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Effectiveness of virtual space in the socialization process of teenagers (under martial law)

Ефективність віртуального простору у процесі соціалізації підлітків (в умовах воєнного стану)

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Abstract

The aim of the research is to study the impact of virtual space on adolescent socialization during the war by analysing the mechanisms of value formation, attitude to war, national identity and other aspects of socialization. The research involved such methods as expert evaluation, questionnaire survey, sociometry, correlation and regression analysis, as well as factor analysis using the maximum likelihood method. The methods of mathematical statistics were used. It was found that 75% of students use social networks every day, and 25% — several times a week. Instagram is the most popular social network among students, which is used by 65% of respondents, followed by Facebook with 30%, and TikTok with 20%. In general, the results of the study showed that the use of virtual space can have both positive and negative consequences for adolescents. These effects may include increased socialization and life satisfaction, but may also include the risk of developing bad habits and involvement in crime. It is important to conduct further research to understand the mechanisms of influence of virtual worlds on adolescent

Анотація

Мета. Дослідження впливу віртуального простору на соціалізацію підлітків у воєнний період шляхом аналізу механізмів формування цінностей, ставлення до війни, національної ідентичності та інших аспектів соціалізації. У дослідженні використано такі методи як, експертна оцінка, анкетування, соціометрія, кореляційно-регресивний аналіз та факторний аналіз методом максимальних варіантів. Також, було використано методи математичної статистики. Було встановлено, що 75% студентів використовують соціальні мережі щодня, а 25% – кілька разів на тиждень. Найбільш популярною соціальною мережею серед студентів є Instagram, яким користується 65% опитаних, на другому місці знаходиться Facebook з 30%, а на третьому місці – TikTok з 20%. Загалом, результати дослідження показали, що використання віртуального простору може мати як позитивні, так і негативні наслідки для підлітків. Ці наслідки можуть включати збільшення соціалізації та підвищення рівня задоволеності життя, але також можуть включати ризик появи

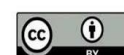
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behaviour and to develop strategies to minimize negative consequences. Future research may be aimed at analysing different types of virtual space and their impact on adolescent socialization.

Keywords: virtualization, social competences, higher education, adolescence, gamification.

Introduction

Relevance

The study of the effectiveness of virtual space in adolescent socialization under martial law is currently an urgent problem. Virtual space is an indispensable part of the life of adolescents, who actively use Internet resources and social networks to communicate and obtain information. At the same time, the martial law can significantly change the social environment for the adolescents, in particular, reduce opportunities for development and socialization. So, there is a need to study the effectiveness of using virtual space in such conditions (Bystrova et al., 2019).

It is necessary to determine the features of the impact of virtual space on the adolescents' psyche. The features of its use that are reflected in the development of social competences and the emotional sphere should also be identified. This work has great theoretical and practical potential. The study will reveal the possibilities of using virtual space for the development of adolescents' social skills, in particular cooperation, communication and interaction with other people (Varela et al., 2021).

Socialization in adolescence is a special stage in life. The basic values, attitudes towards the world and other people, interests and beliefs that will affect the further development of the personality are being formed. The increasing role of peers is one of the main features of socialization in adolescence. Adolescents begin to interact with each other more actively, thereby forming a more defining social group, which can influence their behaviour (Luchinkina & Yudeeva, 2020).

Socialization in adolescence is also characterized by changes in relations with parents and adults. Adolescents begin to actively show their autonomy and independence, which can lead to conflicts (Crespo Ramos et al., 2022). Such

шкідливих звичок та стиків зі злочинністю. Важливо проводити подальші дослідження для розуміння механізмів впливу віртуальних світів на поведінку підлітків та розробки стратегій для мінімізації негативних наслідків. Майбутні дослідження можуть бути націлені на аналіз різних видів віртуального простору та їх вплив на соціалізацію підлітків.

Keywords: віртуалізація, соціальні компетенції, вища освіта, підлітковий вік, гейміфікація.

changes can be difficult because they face problems of mutual understanding and interaction (Tatyanchikov, 2022). Besides, adolescents begin to pay more attention to their own appearance and social status, which can affect their attitude to themselves and to other people. These values translated in a social group can entail negative consequences, such as violence, bullying, mental problems, and others (Pavlyk, 2022).

Virtual space is a new environment that affects the adolescents' socialization. Its main feature is providing the opportunity to interact with other people, while being different from traditional forms of interaction (Gómez-Ortiz et al., 2018). First of all, it enables adolescents to interact with the world without leaving home. They can access large volumes of information and resources for a variety of tasks (Ishchenko et al., 2022). Besides, virtual space enables adolescents to come into contact with people from different countries, and communicate with them on different topics (Boccio & Leal, 2023).

Virtual space also has, however, its drawbacks. For example, adolescents may face the lack of non-verbal cues, such as facial expressions and gestures commonly used in traditional interaction. The adolescents may encounter privacy and security issues in the virtual space because of virtual espionage and surveillance of users (Leal et al., 2022).

Unexplored issues

Previous studies provide an insight into the impact of virtual space on the adolescents' socialization, but there are several unexplored issues that can be the subject of further research. The first unexplored issue is the impact of virtual space on the formation of values, attitudes towards war and national identity among adolescents. It is important, as it can highly

impact moral and ethical principles of young people, which will determine their behaviour in the future. Another unexplored issue is the relationship between virtual communication and empathy of adolescents. This issue is important for understanding the impact of the virtual environment on the development of social skills and emotional intelligence in young people. The third unexplored issue is the role of virtual space in providing social support to adolescents experiencing stressful situations during martial law. It is important because it opens up new opportunities for creating online communities that provide support and help in difficult situations.

Aim

The aim of the research is to study the impact of virtual space on the adolescents' socialization under martial law by analysing mechanisms of values, attitude to war, national identity, and other aspects of socialization.

Objectives/questions

1. Study the impact of Internet communication on the formation of adolescents' attitudes towards war during a military conflict.
2. Analyse the mechanisms of influence of virtual space on adolescents' national identity during martial law.
3. Study the influence of social networks on adolescents' empathy in adolescents who experience stressful situations during a military conflict.

Literature review

The issue of socialization in virtual space is becoming increasingly popular. The researchers focus on the impact of social networks on socialization and personality development in the digital age. Virtual space has become an important source of information and communication for many young people, and it can influence their social behaviour.

Lian et al., (2020) found that cell phone addiction among Chinese adolescents was driven by a desire to seclude themselves because of psychological stress. The authors found that reflection is a mediating variable between mobile phone addiction and psychological stress. This study confirms the importance of the mediating role between personal factors and the psychological implications of mobile phone addiction.

Malander (2019) examines the relationship between technology-dependent children their perceptions of parenting practices. The author explores different types of technological dependence and their relationship to the children's perception of parenting. Research showed that those parents who regulate the use of technology have less addicted children.

Malo-Cerrato et al., (2018) studied the psychosocial profile of Spanish adolescents with a pathological addiction to social networks. The article describes in detail the dynamics of the use of social networks, its impact on the attitude towards oneself and other people, as well as on the mood. The study showed that adolescents addicted to social networks have feelings of loneliness, fear and anxiety more often.

Martínez et al., (2019) dealt with the influence of parenting methods on the likelihood of traditional bullying and cyberbullying among children and adolescents. The study found that children who receive protection from their parents are less likely to be victims of traditional bullying and cyberbullying. On the contrary, parents who are excessively restrictive of their children's Internet use can produce a negative effect, increasing the likelihood of child's feeling stigmatized on social networks.

Mengyun et al., (2021) identified a relationship between perceptions of parental conflict and problematic social media use among Chinese adolescents. The researchers found that self-esteem and maladaptive cognitive processes played a mediating role in this process.

Steinsbekk et al., (2021) studied the relationship between social media use and self-assessment of the appearance from childhood to adolescence. Research found that frequent use of social media has a negative effect on self-esteem in adolescence, especially among girls.

Verheijen et al., (2021) described the relationship between adolescent use of video games and aggression. They found that adolescents who were abused as children are more vulnerable to the effects of violent video games, and are more prone to aggressive behaviour.

Villanueva-Blasco and Serrano-Bernal (2019) study the relationship between the pattern of Internet use, parental control in social networks, and the use of sexting among adolescents. The article examines this relationship in the context of gender differences.

Onoi et al., (2019) examined the role of active tourism in the adolescents' socialization. The study shows the relationship between various forms of active tourism and social adaptation of adolescents.

Du et al., (2021) studied the relationship between games, communication and control mechanisms in virtual environments among children and adolescents. The results of the study indicate that some games can have a positive effect on the development of social and cognitive skills in children and adolescents.

Methods

Research design

The research consists of the following stages:

1. *Research planning (May-June 2022)*: The first stage involved determining research objectives and advancing the hypothesis to be tested. The methods of data collection and analysis were determined, and sampling criteria were established.
2. *Data collection and analysis (September-December 2022)*: The next stage was data collection and analysis. The methods of data collection such as questionnaire survey, observations, and testing were used at this stage. Statistical analysis, content analysis and others were used for data analysis. The respondents were distributed into two groups — Control and Experimental — at this stage with the help of expert analysis of the results of the questionnaire survey.
3. *Drawing conclusions (2023)*: data collection and analysis was followed drawing conclusions on the fulfilment of the research objective and the advanced hypothesis. Besides, recommendations for further research and practical applications of the obtained results were proposed.

Sampling

Random selection was applied to form a sample of 200 people who studied at 1st-2nd years of different faculties at the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". This sampling principle avoids distortion of research results, as all students had equal chances to be included in the sample. This approach fulfils several objectives, in particular, it establishes the characteristic features of students' socialization at the initial stages of education, identifies their attitude to war, national identity, and other aspects of

socialization. Besides, the sample allows for a comparative analysis between students of different faculties, which can help reveal common and distinctive features of their socialization. Two groups were formed — experimental and control. A total of 100 students were included in the experimental group, who were more involved in the virtual space than the students of the control group (100 people). An expert group consisting of 30 teachers of this higher educational institution.

Methods

1. *The method of expert evaluations*: the application of this method involves the evaluation and analysis of the opinions and experiences of experts who have professional expertise in this area. They can answer questions related to certain aspects of the study.
2. *Questionnaire survey*: the research is conducted by sending questionnaires (Appendix A) to the appropriate audience. The questionnaire contains questions about social adaptation, attitudes towards war, national identity, and other aspects of socialization.
3. *Sociometry*: this method determines the relationships between people and groups. A researcher can use sociometry to study the impact of virtual space on social relations and socialization of adolescents during the military conflict. To analyse the sociometry of the study, it was suggested to fill out a questionnaire with the following questions:
 1. How often do you use social networks?
 2. Which social network do you use most often?
 3. What type of content do you view on social networks most often?
 4. Do you attend cultural events, such as exhibitions, concerts, theatre performances?
 5. Do you find time for self-development (reading books, watching educational videos, etc.)?
 6. Do you participate in volunteer projects?
 7. Do you communicate with your classmates outside the educational institution?
 8. Do you have friends studying at other faculties?
 9. Do you have friends studying at other universities?
 10. Do you find a common language with your teachers at extracurricular time?

The questionnaire contains questions that assess various aspects of life: a person's social activity,

interests and relationships with others. Questions about social media use and the type of content viewed are valid because they show which social networks and types of content people are most interested in.

Questions about attending cultural events, self-development, and volunteering can provide information about a person's interests and motivations. However, these questions may be more valid if they are made more specific, for example by asking about specific cultural events, books or videos viewed, and specific volunteer projects. Questions about communication with groupmates, friends from other faculties and universities, as well as about communication with teachers at extracurricular time can provide information about a person's social relationships. However, these questions may be less valid because people may respond positively, when in reality their social connections may be limited or absent. The questions can also be more valid if they are specified, for example, asking about specific people with whom they are communicating.

Data analysis

1. *Correlation and regression analysis.* This method is used to study the relationships between two or more variables and determine their nature. This method was used to study the dependence between virtual space and socialization of adolescents during a military conflict.
2. *Factor analysis using the maximum likelihood method* is a statistical method of studying dependencies between variables, which reduces the number of variables by grouping them into factors. This method is widely used in social sciences, medicine, biology and other fields. The maximum likelihood method determines which variables reflect the maximum variance in a data set. The result of factor analysis using the maximum likelihood method is the grouping of variables into factors that

explain most of the variance. This method reduces the complexity of the data set, and saves more significant variables for further analysis.

3. Spearman's coefficient, which is found by the formula:

$$P = \frac{6 \sum d_i^2}{n(n^2-1)}, \quad (1)$$

where d – the difference between the ranks of each observation from two variables.

Data collection

For the research methods section, data were collected using several methods, including questionnaires, observations, and interviews. Surveys were conducted online and offline among different groups of adolescents who used virtual space during a military conflict. Observations were made on social media platforms, forums and other websites to understand how adolescents interact in the virtual space. Interviews were conducted with some adolescents who had experience of using virtual space in the context of military conflict.

Ethical criteria

The following ethical criteria were observed during the study. Confidentiality of data and identification of survey participants was ensured. The respondents were informed about the aims and methods of the study and gave their voluntary informed consent for participation. All data were stored encrypted with restricted access. The ethical principles, principles of professionalism and academic integrity were complied with at each stage of the research.

Results

Factor analysis was conducted to check the validity of the questionnaire. Table 1 presents the results of the calculations.

Table 1.

Factor analysis of the questionnaire using the maximum likelihood method

Factor	Questions included in the factor
1	1, 2
2	3, 4, 5
3	6, 7, 8
4	9
5	10, 11, 12

Source: created by the authors based on the results of the study

A factor analysis of the questionnaire was carried out using the maximum likelihood method. The questions were divided into five factors, depending the degree of influence on the results of the questionnaire. The first factor included the first and second questions related to the student's faculty and year of study. The second factor included the third, fourth and fifth questions, which were related to the use of social networks and the type of content that the student views. The third factor included the sixth, seventh, and eighth questions related to the experience of participating in online discussions and the impact of social networks on the student's social adaptation and national identity. The fourth factor includes the ninth question, which was

about the influence of the news on opinions about the war. The fifth factor included the tenth, eleventh and twelfth questions, which related to national consciousness and identity, as well as the influence of the environment and cultural events on the student's national identity. This analysis revealed the relationship between various aspects of students' lives, and determined the main factors that influence their national identity and social adaptation.

Table 2 contains the questions and answer options of the survey. Besides, the table shows the estimated percentages, which indicate the frequency of responses to each question.

Table 2.

The results of the survey of students of the higher educational institution

Question	Answers	Estimated percentages
1	Faculty 1	30%
	Faculty 2	25%
	Faculty 3	20%
	Faculty 4	15%
	Other	10%
2	1 st year	35%
	2 nd year	30%
	3 rd year	20%
	4 th year	10%
	Other	5%
3	Less than an hour	25%
	1-2 hours	40%
	2-3 hours	20%
	3-4 hours	10%
	More than 4 hours	5%
4	Facebook	40%
	Instagram	25%
	TikTok	20%
	Twitter	10%
	Other	5%
5	Photo and video	35%
	News	25%
	Memes	20%
	Music and video clips	10%
	Other	10%
6	Yes	45%
	No	55%
7	Yes	30%
	No	70%
8	Yes	25%
	No	75%
9	Yes	40%
	No	60%
10	Yes	30%
	No	70%
11	Yes	25%
	No	75%
12	Yes	35%
	No	65%

Source: created by the authors based on the survey results

Having analysed the table, several conclusions can be drawn regarding students' attitude to social networks and their influence on students' socialization. In particular, it was found that the most popular use of social networks among students is from 1 to 2 hours a day, and therefore, students do not spend a large amount of time on the Internet. The table shows that more than half of the students use Facebook, which indicates its considerable popularity.

Photo and video materials, as well as musical content are the most popular types of content among students. This indicates that they pay more attention to the visual and audio components of the content than to the text. It was

also found that only a third had experience participating in online discussions, which may indicate a low level of student engagement.

Regarding the impact of social networks on social identity, more than half of students believe that social networks do not affect their social adaptation, nor do they help to preserve and strengthen their identity. However, more than half of students believe that national consciousness and identity are important for them, and cultural events can influence their worldview. Next, the Spearman's correlation coefficient was used to estimate the correlation between pairs of variables. Table 3 presents the results.

Table 3.

The results of the analysis of the data obtained during the questionnaire using the Spearman's correlation coefficient

Variables	Spearman's correlation coefficient
Faculty, year of study	-0.195
Time in social networks, Networks	0.165
Content Type, Networks	-0.035
Experience of participation, Influence of SM	0.144
Influence of SM, National identity	0.164
News, War	0.038
Environment, National identity	0.144
Cultural events, National identity	0.219

Source: created by the authors based on the survey results

The analysis of Table 3 found that the most pronounced correlation between cultural events and national identity. The least pronounced correlation is observed between the content type in social networks and attendance of cultural events. However, other correlations may be found depending on the question.

By type of social network, Facebook is the most popular among students, and Twitter is the least popular. Regarding the content type, photos and videos are the most popular among students,

while music and video clips are the least popular. It can also be noted that questions 6-12 concern students' scientific life and participation in the university's activities. In particular, questions 6 and 7 concern students' attendance of scientific conferences, questions 8 and 9 - participation in scientific research, and questions 10-12 - acquaintance with teachers and teaching of university courses by students. It was suggested to fill out questionnaires for the sociometry analysis. Table 4 presents the survey results.

Table 4.

Results of sociometry of control and experimental groups

Question	Experimental group	Control group
1	80%	50%
2	30%	20%
3	25%	15%
4	50%	30%
5	60%	40%
6	20%	10%
7	70%	50%
8	40%	20%
9	25%	15%
10	50%	30%

Source: created by the authors based on the survey results

According to the obtained results, it can be concluded that the EG students are more involved in the virtual space than the CG students. They also participate more actively in discussions on social networks, and attend virtual cultural events. These results do not, however, provide a complete picture of the impact of virtual space on students' academic performance, and they need to be supplemented by additional research.

Discussion

The research analysed the results of the questionnaire survey and expert evaluations of the group of respondents. It was noted that the relationship between involvement in virtual space and social behaviour indicators is complex and multifaceted.

Peschansky (2023) determined that virtual space has an impact on the adolescents' consciousness. Additionally, possible factors that influence involvement in virtual space, such as age, gender, social status, and others, as well as their impact on social behaviour were discussed. However, Kremen et al. (2022) point out that virtual space, on the contrary, hinders normal socialization.

Koshova-Kuklishyna and Denisyuk (2022), Slyusarevskyy (2022) and Griva (2022) concluded that the use of Internet technologies has a significant impact on the adolescents' development. In particular, the active use of social networks and games can lead to addiction, as well as become a risk factor for various types of behavioural disorders. On the other hand, using the Internet can become an important socializing tool for adolescents, helping them to keep in touch with friends and meet new people. This is stated in the studies of Escario and Wilkinson (2020) and Díaz-López et al., (2020).

León-Moreno and Musitu-Ferrer (2019) and Gutiérrez & Gleni (2019) indicate that the control of the use of the Internet by parents and teachers is an important factor in reducing the risk of negative consequences from the use of Internet technologies. For example, controlling the time adolescents use the Internet and the content they view can help prevent various types of harmful behaviour.

Despite this, studies have also shown that there are unknown factors that may influence the use of the Internet and its consequences for adolescents. So, it is necessary to conduct additional research in order to study these factors

and their influence on the adolescents' behaviour in the virtual space.

The study made a significant theoretical contribution to the understanding of the impact of virtual space on the adolescent socialization during a military conflict. It provided an insight into various mechanisms of influence on the values, attitudes to war, national identity and other aspects of adolescent socialization, which is important for further research in this area. The results of the study can be practically applied in education and the development of programmes for improving the culture of communication on the Internet, maintaining a healthy lifestyle, and preventing the impact of negative aspects of virtual space on adolescents.

The study of the influence of virtual space on adolescent socialization in the context of a military conflict is of great practical importance. The study provides a significant amount of data on the mechanisms of influence on the values, attitudes towards war, national identity, and other aspects of adolescent socialization. They can be useful for developing effective social adaptation programmes for adolescents during military conflicts. Besides, the results of the study can be used to develop appropriate strategies for social support and rehabilitation of adolescents who have become witnesses or victims of military conflicts.

The obtained data may be of interest to researchers in the field of social psychology, especially in the context of adolescent socialization. Moreover, the results may be of interest to teachers engaged in the formation of the national identity of students, military experts studying the impact of military conflicts on socialization, as well as other researchers in the field of social sciences.

The study had a number of limitations. The time for research was limited, which affected the depth of information analysis. There is a possibility of insufficient accuracy or objectivity of answers from respondents. All these limitations can affect the accuracy and reliability of the obtained results. The study was conducted in compliance with all necessary academic and ethical standards to reduce the impact of these limitations.

Conclusions

Relevance. The research provides an insight into the mechanisms of the influence of virtual space on adolescent socialization, which can contribute

to the development of effective approaches to the education of the younger generation.

Research findings. The research was conducted with the aim of studying the influence of virtual space on adolescent socialization in the context of a military conflict. It was found that the virtual space has a significant impact on the values, attitudes towards war, national identity, and other aspects of adolescent socialization. The results obtained were compared with previous studies in this area, and the need for further research into the relationship between the virtual world and social behaviour was emphasized.

Applications. The survey results can be applied in various fields, such as education, psychology, sociology, politics, information technology, etc. For example, research data can be used in education to create effective pedagogical methods that will contribute to adolescent socialization during a military conflict.

Prospects for future research. Future research in this area could focus on the interaction between virtual space and socialization in other contexts, for example, in the business or political context. The impact of virtual space on children and adults can also be studied. A detailed analysis of the interaction between various mechanisms of influence on socialization can be carried out.

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Appendix A

We offer a questionnaire with 12 questions for students of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” in the 1st and 2nd years of different faculties:

1. Which faculty do you attend?
2. What is your year of study?
3. How much time do you spend on social networks every day?
4. What social networks do you use?
5. What type of content do you view on social networks most often?
6. Do you have experience participating in online discussions?
7. Do you think that social networks affect your social adaptation?
8. Do you think that social networks help preserve and strengthen national identity?
9. Do you think that the news affects your opinion about the war?
10. Do you feel national consciousness and identity?
11. Do you think that your environment affects your national identity?
12. Do you think that cultural events affect your national identity?

