjects, and 17.1% of students have a pronounced pattern of Internet addictive behavior". More than half of the subjects (69.2%) in the group of dependent students were introverts. 61.5% were markedly isolated, avoiding contact with other people, and not involved in social activities at university. 69.9% were characterized by pronounced impulsiveness (low self-control), and 76.9% were emotionally unstable.

Our study identifies several reasons behind Internet addiction: 1. the lack of time management skills, lack of control over being online: almost a quarter of respondents (24%) often spend more than two hours a day online without interruption, 13% – very often, and 9% – always; 2. the formation of psychological dependence – one-third (33%) experience an irresistible desire to use social media (of these, 3% of responses were "always", 17% – "very often", and 13% – "rather often"); 3. The unwillingness to interrupt and avoidance other activities – 25% "often" and "very often" feel irritation in case of not having access to their social media, accompanying their actions with foul language, and express indignation and aggression at attempts to distract them from the gadget.

Aminov and Timoshina (2021) in their study of Surgut student youth (n=316) based on the focus group method came to similar conclusions: a low level of Internet addiction was detected in 43% of respondents (66% female and 34% male), an average level in 23% (65% female, 35% male), and a high level in 34% (35% female, 65% male). Among the respondents with a high level of Internet addiction, 75% demonstrated a high level of subjective feeling of loneliness and depression and 68.8% had low self-esteem. Internet-dependent respondents spent most of their time on social media, showing

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irritability and an insatiable desire to stay online due to boredom and unorganized leisure time. Completing the spectrum of consequences of excessive fascination with virtual reality, our study found that respondents saw communication on social media to improve their mood (28%), distract themselves from personal problems (22%), and learn the news (33%). 32% reported unsuccessful attempts to reduce their time on social media; 9% reported running late or missing school due to sleepless nights; and 8% reported frequently inviting strangers to befriend them online.

The results of the ascertaining stage of the study, which allowed us to discover the mutual influence of Internet addiction and personality factors, served as a basis for a program for the secondary prevention of Internet addiction among pedagogical university students (Tsyglakova; Besschetnova; Vikulov, 2024).

In our opinion, secondary prevention of Internet addiction should be carried out considering the causes of this dangerous phenomenon, communicative practices, the position of the individual in the digital environment, and the features of network identity.

After the implementation of the proposed program, a follow-up study was conducted to assess the dynamics of changes compared to the results of the ascertaining stage of the experiment (Table 1).

Table 1 – Results of comparative analysis of diagnostics of students' propensity to cyber-communication addiction according to Toncheva's methodology

Level	Ascertaining stage	Control stage
High	16%	6%
Average	56%	63%
Low	28%	31%

Source: Own elaboration (2024).

The Spearman's rank correlation coefficient is 1.0, with a p-value of 0.0, indicating a perfect positive correlation between the ascertaining and control stage percentages. This result suggests that the rankings of the levels (high, average, low) are perfectly consistent between the two stages.

Thus, the control stage of the study showed a decrease in the number of respondents with a high level of cyber-communication addiction from 16 to 6%. The number of respondents having an average and low level of cybercommunication addiction tended to increase.

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Journal of the Graduate Program in Education
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The results of the comparative analysis of the data obtained using Pogorelov's VISMU method are presented in Tables 2 and 3.

Table 2 – Results of the study conducted using Young's test

Level	Ascertaining stage	Control stage
High	13%	5%
Average	52%	61%
Low	25%	34%

Source: Own elaboration (2024).

Table 3 – Results of comparative analysis of the study conducted using Pogorelov's VISMU method

Level	Asc. stage	Control stage	Asc. stage	Control stage	Asc. stage	Control stage	Asc. stage	Control stage
	Propensity for cyberaddiction		Acceptance of subculture		Virtual image		Integral indicator	
High	12%	6%	10%	5%	12%	6%	11%	6%
Average	70%	74%	64%	65%	30%	28%	55%	56%
Low	18%	20%	26%	30%	58	66%	34%	38%

Source: Own elaboration (2024).

The comparative analysis of the results showed a decrease in the share of high levels across all four scales. There was an increase in the share of low levels, which indicates positive dynamics:

- In critical evaluation of the norms of social media subculture;
- The construction of one's self-image on social media based on real psychological and physical qualities;
- The formation of sufficiently stable attitudes consistent with social norms.

Thus, we can state that the proposed activities carried out within the framework of the program for the secondary prevention of Internet addiction promoted a decrease in the level of Internet addiction in student youth and led to changes in the indicators of their network identity.

5 Conclusions

The explosive development of digital technologies over the last 50 years has brought about a new stage in the development of social relations – the digital society, divided into "digital natives" (today's generation of children and youth) and "digital immigrants" (generation X and older), whose communication and socialization is understood in different ways from social, psychological, pedagogical, economic,

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Journal of the Graduate Program in Education
from the State University of Ceará (UECE)

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managerial, environmental, and other perspectives with a focus on benefits/limitations and achievements/negative consequences.

Despite the importance of the evolution of information technology in the era of digital society and its advantages over the methods and modes of activity of the previous era, some factors lead to the formation of deviant behavior patterns. This is especially true for young people as a socio-demographic group that is the most susceptible to the risk of developing Internet addictive behavior since most of their conscious life is connected with the development and use of digital technologies in all spheres.

The results of our research and the analysis of secondary data allowed us to draw the following conclusions.

First, most studies of Internet addiction are focused on psychology and pedagogy; there is a lack of sociological studies linking the nature of Internet addiction with economic, demographic, territorial, stratification, socialization, and other factors. Addiction and its impact on various aspects of health in children and youth also require additional medical research.

Second, a wide range of issues and points of view on Internet addiction allows us to argue for the relevance of the problem and the need for its further exploration in an interdisciplinary context – medical-social, socio-pedagogical, socio-psychological, and socio-technological using multidisciplinary tools that examine the problem from different angles and provide additional scientific data.

Third, the mutual influence of Internet addiction and personality factors has been well documented. Most university students, including pedagogy students, have a propensity for Internet addiction, showing a strong direct correlation with several personality traits, including extroversion/introversion, neuroticism, psychoticism, manipulative behavior, openness to experience, a situational attitude to norms and values to achieve their goals, approval of their actions by reference users on the social network, the formation of their image and Internet reputation.

Fourth, the results show that the higher the level of Internet addiction, the more dependent the individual becomes on the opinion of the Internet community and the number of likes and positive comments on their page. They show readiness, on the one hand, to conformism and, on the other hand, situationally, to participate in cyberbullying, supporting negative comments, and relying on the opinion of the majority regardless of

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Journal of the Graduate Program in Education
from the State University of Ceará (UECE)

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one's assessments and judgments. This can lead to the development of negative personality traits, impair interpersonal communication, and cause difficulties in adaptation and socialization.

Fifth, the analysis of personal qualities and their relationship with the causes of Internet-dependent behavior among young people calls for methodological recommendations based on scientific data to be used in work with modern children and youth in general, vocational, and additional education.

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Journal of the Graduate Program in Education
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REDUFOR
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14

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16

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