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**A Quantitative Research on the Relationship
between Digital Literacy and Self-Esteem at
Romanian Primary School Students**


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Theoretical Background

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- digital intelligence is innovative, driven by new technologies, acting as a response to cultural changes influenced by digital technologies, encompassing the skills and talents belonging to "symbol analysts" and "experts in change" (Gardner, 1999);
 - in relation to digital citizenship, digital intelligence is complementary, representing the informational foundation that a responsible user must have in the digital environment;
 - Ribble et al. define digital citizenship as "the norms for appropriate behavior in relation to the use of technology" (Ribble et al., 2004, p.7), a concept directly connected with digital intelligence;
 - by self-esteem we understand "the feeling of self-appreciation" (Rosenberg, 1965), being an important construct for motivation, personality, and personal success.



Research Aim and Hypotheses

- The aim of this study was to explore the relationship between digital knowledge and skills, and self-esteem.
- Research hypotheses: *Self-esteem has a significant influence on digital knowledge; Students' digital skills are determined by their level of self-esteem.*



Method-Participants



- ▶ primary school students in 3rd and 4th grades (ages 10-11), from both urban and rural areas in Iași County, totaling 299;
- ▶ data collection took place between November 2023 and January 2024;
- ▶ 48.7% were boys (145), 49.3% girls (147), and 2% (6) chose not to disclose their gender;
- ▶ 98% of respondents stated they are enrolled in an educational institution in an urban area, with only 2% from rural areas;
- ▶ 51.5% are students enrolled in 3rd grade and 48.5% in 4th grade;
- ▶ 51.5% of respondents reported spending 1-5 hours on the internet per day, 43.1% less than one hour per day, and 5.4% more than five hours per day.



Method-Instruments

- ▶ The instruments used for data collection in this study were the **DigIQ**, developed by De Vries, Piotrowski, & Vreese (2022), which includes two subscales for collecting information on students' digital skills and knowledge, and the **Self-Esteem Scale** created by Rosenberg (1965) in its Romanian version.
- ▶ The **Cronbach's Alpha coefficient** indicated acceptable consistency for the Self-Esteem Scale, which consists of 10 items ($\alpha=0.738$), excellent consistency ($\alpha=0.942$; 35 items) for the subscale collecting information on participants' digital skills (De Vries, Piotrowski, & Vreese, 2022), and good consistency ($\alpha=0.866$) for the 21-item subscale assessing digital knowledge level in relation to the subjects included in the study (De Vries, Piotrowski, & Vreese, 2022; Pallant, 2007).

Method-Procedure

- Before including the students in the study, consent was obtained from their parents/legal guardians, who were informed beforehand about the research and provided their written consent.
- Data was collected between November 2023 and January 2024, both in written form and online, via a Google form.
- Students accessed the questionnaire with the help of their classroom teachers and also through their parents.
- Before responding to the items, the classroom teacher read a consent form aloud to help the young students understand the purpose of the research, and their continuation with the questionnaire indicated their consent to participate.
- If parents did not give their consent, students were assigned alternative tasks while their peers completed the items.
- The Romanian-language questionnaires were completed both during school hours and outside school hours, depending on the availability of teachers, students, and parents.
- Completing the questionnaires took approximately 40-50 minutes.
- Participation in the study was not financially compensated.



Results



- ▶ In data analysis, we used the IBM SPSS software to perform regression analyses on the relationships between the level of self-esteem and participants' digital knowledge and digital skills.
- ▶ Initially, we conducted descriptive statistics for each variable considered (self-esteem, digital knowledge, and digital skills), providing information on the mean and standard deviation (Table 1).

Results

Table 1
Descriptive Statistics for Digital Knowledge, Digital Skills, Self-Esteem

	Mean	Standard Deviation	N
Digital Knowledge	8.668	3.984	299
Digital Skills	82.501	25.604	299
Self-Esteem	19.003	4.414	299

Results

We calculated the Pearson correlation for each of the relationships: digital knowledge–self-esteem and digital skills–self-esteem, with the results shown in Tables 2 and 3.

Table 2
Pearson Correlation between Digital Knowledge and Self-Esteem

		Digital Knowledge	Self-Esteem
Pearson Correlation	Digital Knowledge	1.000	-0.139
	Self-Esteem	-0.139	1.000
Sig. (1-tailed)	Digital Knowledge	.	0.008
	Self-Esteem	0.008	.
N	Digital Knowledge	299	299
	Self-Esteem	299	299

Results

We calculated the Pearson correlation for each of the relationships: digital knowledge–self-esteem and digital skills–self-esteem, with the results shown in Tables 2 and 3.

Table 3

Pearson Correlation between Digital Skills and Self-Esteem

		Digital Skills	Self-Esteem
Pearson Correlation	Digital Skills	1.000	0.065
	Self-Esteem	0.065	1.000
Sig. (1-tailed)	Digital Skills	.	0.132
	Self-Esteem	0.132	.
N	Digital Skills	299	299
	Self-Esteem	299	299

Results

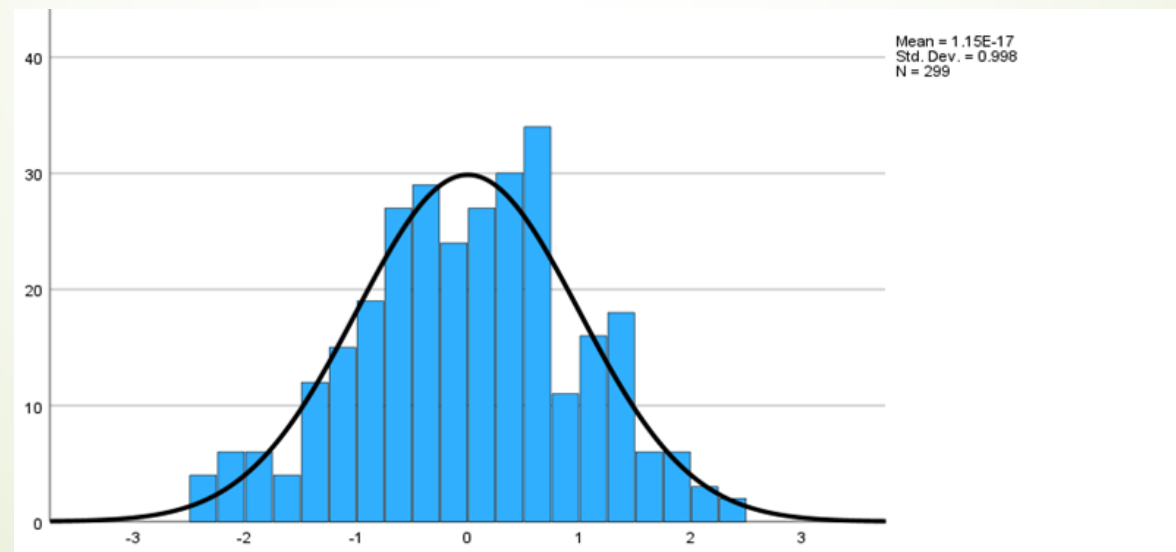
- In terms of the correlation between digital knowledge and self-esteem, we observe that the value is negative ($r = -0.139$), indicating a negative correlation (Table 2).
- There is a positive correlation between students' digital skills and their level of self-esteem, with a value of $r = 0.065$ (Table 3).
- The results of the regression analyses showed that the level of self-esteem explains 1.9% of the variance in the relationship with digital knowledge, $R^2 = 0.019$, $F(1, 297) = 5.854$, $p = 0.016$. Self-esteem is a significant predictor of participants' digital knowledge, $B = -0.125$, $t = -2.42$, $p = 0.016$. On the other hand, regarding the relationship between the level of self-esteem and the digital skills of the students included in the study, we noted that this relationship is not significant. The obtained values were $R^2 = 0.004$, $F(1, 297) = 1.248$, $p = 0.265$, $B = 0.375$, $t = 1.117$, $p = 0.265$.

Results

Regarding the standard residuals of the regression, relevant information is provided based on the two figures (Figure 1 and Figure 2). From these, we observe that the residuals have a normal distribution in both cases.

Figure 1

Standardized residual of the regression for the variable digital knowledge

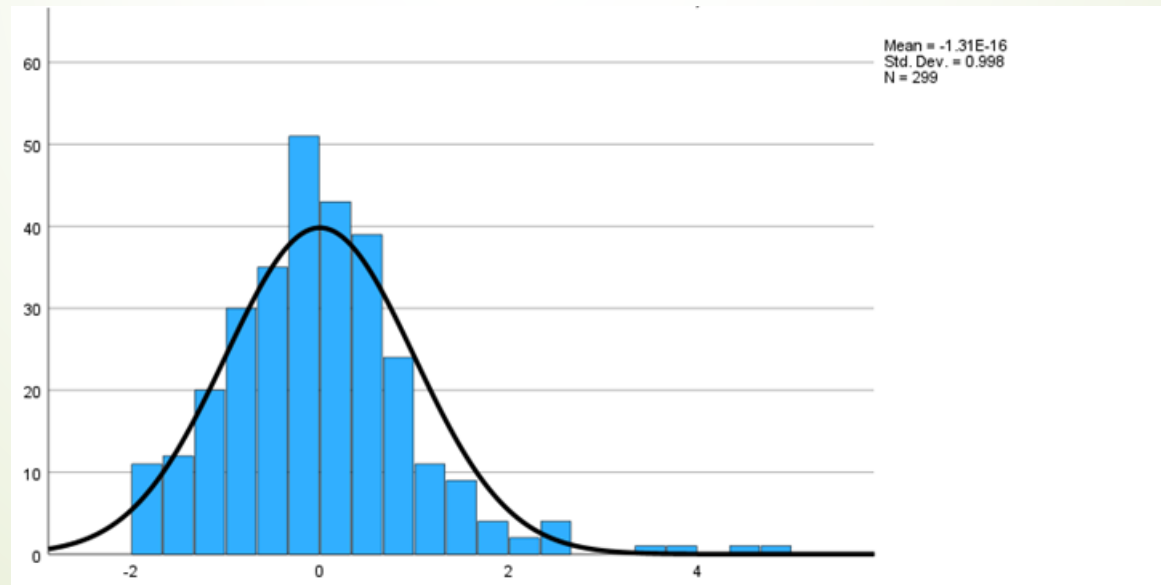


Results

Regarding the standard residuals of the regression, relevant information is provided based on the two figures (Figure 1 and Figure 2). From these, we observe that the residuals have a normal distribution in both cases.

Figure 2

Standardized residual of the regression for the variable digital skills



Discussion

- Based on the results obtained, we observed that the self-esteem of primary school students significantly influences only their digital knowledge, in contrast to their digital skills. This indicates that students with higher self-esteem are more interested in acquiring the necessary knowledge for the effective use of digital devices;
- A positive self-image is insufficient for students to develop digital skills (Arshad, Zaidi & Mahmood, 2015; Afari, Ward & Khine, 2012). The latter represents a more complex aspect, which develops over time through constant effort from students, with the involvement of all educational stakeholders. There is a need for an impulse in acquiring the necessary digital knowledge, explained in this case by a higher level of self-esteem. The discussion becomes more complex when the concept of competence is introduced, as a range of factors is needed for young children to be thoroughly prepared to face all the challenges in the online environment. Support from parents, guardians, teachers, and society as a whole is necessary for younger generations to be ready for the challenges of the future.

Research Limits and Future Directions

- ▶ One limitation is the inclusion of only primary school students, allowing for the possibility in the future to conduct research that includes middle school or high school students to investigate the relationship between self-esteem and their digital skills/knowledge.
- ▶ Another limitation arises from the participation in the study being restricted to students from a single county in the country. This could represent a future research opportunity to include students from all counties to achieve national representativeness.
- ▶ The third limitation is the analysis of the influence of only a single independent variable (self-esteem) on the dependent variables (digital knowledge and skills). Future research could also examine the effects of different independent variables (time spent online in a day, family structure, parents' education level, etc.) on the development of digital skills and knowledge.

Conclusions

- This research introduces as a novel element the investigation of the relationship between digital knowledge and skills and the level of self-esteem, specifically in the context of primary education in the local setting. The innovative aspect lies in the fact that students in primary education are influenced by their self-image only in acquiring digital knowledge. Their skills in using digital technologies are not significantly determined by self-esteem, according to the results obtained from this study.
- We can explain this by the need for children to have support from all educational stakeholders so that they are prepared for the novelty brought about by the presence of digital tools in everyday life. Self-esteem acts as a "driving force" in the desire to accumulate as much information as possible about the digital environment, as we observed from the collected data. Self-appreciation can serve as a stimulus for developing a considerable perceptual foundation at a young age.
- The complexity involved in developing digital skills necessitates considering a range of factors that underlie these skills. Support from all educational stakeholders, perseverance, and digital maturity are some of the elements that join self-esteem in shaping generations of young people prepared to adequately meet the demands of the present and future.
- We hope that the results obtained will provide directions for practitioners to offer students learning experiences tailored to their needs. We also hope that these results will serve as a source of information for future studies related to self-esteem, digital knowledge, and skills.

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Thank you very much for
your attention!

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