Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 43, Jun-2025
http://sjii.indexedresearch.org

# The Impact of Smartphone and Gadget Use on Learning and Attention Concentration in Adolescents

***Babajanov Maqsadbek Ulug'bekovich***
*Lecturer at Mamun University*

***Durkhonim Karimova Bakhodirovna***
*3rd-year Student, Faculty of Psychology, Medicine and Sports*
*Mamun University, maqsadbekbobojonov2@gmail.com*

***Abstract:*** *This article presents an empirical analysis of how adolescents' use of mobile phones and gadgets psychologically affects their attention concentration and academic performance. The study utilized the Smartphone Addiction Scale – Short Version (SAS-SV) and E. Kraepelin's method for diagnosing attention. Statistical analyses revealed no significant correlation between the level of smartphone addiction and indicators of attention concentration or academic achievement. However, the results highlight the necessity of implementing psychological training and developmental programs to enhance attention and optimize the learning process.*

***Keywords:*** *adolescents, gadgets, attention concentration, smartphone addiction, psychological diagnostics.*

**INTRODUCTION.** The advancement of science and technology, especially mobile technologies, has become an integral part of the modern school student's life. However, uncontrolled use of gadgets has been found to cause functional changes in various organs and systems, and even contribute to the development of certain illnesses.

Research has identified ophthalmologic and orthopedic pathologies, particularly vision impairments and musculoskeletal strain in children. Prolonged use of computers and other devices further exacerbates these conditions. At the same time, children from low-income families, who have limited access to such devices, appear to experience lower levels of negative health impacts.

Radiation emitted from screens negatively affects eye function, leading to a decline in visual acuity. Currently, over 25% of individuals under the age of 18 use mobile phones on a regular basis. Therefore, adherence to hygienic standards in the use of electronic devices has become a critical issue.

Prolonged use of mobile devices causes symptoms typical of *asthenopia* in adolescents, including eye strain, fatigue, and discomfort. Although it is unrealistic to completely eliminate the use of such devices, their harmful effects can be reduced. To achieve this, it is recommended to follow screen usage guidelines, introduce world literature-based textbooks in schools and libraries, and apply interactive methods that actively engage students' attention.

**LITERATURE REVIEW.** Research shows that today's generation uses information and communication technologies through gadgets on a daily basis. The most commonly used devices include mobile phones, laptops, and computers. The harmful effects of electronic systems tend to increase over time. Uncontrolled and improper use of gadgets for prolonged periods introduces several risk factors that negatively affect children's health.

For instance, children often develop a habit of continuously watching films online. As a result, their speech development slows down, they struggle to express their thoughts freely, and begin to withdraw from communication with parents or close relatives. Films become more interesting than real-life interactions; they eat hastily, ignore adults' remarks, and in some cases become entirely inattentive.

On the other hand, mobile devices restrict freedom. Among adolescents, imitation is widespread—they attempt to resemble the actors or actresses they watch, copying their clothing, behavior, and gestures. This tendency promotes social comparison, lowers self-confidence, and alters relationships with family members.

Contemporary scientific studies are increasingly focusing on the effects of mobile phones on human health. Despite various precautions, smartphone dependency has become a real and pressing problem.

The psychological effects of modern multimedia devices on adolescents have been extensively explored in recent scientific research. A study by A.V. Li (2015) empirically evaluated changes in attention and memory among 8th–9th grade students. The results showed that 65.1% of students exhibited reduced attention, sluggishness, and instability based on the *Digit Placement Test*. Furthermore, the *Digit Span Test* indicated a decrease in memory capacity in 55.6% of participants. The most severe impairments were observed in students who simultaneously used six types of devices—amounting to 40.1%. According to the author, constant cognitive overload weakens the attention system and leads to a decline in attention concentration **[4].**

Today, technological devices occupy a significant portion of children's daily activities. Several scientific sources suggest that this phenomenon disrupts the natural development of key psychological functions—such as memory, thinking, imagination, attention, and speech—through artificial means. Researchers argue that modern gadgets prevent children from independently performing intellectual operations, instead completing tasks for them: calculations, historical text analyses, and visualizations. As a result, the child transitions from an active cognitive participant to a passive observer. This hinders the formation of essential skills like independent thinking, analytical reasoning, and voluntary attention control, ultimately negatively impacting social adaptation **[1].**

One particularly concerning phenomenon is sensory deprivation, which refers to a decrease in a child's emotional perception and motor activity. Studies show that when a child is exposed to a mobile screen for extended periods, bodily movement, visual tracking coordination, and spatial perception systems become underutilized. This disrupts the sensorimotor integration essential for healthy psychological development. As a result, the child experiences not only physical stagnation but also impairments in emotional stability, environmental adaptation, and the adequate interpretation of reality.

Moreover, under conditions of unsupervised use, the gadget may become psychologically internalized by the child as a "friend" or source of emotional support. This fosters emotional isolation, withdrawal from communication, and a diminished need for real-life interaction **[1].**

Excessive smartphone use in children and adolescents leads to diminished attention and negatively affects psychological stability. Such patterns are linked to increased risks of depression, anxiety, stress, sleep disturbances, and declining academic performance. Sustained attention and executive control weaken, resulting in concentration deficits **[5].**

In a large-scale study by Wallace et al. (2023), the psychoneurological consequences of screen exposure among adolescents were analyzed. The researchers found that excessive engagement with social media and video games significantly reduced attentional resources and increased impulsive responses, thereby amplifying ADHD symptoms. Their analysis indicated that impulsivity played a mediating role in the disruption of attention regulation **[6].**

In adolescents, increased imitation turns into habit; even without understanding certain behaviors, they begin to teach them to those around them, and these behaviors spread widely. As a result, they become overly attached to gadgets. Consequently, kindness, social values, and interpersonal relationships begin to weaken. In classroom settings, students experience divided attention, distractibility, and an inability to concentrate.

Therefore, in order to study the characteristics of attention, mental work capacity, and psychological pace among school students, we used the "Kraepelin" table, presented by E. Kraepelin in 1895, to determine attention concentration **[2].** According to the results, among 5th, 7th, and 9th grade students, the highest efficiency observed was 150% (indicating increased work pace), the lowest was 40% (a significant decline), and in most cases, the results ranged between 50% and 70%. This indicates that in the later stages of the test, fatigue or a decrease in attention occurred. Performance was initially strong, but over time, stability decreased. In some cases, due to increased motivation or activity, results above 100% were also observed.

Additionally, in order to assess the level of smartphone usage among adolescents, the "Smartphone Addiction Scale – Short Version" (SAS-SV) was used **[3].** After that, the 1st and 2nd term grades in some subjects were collected for students in grades 5, 7, and 9. The results were analyzed using mathematical and statistical methods according to the test scores, academic performance, age, gender, and class level.

**RESULTS AND DISCUSSION.** The distribution of variables was assessed using the Kolmogorov–Smirnov test. For all key indicators where the p-values were below 0.05, the data were considered to have a non-normal distribution. Only the Kraepelin test showed a p-value of 0.178, indicating signs of a normal distribution. Based on these findings, non-parametric methods were applied during the analysis.

The students who participated in the study were of different ages. Their age distribution is shown in the figure below (Figure 1).

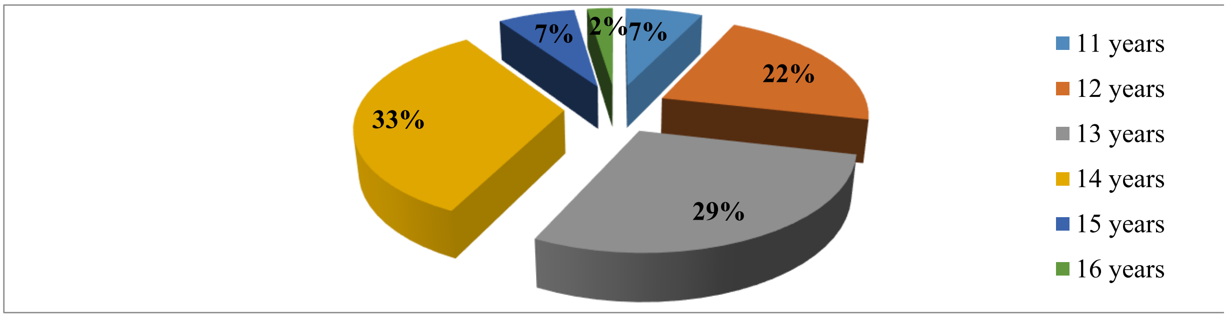


**Figure 1. Distribution of Students by Age Group (n = 42)**

Among the 42 students who participated in the study, ages ranged from 11 to 16. The majority were 13 years old (28.6%) and 14 years old (33.3%), making up 61.9% of the total sample. The remaining age groups (11, 12, 15, and 16) accounted for smaller proportions, ranging between 2.4% and 21.4%. Therefore, subsequent analyses are primarily interpreted based on the middle age group (13–14 years).

The figure below presents the gender distribution of the study participants. Out of 42 students, 17 were male (40.5%) and 25 were female (59.5%). The higher number of female participants indicates the need to consider gender predominance when interpreting results. In some cases, outcomes are interpreted from the perspective of the dominant female group (Figure 2).

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 43, Jun-2025
http://sjii.indexedresearch.org

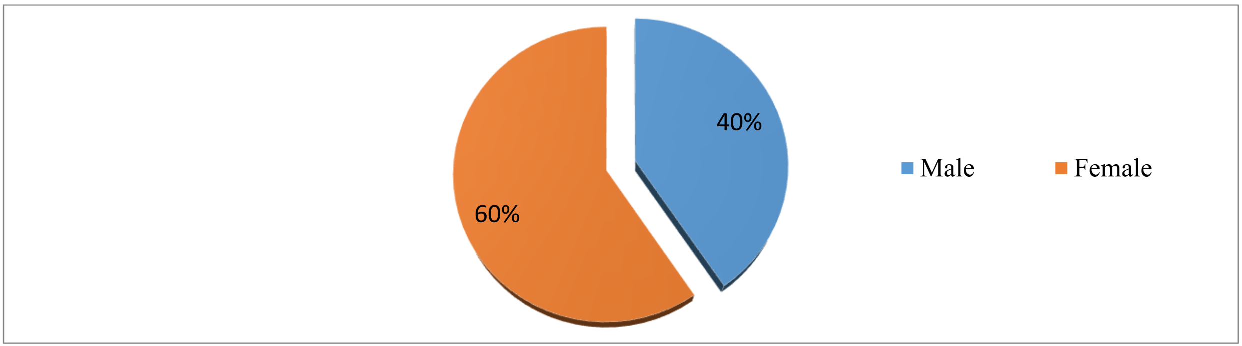


**Figure 2. Distribution of Students by Gender (n = 42)**

The following figure shows the distribution of study participants by grade level. As seen in the diagram, the majority of students were from the 7th grade (61.9%). Fifth-grade students accounted for 28.6%, while ninth-grade students made up 9.5% of the sample. These differences across grade levels highlight the need to consider proportional representation between groups during the analysis (Figure 3).

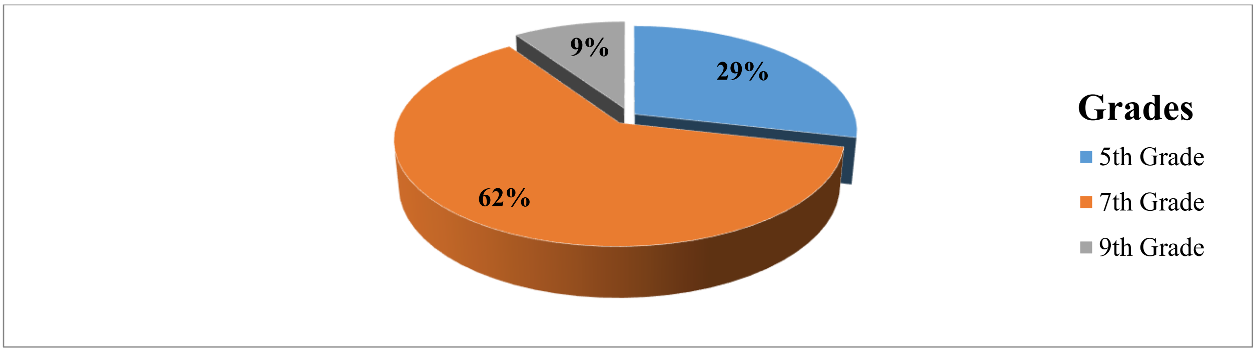


**Figure 3. Distribution of Students by Grade Level (n = 42)**

Gender differences in students' scores on the "Smartphone Addiction Scale – Short Version" (SAS-SV) were assessed using the Mann–Whitney U test. The mean rank for boys was 20.18, and for girls 22.40. No statistically significant difference was found between the two groups ($U = 190.000$; $p > 0.05$). This result indicates that the level of smartphone addiction is not dependent on gender (Table 1).

**Table 1.Distribution of Students by Gender Based on the "Smartphone Addiction Scale – Short Version" (SAS-SV)**
**(According to Mann–Whitney U Test, n = 42)**

| Scales | Gender | Mean Rank | Sum of Ranks | U | p |
|---|---|---|---|---|---|
| **Survey Score** | **Boys** | 20.18 | 343.00 | 190.000 | 0.305 |
| | **Girls** | 22.40 | 560.00 | | |

Gender differences in students' "Kraepelin" test results were analyzed using the Mann–Whitney U test. The mean rank for boys was 19.29, and for girls 23.00. The difference between the two groups was not statistically significant ($U = 175.000$; $p > 0.05$). This finding indicates that the level of attention concentration is not dependent on gender (Table 2).

**Table 2. Distribution of Students by Gender According to "Kraepelin" Test Results (Based on Mann–Whitney U Test, n = 42)**

| Scales | Gender | Mean Rank | Sum of Ranks | U | p |
|---|---|---|---|---|---|
| Kraepelin Test | Boys | 19.29 | 328.00 | 175.000 | 0.336 |
| | Girls | 23.00 | 575.00 | | |

The level of smartphone use among students was analyzed by age group. According to the results of the "Smartphone Addiction Scale – Short Version" (SAS-SV), the mean ranks for participants aged 11 to 16 were as follows: age 11 – 24.00, age 12 – 24.00, age 13 – 22.33, age 14 – 17.93, age 15 – 24.00, and age 16 – 24.00. The Kruskal–Wallis test showed no statistically significant difference in survey scores between age groups ($H = 6.031$; $p > 0.05$). This indicates that the level of smartphone use is not dependent on age (Table 3).

**Table 3. Distribution of "Smartphone Addiction Scale – Short Version" (SAS-SV) Scores by Age Group (Based on Kruskal–Wallis Test, n = 42)**

| Scales | Age Groups | | | | | | H | p |
|---|---|---|---|---|---|---|---|---|
| | 11 years (n=3) | 12 years (n=9) | 13 years (n=12) | 14 years (n=14) | 15 years (n=3) | 16 years (n=1) | | |
| Survey Scores | 24 | 24 | 22,33 | 17,93 | 24 | 24 | 6,031 | 0,303 |

To assess students' attention concentration, the results of the E. Kraepelin test were analyzed across different age groups. According to the findings, the average scores were as follows: 23 for 11-year-olds, 19.61 for 12-year-olds, 19.17 for 13-year-olds, 26 for 14-year-olds, 13.5 for 15-year-olds, and 23 for 16-year-olds.

Based on the Kruskal–Wallis test, no statistically significant differences were found between the age groups ($H = 3.874$; $p > 0.05$). This suggests that the level of attention concentration measured by the E. Kraepelin test is not dependent on age (Table 4).

**Table 4. Distribution of Students' Kraepelin Test Scores by Age Group (Based on Kruskal–Wallis Test, n = 42)**

| Scales | Age Groups | | | | | | H | p |
|---|---|---|---|---|---|---|---|---|
| | 11 years (n=3) | 12 years (n=9) | 13 years (n=12) | 14 years (n=14) | 15 years (n=3) | 16 years (n=1) | | |
| Kraepelin Test | 23 | 19,61 | 19,17 | 26 | 13,5 | 23 | 3,874 | 0,568 |

The level of smartphone use among students (measured by SAS-SV scores) was compared by grade level. According to the Kruskal–Wallis test results, students in the 5th and 9th grades had an average score of 24, while 7th-grade students showed a lower average score of 19.96.

The statistical analysis revealed no significant differences between the grade levels ($H = 3.396$; $p > 0.05$). This indicates that students' level of smartphone use is not strongly associated with their grade level (Figure 4).

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 43, Jun-2025
http://sjii.indexedresearch.org

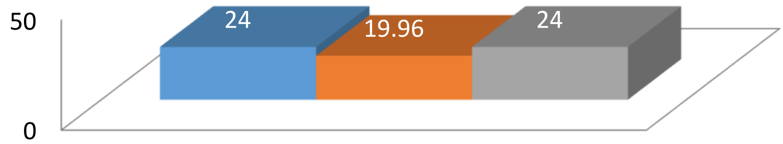


**Figure 4. Differences in Students' Grade Level and Smartphone Addiction Scale – Short Version (SAS-SV) Scores(Based on Kruskal–Wallis Test, n = 42)**

In the study, students' attention concentration was analyzed based on their grade levels using the E. Kraepelin test. According to the results, 7th-grade students had the highest average score (22.85), followed by 5th-grade students with 20.46 points, while 9th-grade students showed the lowest score — 15.88 points.

The Kruskal–Wallis test indicated no statistically significant differences between grade levels ($H = 1.243$; $p > 0.05$). This suggests that the level of attention concentration is not dependent on the students' grade level (Table 6).

**Table 6. Differences in Students' Grade Level and Kraepelin Test Scores (Based on Kruskal–Wallis Test, n = 42)**

| Scales | Grades | | | H | p |
|---|---|---|---|---|---|
| | 5th Grade (n=12) | 7th Grade (n=26) | 9th Grade (n=4) | | |
| Kraepelin Test | 20.46 | 22.85 | 15.88 | 1.243 | 0.537 |

The correlation analysis between students' first and second term grades revealed a high level of consistency. Strong correlations were observed particularly in Literature ($r = 0.838$), Native Language ($r = 0.771$), and English ($r = 0.699$), all statistically significant at $p < 0.01$. In contrast, the correlations were relatively weaker in Mathematics ($r = 0.592$) and Russian ($r = 0.382$; $p < 0.05$).

These findings suggest that students generally demonstrate academic stability across terms, although this consistency appears lower in certain subjects. Therefore, there is a need to improve the quality of instruction in subjects like Russian (Table 7).

**Table 7..Students' Performance Indicators Between First and Second Term Grades by Subject *(Based on Spearman's Rank Correlation, n = 42)***

| Scales | Native Language (2nd Term) | Literature (2nd Term) | Mathematics (2nd Term) | English (2nd Term) | Russian (2nd Term) |
|---|---|---|---|---|---|
| Native Language (1st Term) | 0,771** | 0,812** | 0,587** | 0,436** | 0,455** |
| Literature (1st Term) | 0,808** | 0,838** | 0,677** | 0,478** | 0,515** |
| Mathematics (1st Term) | 0,549** | 0,611** | 0,592** | 0,623** | 0,542** |
| English (1st Term) | 0,695** | 0,718** | 0,783** | 0,699** | 0,576** |

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 43, Jun-2025
http://sjii.indexedresearch.org

| | | | | | |
|---|---|---|---|---|---|
| **Russian (1st Term)** | 0,616** | 0,689** | 0,619** | 0,626** | 0,382* |

**Note: *p<0.05; **p<0.01**

The relationship between students' Kraepelin test results (attention concentration) and their academic subject grades was analyzed using Spearman's correlation. As shown in the table, all correlation coefficients were low, and no statistically significant relationships were found (r ranging from –0.118 to +0.256, p > 0.05).

The highest coefficient was observed with Russian (2nd term) grades (r = 0.256), but this value still fell below the threshold for statistical significance, indicating no meaningful association. Some subjects even showed negative correlations (e.g., Literature, 1st term: r = –0.031), but these values were also statistically insignificant.

Thus, attention concentration as measured by the Kraepelin test does not have a strong statistical relationship with students' academic performance across subjects. This suggests that attention level and academic achievement are not directly connected (Table 8).

**Table 8. Correlation Between Kraepelin Test Results and Subject Grades (Based on Spearman's Rank Correlation, n = 42)**

| Scales | Native Language (1st Term) | Literature (1st Term) | Mathematics (1st Term) | English (1st Term) | Russian (1st Term) | Native Language (2nd Term) | Literature (2nd Term) | Mathematics (2nd Term) | English (2nd Term) | Russian (2nd Term) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Kraepelin Test** | 0,066 | -0,031 | 0,154 | -0,037 | -0,118 | 0,091 | 0,145 | 0,047 | 0,055 | 0,256 | |

The relationship between survey scores (reflecting the level of smartphone and gadget use) and students' academic grades was assessed using Spearman's rank correlation. As shown in the table, the correlation coefficients (r) ranged from 0.037 to 0.26, all of which are low and statistically insignificant (p > 0.05).

The highest coefficient was recorded with mathematics (2nd term) (r = 0.26), yet even this does not indicate a meaningful correlation. For other subjects, the coefficients fell between 0.1 and 0.18, reflecting weak associations.

These findings suggest that the level of smartphone and gadget use does not have a direct or statistically reliable impact on students' academic grades. Smartphone dependency does not appear to exert a strong influence on learning outcomes.

**Table 9. Correlation Coefficients Between Students' "Smartphone Addiction Scale – Short Version" (SAS-SV) Scores and Subject Grades (Based on Spearman's Rank Correlation, n = 42)**

| Scales | Native Language (1st Term) | Literature (1st Term) | Mathematics (1st Term) | English (1st Term) | Russian (1st Term) | Native Language (2nd Term) | Literature (2nd Term) | Mathematics (2nd Term) | English (2nd Term) | Russian (2nd Term) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Survey** | 0,171 | 0,151 | 0,037 | 0,142 | 0,125 | 0,16 | 0,13 | 0,26 | 0,188 | 0,075 |

The relationship between students' level of smartphone use (based on the SAS-SV survey) and attention concentration (measured by the E. Kraepelin test) was assessed using Spearman's rank correlation. The analysis revealed a negative but weak and statistically insignificant correlation between the two variables ($r = -0.109$; $p > 0.05$) (Table 10).

**Table 10. Indicators of the Relationship Between Students' Smartphone Use Level (SAS-SV) and Kraepelin Test Results (Based on Spearman's Rank Correlation, n = 42)**

| Scales | Smartphone Addiction Scale – Short Version (SAS-SV) Test |
|---|---|
| **Kraepelin Test** | -0,109 |

Although this result suggests that a higher level of smartphone dependency may be associated with a decrease in students' attention concentration, the correlation is not statistically significant. There is no clear or reliable link between students' smartphone usage level and their attention concentration. These findings highlight the complexity of the topic and the necessity for deeper research that accounts for additional contributing factors.

The study results indicate that students' level of smartphone use does not have a statistically reliable effect on either their attention concentration or their academic grades. Furthermore, the outcomes of the "Smartphone Addiction Scale – Short Version" (SAS-SV) and the E. Kraepelin test show that attention levels are not significantly associated with gender, age, or grade level.

Based on the correlation analyses, the relationship between smartphone dependency and attention concentration is weak and insignificant, suggesting that these variables operate independently. This implies that many other factors—such as the learning environment, emotional state, motivation, and other psychological variables—can influence attention and academic performance. Therefore, it is recommended to implement specialized attention-enhancement exercises, psychological training sessions, and interactive teaching methods for students.

**CONCLUSION.** The conducted study observed that regular use of modern gadgets may negatively affect students' psychological functioning, particularly attention concentration and perceptual quality. However, the Kruskal–Wallis test result ($p = 0.303$) indicated that there was no statistically significant difference between age groups. Based on this result, drawing a definitive conclusion is limited—likely due to the small sample size ($n = 42$) and the very low number of participants in certain age categories.

Despite these limitations, the observed findings suggest a subtle influence of external information flows and the digital environment on attention development. Additionally, factors such as emotional isolation, sensory deprivation, and reduced real-life communication may slow the dynamics of psychological development.

Future research should include a larger participant pool, deeper assessment of various components of attention, and apply a longitudinal design to track changes over time. This approach would allow for a more reliable understanding of the relationship between gadget use and attention development.

**REFERENCES**


1. Иванова, Т. А. (2021). Влияние современных технологии (гаджетов) на детей подростков в современном мире. *Материалы Международной научно-практической конференции «Психология и общество»*, с. 135–140.
2. Karamyan, M. X., Nurullayeva, B. B., Bondareva, E. V., Djumaniyazova, M. X., va Gaziyeva, F. E. (2023). *Eksperimental psixologiya: Darslik*. Toshkent: Bookmany print. – 494 b.
3. Kwon, M., Kim, D.J., Cho, H., & Yang, S. (2013). The smartphone addiction scale: development and validation of a short version for adolescents. *PLoS ONE, 8(12), e83558*.
4. Li, A. V. (2015). *Влияние мобильных и мультимедийных устройств на когнитивные функции подростков. Bulletin of Medical Internet Conferences*, 5(5), 760. ID: 2015-05-376-T-4812. URL: www.medconfer.com
5. Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). *Problematic smartphone usage and mental health outcomes: a systematic review*. *BMC Psychiatry*, 19:356. https://doi.org/10.1186/s12888-019-2350-x
6. Wallace, J., Boers, E., Ouellet, J., Afzali, M. H., & Conrod, P. (2023). *Screen time, impulsivity, and ADHD symptom growth in adolescents*. *Scientific Reports*, 13, 18108. https://doi.org/10.1038/s41598-023-44105-7