



# Socio-Pedagogical Prevention Program of High-School Students' Propensity to Virtual Social Networks' Dependence: The Results of Program Implementation

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**Annotation.** The article presents the outcomes of a socio-pedagogical prevention program aimed at reducing high schoolers' propensity to virtual networks dependence. The results by control diagnostics showed a reduction in students' propensity on virtual networks, reflected in several indicators, including improved understanding of cyber risks, positive self-perception in both real and virtual environments, reduced interest in harmful online activities, and enhanced self-regulation and time management online.

**Keywords:** *high school students, high schoolers' propensity, virtual social networks' dependence, socio-pedagogical prevention program, propensity to virtual networks dependence, general secondary education institution.*

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## Introduction

The relevance of the problem considered in this article lies in fact that in the conditions of the information society formation, the Internet and virtual social networks are the key elements of the social development of high school students, the spontaneity of which influence (due to the spread of fake news and junk information, cyber harassment or/and bullying, phishing, dubious destructive groups, etc.) poses

a real social threat for them, including due to a growth of anxiety in communication, stimulation of over-emotional reactions to the events of social reality, a state of intellectual and social isolation, leveling of the need for social interaction in real life, an obsessive desire to replace the real social “I” by its virtual deformed representation in virtual social networks, leading to dependence on them. In connection with the above, there is an urgent need to implement innovative preventive interventions at the stage of identifying indicators of the high schoolers’ propensity to dependence on virtual social networks, in order to prevent their social degradation and destruction of personality in real social space.

During the indicators research and substantiation of dependence propensity and their features among youthhead, it was based on the analysis of hierarchical relationships of concepts and correlation of the revealed essence of this propensity with psychosocial features of young people. The results of this analysis made it possible to define a key concept and to state that the “high school students’ propensity to virtual social networks dependence” is the excessive desire of scholars only for virtual self-realization in social cyber structures, which can lead to deviation of the “I-social” and is manifested in indicators : cognitive (false knowledge about the threats of relationships in cyber structures for social development; distorted knowledge about the consequences of representation in virtual social networks of the “virtual self” different from the “real self”); motivational-value (absence of a positive attitude towards the “real self” and motivation only for virtual self-realization; persistent interest in destructive cyber activity in networks), emotional and volitional (fear of real relationships and positive emotions failure from the desire for destructive cyber activity “I-“virtual” in virtual social networks; lack of willpower to independently exit virtual social networks), behavioral (most free time is spent in networks; lack of effective self-realization skills in a real social environment).

Among all institutions of students’ socialization, the school remains the only formalized institution of social education and therefore a unique center for the implementation of the socio-pedagogical approach. Thanks to the coordinated activities of the school’s social pedagogue: 1) it becomes possible to directly influence the subject with a problem (a high school student with a propensity to dependence); 2) optimal conditions are provided for harmonious interaction with other institutions of socialization important for the student (family, peer groups, extracurricular institutions, public organizations, etc.), which make up its social environment (both real and virtual); 3) a mediated subject-subject interaction is ensured, which creates an inseparable interdependent relationship, thereby providing an opportunity to organize activities related to the timely prevention of the high schoolers’ propensity to become addicted to virtual social networks. At the same time, socio-pedagogical prevention, as a priority direction of the preventive activities of the educational institution and one of the leading technologies of social work, which ensures the unification of all types

of prevention (legal, psychological, pedagogical, social, etc.), regarding the problem of overcoming the high school students' propensity to virtual social networks' dependence in realities of nowadays needs to be modernized with innovative methods, means, and forms both offline and online, including by combining the efforts of various specialists into a multidisciplinary team, whose activities are coordinated by the institution's social pedagogue. In addition, the multifaceted nature of prevention will ensure the harmonization of the high school students' "I-social" by reducing the impact of spontaneous factors of cyber reality, which young men and women face every day, being uncontrollably in virtual social networks due to their unstable "I-virtual" and strengthening the positive opportunities of the virtual space and strengths personalities of future graduates of the general secondary education institution.

## Literature Review and Theoretical Framework

The theoretical justification of the program, the effectiveness of which has been proven experimentally and presented in this article, became possible thanks to the scientific work of social pedagogues, psychologists, and specialists in the social sphere. Bartkiv et al. (2016), Lanier (2010), Makhnii, Ryzhanova, and others made a significant contribution to the development of theoretical aspects regarding the social situation of youth development in the conditions of the information society. The general features of dependence on virtual social networks as a type of Internet addiction are reflected in the works of Griffiths (2013; 2016), Hussain and Pontes (2018), Kaminska and Kuss (2013; 2016), Orzack et al. (2013), Shorter (2013), Young (2000) and others. The specifics of the influence of social factors on the formation of dependence of high school students on virtual social networks are summarized in the publications of Procentese et al. (2019), and others. The central directions of socio-pedagogical preventive interventions, which allowed a systematic approach to the solution of this social problem, were selected in accordance with the systematic analysis of modern foreign and domestic experience in the prevention of addiction to virtual social networks in school, which were published earlier (Ryzhanova & Potomkina, 2021). Justification of the basic principles of socio-pedagogical activity and its technology of influence on the young generation, presented in the scientific studios of Bezpalko, Halahuzova, Kapska, Karaman, Maksymovska, Ryzhanova, Savchenko, Stepanenko, Tadaieva, Zvierieva, and others (Potomkina, 2023), were applied to determine the main principles, functions, and tasks of the relevant preventive activities.

## The Aim and Tasks

The purpose of the article is to confirm the effectiveness of the developed socio-pedagogical prevention program of high school students' propensity to virtual

social networks dependence (hereinafter – Program) through its implementation in general secondary education institution.

## **Research Methodology and Methods**

### ***Methodological basis***

The methodological basis for the development of the socio-pedagogical prevention program in general secondary education institution of high school students' propensity to virtual social networks' dependence and further harmonization of the socialization of young people in modern conditions both offline and on the Internet became defined and theoretically grounded approaches to this process, which are: a multi-level approach that combines the efforts of social professionals and educators, parents, the community, etc. in order to prevent dependence; spiritual and creative development, in improving the informational culture of high school students, as well as in stimulating their subjectivity; active use of virtual tools and diversification of the educational process with interesting activities (for details, see the article: Ryzhanova et al., 2021, pp. 157–158).

### ***Analysis methods***

In the course of the research, theoretical and empirical research methods were applied. Methods of analysis and synthesis, correlation, and generalization of scientific facts were used to identify and determine the indicators of the high schoolers' propensity to virtual social networks' dependence, which were targeted by the program of socio-pedagogical prevention. The programming method is for the forming of socio-pedagogical prevention program in general secondary education institution; pedagogical observation, conversation and testing made it possible to identify and certify the level of youth' propensity to dependence. The above-mentioned experimental research, which was conducted on the grounds of the consents given by the respondents to the processing of their personal data, was, among other things, regulated by ethical agreements executed with the relevant educational institutions.

### ***Population and Sampling***

The total number of participants in the experiment was 964: 916 students, of which there were 460 persons in the general control group (CG), and 456 persons in the experimental group (EG), 48 were found to be addicted, requiring correction. The subjects of the realization of the socio-pedagogical prevention program were representatives of real internal (social pedagogues – 6, practical psychologists – 4, medical workers – 4, computer science teachers – 6, biology teachers – 3, librarians – 5) and external (juvenile prevention inspectors – 2, cyber police representatives – 2) social environment.

## *Practical basis*

The practical basis for the experiment was six schools of the Kharkiv City Council of the Industrial District: Kharkiv General Education School of I-III Degrees No.70, Kharkiv Specialized School of I-III Degrees No.85, Kharkiv General Education School of I-III Degrees No.88 named after O.G. Zubareva, Kharkiv general education school of I-III degrees No.113, Kharkiv specialized school of I-III degrees No.119, Kharkiv specialized school of I-III degrees No.155. The specified educational institutions are state-owned, do not differ in terms of local and regional parameters and have the same educational degrees. The ninth and senior (10-11) grades of education were selected: school No.70 (184 students), No. 85 (198 students), No.8 (108 students), No.113 (114 students), No.119 (194 students), No. 155 (118 students). The total number of participants in the experiment was 916 students, of which there were 460 in the general control group (KG70 – 94 persons, KG85 – 100 persons, KG88 – 54 persons, KG113 – 58 persons, KG119 – 96 persons, KG155 – 58 persons), the experimental group (EG) – 456 (EG70 – 90 persons, EG85 – 98 persons, EG88 – 54 persons, EG113 – 56 persons, EG119 – 98 persons, EG155 – 60 persons).

## *Instrument*

For diagnosis was selected and used a standardized and modified diagnostic tests, the effectiveness of individual methods of which was proven and tested in the dissertation research of Turetska (2011, pp. 49–50). The application of the selected methods (see Table 1) reflects the essence of the criteria and indicators of the Programs' efficacy, as well as senior students' psycho-age and social features.

**Table 1**

### *The Application of the Selected Methods*

<b>Criterion</b>	<b>Methodology of assessment</b>
Cognitive	«Methodology for determining the clarity of self-concept by T. Campbell (adapted by I. Shemelyuk)»; «Media literacy» test. Questionnaire «Perception of the Internet» by E. Shchepilina. Integral indicators on the scales:
Motivational and valuable	«Test of meaningful life orientations». perception of the Internet as a projective reality; perception of the Internet as better compared to
Emotional and strong-willed	SAQ (Self-Assessment Questionnaire) by V. Stolin and S. Pan-teleev. real life; lack of purposefulness of behavior.
Behavioral	Observation.

## *Timeframe*

Research and experimental work were carried out from August 2020 to June 2021 as part of the educational process in Kharkiv schools.

## *Procedure and organization*

The implementation of the Program was in three meaningful stages, according with the set goal, tasks, directions that take into account the specifics of socio-pedagogical activity.

The whole process began with the preparation of its representatives for the specified activity: 1) pedagogization of the external and internal (real and virtual) environment of the general secondary education institution for the socio-pedagogical prevention of the high school students' propensity to virtual social networks dependence (a cycle of short meetings and online briefings with agents of the external real and virtual environment; round table discussion "Real life or virtual reality"; open debates "Cyberspace" and the consequences of spontaneous immersion in it"; seminar and workshop "School as a mediator to a safe cyberspace"; general education "How to find a way out of the Web"; video lecture "On the other side of the screen, on the other side of the border", etc.). The result of the stage assumption was the establishment of activities coordination: a multidisciplinary team and its methodical support for the organization of socio-pedagogical prevention of high schoolers' tendency; a safe virtual platform of socio-pedagogical guidance for high school students and their environment; 2) stimulation of self-prevention of the high school students' propensity (supervision of distance learning of scholars on educational portals for relevant online courses; a series of thematic challenges on Instagram "First love", "One day in my family", "15 pages every day"; methodical meeting-workshop with teachers "Interactive learning as a component of the prevention system" legal educational marathon "The rights of boys and girls in the real and virtual world", etc.). The effectiveness of this stage was recorded in both quantitative and qualitative indicators of the decreased propensity of senior students (adequate knowledge was formed about the threats of relationships in cyber structures and the consequences of the representation in virtual social networks (VSN) of the "I-virtual" different from the "I-real" for the construction of "I-social"; a positive attitude towards the "I-real" and motivation for harmonious self-realization in both real and virtual social environments are established); 3) social hardening of the lack of youth' tendency in the external school environment (video festival "Real and virtual: invisible connections"; selfie contest "Frontal view of school life"; training cycles; manifesto of virtual communication "School cyber etiquette in action" and etc.), as a manifestation of the conscious social activity of youth head with a low level of inclination to promote the value of self-realization in a real social environment, which is accompanied by a competent command of the latest means of communication without losing awareness of the value of real life. The general result

of the systems' efficacy was a decrease in the quantity of youthful tendency due to the achievement of a harmonious state of their "I-social", the self-presentation of the "I-real" and "I-virtual", which coincide both in reality vs. virtuality.

Speeches at pedagogical meetings, methodical meetings, round tables, meetings, conferences, open debates, etc. for potential subjects of socio-pedagogical prevention made it possible to actualize the social threat of the outlined problem. The methodical provision of the leading and potential subjects of the prevention program with the necessary knowledge, practice of relevant practical skills, and general improvement of their informational competence took place due to the direct inclusion in the work of a seminar-workshop, didactic training, systematic completion of online courses, and comprehensive training on open educational platforms. A demonstrative result of achieving the desired result of this stage was the creation of a special socio-pedagogical program, the organization of which allowed to further coordinate and regulate the process of prevention of the adolescents' tendency to become addicted to VSN in the internal and external (equally real and virtual) environment of general secondary education institution, as well as to coordinate activities of relevant social agents. The execution of the stage of stimulating self-prevention of the youths' tendency involved: organizational and educational prevention of information and knowledge vacuum (online educational courses, press conference, legal marathon, round table, web quests, interactive conversations, newsletters, etc.); prevention of schoolers' involvement in virtual communication (training classes, interactive debates, promotions, etc.), promotion of self-prevention of high schoolers' propensity to dependence to virtual social networks (challenges, selfie-photo contest, virtual excursions, intra-school quest, advent calendar, video marathon, etc.). Social hardening of the lack of propensity to dependence in the external school environment succeeded in the process of participation of sample with a reduced propensity in intra-school events initiated in other educational institutions of the district, as well as in some virtual actions in the external environment (challenges, club activities, watching and discussion of films in open cyberspace, etc.), which contributed to the consolidation and development of social activity and responsibility, and also promoted the value of real communication and direct social interaction. As a result, interactive forms of virtual interaction (challenges, multimedia presentations, web quests, interaction through an Instagram account) and creative types of joint activities, during which a variety of media content was used (text, photos, videos, films, infographics).

### *Research access*

Mixed methods were used to evaluate the results of the presented research in this article: quantitative to confirm statistical effectiveness and qualitative to confirm qualitative changes in representatives of the control group.

## Research Results

In order to address the epidemic situation regarding COVID-19 in the regions of Ukraine and the transition to distance and mixed learning of juvenility during the research and experimental work, it was necessary to change the sequence some forms of activity and even postpone a number of preventive measures in the external school environment. Despite the additional difficulties in implementing the preventive program in quarantine conditions, we fully engrained all the tasks set.

Repeated monitoring of the level of high school students' propensity to VSN' dependence at the control stage of the study, which was carried out using methods of quantitative and qualitative analysis of the Program results, confirmed the positive dynamics of all criteria and indicators of the studied phenomenon (Ryzhanova & Potomkina, 2021, pp. 51–55).

Quantitative and qualitative analysis of the effectiveness of the system took place through diagnosis and included observation of representatives of the internal (real and virtual) environment of the selected schools (social pedagogues, heads of senior classes, subject teachers, etc.). Pedagogical staff of general secondary education institutions are convinced that it is necessary for high schoolers: it is expedient to combine ICT tools and other innovative technologies to create conditions for independent development and self-realization of students as active participants in their own lives and the life of the school; to establish an atmosphere of mutual respect, dignity, and justice in each classroom; to unite the efforts of the family, school, and the public in the teaching of adolescents, take into account their individual abilities and interests. This lays the foundation of social subjectivity, aids in developing the ability to independently analyze the phenomena and processes occurring in the surrounding social reality, as well as determine one's place in them.

In order to compare the E and C groups of general secondary education institutions with each other and determine whether they are approximately equal according to all criteria, the value of the Temp criterion for all groups was determined according to Formula 1. The accomplished results are given in Table 2.

Upon reviewing the data in below Tab. 2, it was confirmed that the all groups satisfy the condition of non-dissimilarity of the two populations  $T_{emp} < T_{tabl}$ . Thus, using the Pearsons' test (criterion  $\chi^2$ ), implies that the initial conditions across all groups are comparable. The results of the calculations shown in Table 2 indicate insignificant statistical differences between the C and E groups at the beginning of the experiment. The values of  $\chi^2$  do not exceed the value of 0.73, i.e., all the given results are less than the Pearson critical value (the critical value of  $\chi^2$  at  $k = 2$  for the significance level  $\alpha = 0.05$   $T_{tabl} = 5.99$ ), which means approximately the same level of formed sampling at the experiment's outset.



**Table 2***Comparison of Experimental and Control Groups: Initial Pearson's Test Results*

Criterion	$T_{emp}$							$T_{tab}$
	EG70-CG70	EG85-CG85	EG88-CG88	EG113-CG113	EG119-CG119	EG155-CG155	EG-CG	
Cognitive	0.014	0.074	0.072	0.030	0.027	0.670	0.294	
Motivational-value criterion	0.015	0.028	0.097	0.039	0.730	0.051	0.305	
Emotional-volitional criterion	0.029	0.257	0.234	0.436	0.407	0.121	0.256	5.99
Behavioral	0.020	0.504	0.347	0.380	0.187	0.006	0.045	
Generalized data for all criteria	0.030	0.043	0.133	0.003	0.229	0.094	0.150	

The comparison of EG and CG using the Pearson criterion (criterion  $\chi^2$ ) indicates insignificant statistical differences between both groups, which establishes the fact of their homogeneity. We will analyze the positive changes across each criterion for both general groups, comparing the data from the start and the conclusion of the study.

The following Tables 3–6 summarize the relevant data that presents positive developments of the senior students' propensity to VSN' dependence pursuant to the cognitive (Table 3), the motivational-value (Table 4), the emotional-volitional (Table 5) and the behavioral (Table 6) criteria's in EG and CG before and after the research.

**Table 3***The Dynamics of High School Students' Propensity to VSN' Dependence: Cognitive Criterion (E vs. C group)*

Levels	in the initial phase of the experiment				in the post-experimental phase			
	EG		CG		EG		CG	
	persons	%	persons	%	persons	%	persons	%
High	72	15.8	75	16.3	59	12.9	71	15.4
Average	317	69.5	323	70.2	209	45.8	315	68.5
Low	67	14.7	62	13.5	188	41.3	74	16.1
In total	456	100	460	100	456	100	460	100

As shown in the table, at the outset, the data for the low level of high schoolers' propensity to VSN' dependence almost did not differ 14.7% and 13.5%, and upon completion in EG there were significant shifts (41.3%), and in CG – almost unchanged (16.1%):

- in the EG  $\Delta = 26.6\%$  (reduction in the sample with an average level  $\Delta = 23.7\%$ , a high level  $\Delta = 2.9\%$ );

- in the CG  $\Delta = 2.6\%$  ( $\Delta = 1.7\%$ ,  $\Delta = 0.9\%$ ).

Having diagnosed the motivational-value criterion of the propensity, we can say that the data of CG and EG have also changed: before the intervention, 46.1% of the sample showed a high level in EG, after – 31.6% have a high-level propensity to VSN' dependence. The CG data almost did not change: at the initial stage, 47.0% with a high level, at the final phase – 46.1%.

**Table 4**

*The Dynamics of High School Students' Propensity to VSN' Dependence: Motivational-Value Criterion (E vs. C group)*

Levels	in the initial phase of the experiment				in the post-experimental phase			
	EG		CG		EG		CG	
	persons	%	persons	%	persons	%	persons	%
High	210	46.1	216	47.0	144	31.6	212	46.1
Average	185	40.6	188	40.9	132	28.9	179	38.9
Low	61	13.3	56	12.1	180	39.5	69	15.0
In total	456	100	460	100	456	100	460	100

*Note.* Quantitative changes aster the experiment: in the EG  $\Delta = 26.2\%$  ( $\Delta = 11.7\%$ ,  $\Delta = 14.5\%$ ); in the CG  $\Delta = 2.9\%$  ( $\Delta = 2.0\%$ ,  $\Delta = 0.9\%$ ).

**Table 5**

*The Dynamics of High School Students' Propensity to VSN' Dependence: Emotional-Volitional Criterion (E vs. C group)*

Levels	in the initial phase of the experiment				in the post-experimental phase			
	EG		CG		EG		CG	
	persons	%	persons	%	persons	%	persons	%
High	309	67.8	311	67.6	179	39.3	306	66.5
Average	118	25.9	123	26.7	92	20.2	117	25.4
Low	29	6.3	26	5.7	185	40.5	37	8.1
In total	456	100	460	100	456	100	460	100

*Note.* In the EG  $\Delta = 34.2\%$  ( $\Delta = 5.7\%$ ,  $\Delta = 28.5\%$ ); in the CG  $\Delta = 2.4\%$  ( $\Delta = 1.3\%$ ,  $\Delta = 1.1\%$ ).

**Table 6**

*The Dynamics of High School Students' Propensity to VSN' Dependence: Behavioral Criterion (E vs. C group)*

Levels	in the initial phase of the experiment				in the post-experimental phase			
	EG		CG		EG		CG	
	persons	%	persons	%	persons	%	persons	%
High	302	66.2	306	66.5	225	49.3	302	65.7
Average	138	30.3	139	30.2	106	23.2	131	28.5
Low	16	3.5	15	3.3	125	27.5	27	5.8
In total	456	100	460	100	456	100	460	100

Note. In the EG  $\Delta = 24.0\%$  ( $\Delta = 7.1\%$ ,  $\Delta = 16.9\%$ ); in the CG  $\Delta = 2.5\%$  ( $\Delta = 1.7\%$ ,  $\Delta = 0.8\%$ ).

**Table 7**

*The Generalized Data Across all Criteria (E vs. C group)*

Levels	in the initial phase of the experiment				in the post-experimental phase			
	EG		CG		EG		CG	
	persons	%	persons	%	persons	%	persons	%
High	223	48.9	227	49.3	152	33.3	223	48.5
Average	190	41.7	193	42.0	135	29.6	186	40.4
Low	43	9.4	40	8.7	169	37.1	51	11.1
In total	456	100	460	100	456	100	460	100

Note. In the EG  $\Delta = 27.7\%$  ( $\Delta = 12.1\%$ ,  $\Delta = 15.6\%$ ); in the CG  $\Delta = 2.4\%$  ( $\Delta = 1.6\%$ ,  $\Delta = 0.8\%$ ).

Based on the results presented in Table 7, it can be concluded that the number of senior students exhibiting a reduced tendency by the generalized data across all criteria has increased. The examination of the experiment was conducted with consideration of the formative stage outcomes. To correlate the empirical data, an analysis was performed for each criterion was carried out and the statistical probability of the study results based on the  $\chi^2$  criterion (see Table 8) was checked using the formula 1 presented above.

**Table 8***Analysis of EG-CGs: Pearson's Test Results Post-Experiment*

Criterion	$T_{emp}$							$T_{tab}$
	EG70- CG70	EG85- CG85	EG88- CG88	EG113- CG113	EG119- CG119	EG155- CG155	EG- CG	
Cognitive	11.96	16.78	9.87	7.73	14.66	12.15	72.14	
Motivational- value criterion	14.38	10.08	8.39	6.09	15.47	17.76	69.56	
Emotional-volitional criterion	22.31	21.56	23.44	18.17	29.76	21.76	134.90	5.99
Behavioral	10.55	10.53	19.00	10.28	15.08	14.77	77.06	
Generalized data for all criteria	12.79	14.32	15.71	10.49	16.92	16.99	84.82	

The results obtained after the implementation of pedagogical conditions to reduce the level of high school students' inclination became an indicator of significant changes in empirical frequencies for the EGs in comparison with the CGs. Thus, the value of the criterion  $\chi^2$  for both groups exceeds  $69.56 > 5.99$ . Therefore, the  $H_1$  hypothesis is rejected and the  $H_0$  hypothesis is accepted, according to which the empirical distributions of the development levels after conducting the intervention study differ from each other and are caused by the influence of the investigative factor.

To check the efficiency of the research, the method of comparing average values and the Student's criterion was also applied. Student's coefficient for two populations (initial and final) with different variances and is calculated by the formula (Kushlyk-Dyvulska et al., 2014, p.78, 137-142).

**Formula 1***The method for comparing average values: the Student's t-test*

$$t_{emp} = \frac{\bar{x}_2 - \bar{x}_1}{\sqrt{S_1^2/n_1 + S_2^2/n_2}}$$

where  $n_1$  and  $n_2$  are the volume of aggregates.

When choosing the confidence probability of not making an error  $\alpha$ , the obtained coefficient is compared with the critical (table) Student's t-value coefficient  $t_\alpha$  for a given number of degrees of freedom  $k$  ( $k = n - 1$ ). The statistical probability of the hypothesis is confirmed with this probability if the obtained Student's coefficient is not less than the table one.

The null hypothesis, which predicts that the means in two populations are equal, is rejected if  $t_{emp} > t_{\alpha}$ , for a significance level of  $\alpha$ . In this case, an alternative hypothesis is accepted about a reliable distinction amid the averages in the two considered populations, that is, a conclusion is made about the effectiveness of the intervention impact.

The results of calculating the dynamics of the indicators of the E and C groups in consonance to the Student's criterion are shown in Tables 9 and 10, respectively.

The probability of changes in all indicators for the experimental groups is confirmed with a fairly high probability of 96.1 – 99.9%. Conversely, for the CGs, changes in all indicators had a probability of 57.7 – 94.8%.

**Table 9**

*Analysis of EG Indicators Across General Secondary Education Institutions: the Student's T-Test*

Criterion	$T_{emp}$							$T_{tab}$
	EG70	EG85	EG88	EG113	EG119	EG155	EG	
Cognitive	6.01	6.07	4.93	5.10	6.23	5.03	13.76	
Motivational-value criterion	8.70	8.67	6.58	6.97	8.67	9.49	18.62	
Emotional-volitional criterion	11.04	11.61	11.74	9.57	12.11	12.74	27.67	4.30
Behavioral	7.01	7.18	9.88	6.19	7.18	7.19	17.70	
Generalized data for all criteria	7.88	8.01	7.84	6.66	7.84	7.94	18.60	

**Table 10**

*Study of the Dynamics of CGs' Indicators: the Student's t-test*

Criterion	$T_{emp}$							$T_{tab}$
	CG70	CG85	CG88	CG113	CG119	CG155	CG	
Cognitive	2.03	1.00	1.00	2.05	1.75	1.76	4.07	
Motivational-value criterion	1.75	2.03	1.00	2.05	2.03	1.00	4.20	
Emotional-volitional criterion	1.75	1.75	1.00	1.76	1.75	1.76	4.07	4.30
Behavioral	2.03	1.75	1.77	1.43	1.75	1.00	4.07	
Generalized data for all criteria	2.03	1.75	1.00	1.43	1.75	1.00	3.93	

After we are convinced of the reliability of the changes in the experimental groups after the experiment, we will conduct a correlation analysis of positive changes according to all criteria between the general EG and all other groups.

To assess the degree of dependence of two values on each other (in our case, positive changes in groups according to all criteria), it is necessary to determine the correlation coefficients between these changes. Evaluation of the mutual influence of the criteria on each other can be performed by the deviation of the obtained values from their average values:

### Formula 2

*The deviation of the obtained values from their average values*

$$(x_{1i} - \bar{x}_1), (x_{2i} - \bar{x}_2) \quad (i = 1, 2, \dots, n).$$

However, the comparison of these values for all values of arrays  $X_1$  and  $X_2$  will be correct only in relative units. To convert the initial data to this type, it is necessary to normalize the values by their mean square deviations:

### Formula 3

*Normalizing the values by their mean square deviations*

$$\tilde{x}_1 = \frac{x_{1i} - \bar{x}_1}{\sigma_{x1}}, \tilde{x}_2 = \frac{x_{2i} - \bar{x}_2}{\sigma_{x2}},$$

where

### Formula 4

$$\sigma_{x1} = \sqrt{\frac{\sum_{i=1}^n (x_{1i} - \bar{x}_1)^2}{n}}; \sigma_{x2} = \sqrt{\frac{\sum_{i=1}^n (x_{2i} - \bar{x}_2)^2}{n}};$$

The correlation coefficient is the average value of the sum of normalized deviations:

### Formula 5

*The correlation coefficient*

$$r = (\tilde{x}_{1i} \cdot \tilde{x}_{2i}) = \frac{\sum_{i=1}^n \tilde{x}_{1i} \cdot \tilde{x}_{2i}}{n} = \sum_{i=1}^n \frac{(x_{1i} - \bar{x}_1)^2}{\sigma_{x1}} \cdot \frac{(x_{2i} - \bar{x}_2)^2}{\sigma_{x2}} \cdot \frac{1}{n}.$$

If you make some changes in this formula, you will get a dependence that is more suitable for calculations:

### Formula 6

*The dependence of the correlation coefficient*

$$r = \frac{n \cdot \sum_{i=1}^n x_{1i} \cdot x_{2i} - \sum_{i=1}^n x_{1i} \cdot \sum_{i=1}^n x_{2i}}{\sqrt{n \cdot \sum_{i=1}^n x_{2i}^2 - (\sum_{i=1}^n x_{2i})^2} \cdot \sqrt{n \cdot \sum_{i=1}^n x_{1i}^2 - (\sum_{i=1}^n x_{1i})^2}}$$

If the relationship between the signs is close to a linear functional one, then the correlation coefficient is equal to one ( $r = \pm 1$ ). If the connection does not exist at all, then  $r = 0$ . It is considered that for  $r \leq 0.6$  - the connection is weak, for  $0.6 < r < 0.9$  - the connection is strong, and for  $r \geq 0.9$  - very strong.

We summarize the calculated correlation coefficients in Table 11.

**Table 11**

*Correlation Coefficients of Positive Changes EG-CG*

EG-EG70	EG-EG85	EG-EG88	EG-EG113	EG-EG119	EG-EG155
0.998	0.999	0.985	0.999	0.999	0.994
EG-CG70	EG-CG85	EG-CG88	EG-CG113	EG-CG119	EG-CG155
0.537	0.037	0.537	0.312	0.078	0.512

Analyzing the obtained results in Table 11, we can draw the following conclusion: the relationship between positive changes in the EG and CG is weak. At the same time, the relationship between positive changes in the test groups is very strong. This conclusion once again confirms the positive influence and effectiveness of the developed Program, especially for experimental groups.

## The Analysis and Discussion

The implementation of the Program as an algorithm for the implementation of the corresponding system took place in three meaningful stages in accordance with the set goal, tasks, directions that take into account the specifics of social-pedagogical activity, namely: external and internal pedagogy (real and virtual) environment of school for socio-pedagogical prevention of high schoolers' propensity to dependence on VSN, stimulation of self-prevention of propensity, and social hardening of lack of propensity to dependence through the participation of seniors with a low level of propensity. The

leading activity at the first stage was focused on the preparation and methodical provision of leading and potential subjects of the prevention program with the necessary knowledge, practice of relevant practical skills and general improvement of their informational competence due to the direct inclusion in the work of a seminar-workshop, didactic training, systematic online courses, and comprehensive courses on open educational platforms, etc. The multidisciplinary team created at this stage provided the possibility of further coordination and regulation of the process of socio-pedagogical prevention of the high schoolers' predisposition in the internal and external (equally real and virtual) environment of school, as well as the coordination of the activities of social agents of the external (real and virtual) school environment. At the stage of "stimulation of self-prevention" organizational and educational prevention of information and knowledge vacuum was carried out (through educational online courses, press conferences, legal marathon, round table, web quests, interactive conversations, newsletters, etc.); prevention of high school students' involvement in virtual communication (training classes, interactive debates, promotions, etc.), promotion of self-prevention of high school students' tendency (challenges, selfie-photo contest, virtual excursions, intra-school quest, advent calendar, video marathon, etc.). The final stage of social hardening of the lack of inclination was carried out in the process of participation of high school students with a low level of inclination in intra-school activities, as well as in some virtual actions in the external environment (challenges, club activities, watching and discussing films in open cyberspace, etc.), which contributed to the consolidation and expansion of social activity and responsibility, and promoted the value of real communication and direct social interaction.

The obtained results of the ascertainment stage of the experiment made it possible to record the real state of the level of high school students' tendency: in CG 49.3% of youth are increased, 42.0% are average, and 8.7% are low; in EG – 48.9% – high, 41.7% – average, and 9.4% – low. Statistical data for each criterion testify to the highest indicators of the levels of inclination according to the emotional-volitional (at a high level in CG 67.6%, in EG 67.8%) and behavioral criteria (at a high level in CG 66.5%, in EG 66.2%).

The preventive program proposed in the study, represents a comprehensive approach of solving the stated problem of high schoolers' inclination to VSN' dependence. The programs presented in previous studies and the analysis of extensive foreign experience (the link to the analytical publication is in the article above) provided the basis for the creation of this system, but the available experience of the predecessors does not cover such a multi-level approach as proposed in our study. In addition, the programs taken as a methodological basis are designed to solve the issue of correction of an already acquired state of addiction. As for our research, we have proposed a program for identifying young people's propensity to become depended on virtual social networks and their timely prevention due to multicomponent influence. As a



result, in our study we did not include a comparison of quantitative indicators of the obtained results. We consider the thought, that it is better to take measures to prevent a negative phenomenon than to deal with the consequences of its manifestation later.

Quantitative analysis of the study results, regarding the Program's provision, allows us to state that the statistical significance of the differences among both groups (EG vs. CG) is observed after the experiment. Control groups with detected levels of propensity underwent minor changes after the experiment, while the experimental group showed significant changes in the final phase of the study. Thus, the conclusions from the quantitative evaluation of the results allow us to state the effectiveness of the socio-pedagogical prevention program.

It was established that the developed criteria and indicators of the tendency of high school students to depend on VSN (cognitive, emotional-value, motivational-volitional and behavioral) provide a different information base regarding the respondents, which allows for a comprehensive assessment of the level of manifestation of their inclination.

Therefore, the quantitative and qualitative analysis of the experiment's findings on the levels of tendency to VSN' dependence among high school students indicates positive gains, which is confirmed by the dynamics of changes in the criteria, which gives grounds to assert the effectiveness of the Program.

In order to quantitatively confirm the effectiveness of the implemented system of socio-pedagogical prevention, we state consequences of the control stage of the research: in EG, the high level of propensity to virtual social networks' dependence decreased by 15.6%, and the average – by 12.2%, the low-level indicators increased by 27.7%; there were no significant changes in CG (general dynamic  $\Delta = 2.4\%$ , an average level  $\Delta = 1.6\%$ , a high level  $\Delta = 0.8\%$ ). Thus, it is possible to prove the effectiveness of the developed socio-pedagogical prevention system in school on the students' propensity to VSN' dependence and the implemented program, which is confirmed by statistical data regarding the decrease in the extent of predisposition in the EG.

## Recommendations

The conducted research does not exhaust all aspects of the considered problem of youth' propensity to virtual social networks' dependence and its final solution through socio-pedagogical prevention at school. Further development is required for research into the specifics of socio-pedagogical prevention of the tendency of primary and elementary school students to become addicted to virtual social networks, as well as conducting relevant research by gender.

## Conclusion

The article represents the outcomes of the implementation of the social and pedagogical prevention program of schoolers' propensity to virtual social networks' dependence. The basis of the program is an appropriate system of prevention, which was developed through the prism of the socio-educational paradigm of social pedagogy. The choice of a socio-pedagogical paradigm is due to the need to include an environmental component (both real and virtual) to influence youth representatives and their active inclusion during implementing the Program. Previous theoretical research and in-depth analysis of the correctional experience of foreign countries in solving the problem of addiction made it possible to formulate a unique program for the prevention of dependence on virtual social media at the stage of identifying indicators of predisposition among young people.

The initial assessment revealed a high level of propensity to dependence in both the CG and EG, with over 48% of students showing a strong inclination toward dependence.

The socio-pedagogical prevention program aimed at reducing adolescents' tendency on virtual social networks' dependence has been implemented in three practical stages (preparation, stimulation of self-prevention, and social hardening – the program successfully engaged schoolers in real and virtual environments, promoting self-prevention and enhancing social responsibility) and has demonstrated significant effectiveness and efficiency by the positive dynamics in the indicators of the levels of their inclination through both qualitative and quantitative results.

Socio-psychological features of youth determined the choice of an interactive forms of virtual interaction (challenges, virtual excursions, informational messages in the form of multimedia presentations, web quests, interaction through a public account on the Instagram network) and creative types of joint activities, during which various types of media content (text, photos, videos, films, infographics) were applied. During the entire process of implementing the program, these forms and methods demonstrated the highest efficiency and involvement of the system's subjects.

After the intervention, significant improvements were observed in the EG. The high level of dependence decreased by 15.6%, while the low level increased by 27.7%. In contrast, the control group showed only minimal changes.

These results demonstrate that the program's criteria (cognitive, emotional-value, motivational-volitional, and behavioral) and indicators formed accordingly by three levels (low, medium, high) – provided comprehensive insights into high schoolers' propensity, enabling targeted interventions. The combination of quantitative data and qualitative analysis emphasizes the success of the socio-pedagogical preventive program in reducing the propensity of high school students' dependence to virtual social networks, confirming its effectiveness in fostering healthier social habits and, as a result, a harmonized process of youth socialization which is necessary for human survival at all.

### ***Conflict-of-Interest Statement***

The authors declare that they have no conflict of interest.

### ***Ethical Approval***

The above-mentioned experimental research, conducted with the respondents' consents for processing their personal data, was also regulated by ethical agreements executed with the relevant educational institutions.

### ***Author Contributions***

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Ryzhanova Alla, and Potomkina Nanuli. The first draft of the manuscript was written by Potomkina Nanuli and other author Ryzhanova Alla commented on previous versions of the manuscript. Both authors read and approved the final manuscript.

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# Vidurinės mokyklos mokinių polinkio į priklausomybę nuo virtualių socialinių tinklų socialinė-pedagoginė programa: programos įgyvendinimo rezultatai

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## Santrauka

Straipsnyje pateikiami įgyvendintos socialinės-pedagoginės prevencijos programos rezultatai. Programa buvo skirta vidurinių mokyklų moksleivių polinkiui į priklausomybę nuo virtualių socialinių tinklų (angl. VSN) nustatyti. Ši programa yra pagrįsta gerai struktūrizuota prevencijos sistema bei sukurta atsižvelgiant į socialinės pedagogikos socioedukacinę paradigmą. Jos veiksmingumui įvertinti buvo pritaikyti jau patikrinti diagnostiniai testai, kurie buvo naudojami vykdant nuotolinę internetinę apklausą. Vidurinių mokyklų moksleivių polinkio į VSN programos įgyvendinimas vyko trimis pagrindiniais etapais, po kurių buvo atlikta kontrolinė diagnostika.

Eksperimento veiksmingumas buvo įrodytas mažinant vyresniųjų klasių mokinių polinkio lygį. Tai atspindėjo šie rodikliai: tinkamos žinios apie santykių kibernetinėse struktūrose grėsmes „aš-socialiojo“ vystymuisi ir žinios apie „aš-virtualiojo“ atstovavimo VST pasekmes, kurios skiriasi nuo „aš-realiojo“; teigiamas požiūris į „aš-realųjį“ ir motyvacija harmoningai savirealizacijai tiek realioje, tiek virtualioje socialinėje aplinkoje; nesidomėjimas destruktvyvia kibernetine veikla virtualiuose socialiniuose tinkluose; baimė prarasti realius santykius ir užsiimti destruktvyvia „aš-virtualiojo“ kibernetine veikla; valingos pastangos savarankiškai palikti VST; harmoningas laiko naudojimas VST „realiojo“ ir „virtualiojo“ asmenybės vystymuisi; veiksmingų savirealizacijos įgūdžių realioje socialinėje aplinkoje plėtojimas.

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**Esminiai žodžiai:** *vyresniųjų klasių mokiniai, vyresniųjų klasių mokinių polinkis, priklausomybė nuo virtualių socialinių tinklų, socialinė-pedagoginė prevencinė programa, polinkis į priklausomybę nuo virtualių tinklų, bendrojo lavinimo vidurinė mokykla.*

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