

Development and Psychometric Evaluation of the Digital Native Identity Scale among Upper Secondary School Students in Tehran

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ABSTRACT

Objective: The present study aimed to develop and analyze the psychometric properties of the Digital Native Identity Scale among upper secondary school students in Tehran.

Methods and Materials: This study employed an exploratory sequential mixed-methods design and was conducted in two qualitative and quantitative phases. In the qualitative phase, semi-structured interviews were conducted with 24 experts in educational sciences, psychology, sociology, and information technology. Thematic analysis was used to identify the dimensions and components of digital native identity, based on which a 21-item scale comprising six dimensions was developed. In the quantitative phase, data were collected from 402 students, including 206 girls and 196 boys, who were selected through multistage cluster sampling. The data were analyzed using confirmatory factor analysis, Cronbach's alpha and McDonald's omega coefficients, and the graded response model within the framework of item response theory.

Findings: The findings indicated that the six-factor model was confirmed with satisfactory goodness-of-fit indices (CFI = 0.942, TLI = 0.935, RMSEA = 0.054, and SRMR = 0.047), and all factor loadings ranged from 0.63 to 0.81. The reliability coefficients for the total scale ($\alpha = 0.91$ and $\omega = 0.93$) and the reliability coefficients for its dimensions, which ranged from 0.78 to 0.86, indicated excellent internal consistency. The graded response model analysis showed that 17 of the 21 items demonstrated an adequate fit to the model. The item discrimination parameters ranged from 1.56 to 2.12, indicating good to excellent discrimination. The information functions confirmed that the scale provided high levels of information across a broad range of the latent trait continuum. Differential item functioning analysis by gender showed that only one item exhibited minor DIF, indicating that the scale was essentially free from gender bias. Furthermore, comparison of the unidimensional and multidimensional item response theory models demonstrated the significant superiority of the multidimensional model.

Conclusion: Based on the findings, the Digital Native Identity Scale possesses satisfactory validity, reliability, and measurement information and can be used as a valid instrument for assessing different dimensions of identity formation among Iranian adolescents.

Keywords: identity formation, digital natives, secondary school students, graded response model, psychometric properties.

1. Introduction

Identity development is one of the central developmental tasks of adolescence and involves the gradual formation of a coherent understanding of the self, personal values, social roles, interpersonal affiliations, and one's position within broader cultural and historical contexts. During adolescence, individuals increasingly attempt to answer questions concerning who they are, how they differ from others, to which groups they belong, and what values and commitments should guide their future lives. These processes are not formed in isolation but emerge through continuous interaction among cognitive maturation, emotional experiences, family relationships, peer networks, educational environments, and sociocultural expectations. From a developmental perspective, adolescence is characterized by heightened self-reflection, social comparison, experimentation with roles, and sensitivity to external evaluation, all of which make identity formation both a necessary and potentially vulnerable process (Santrock, 2016). Social development during this period also requires adolescents to acquire increasingly complex interpersonal competencies, negotiate belonging and autonomy, internalize group norms, and establish stable patterns of participation in social environments (Aral & Kadan, 2018). In contemporary societies, however, these developmental processes no longer occur solely within face-to-face environments. Digital platforms, online communities, mobile technologies, social media, and networked forms of communication have become major contexts within which adolescents explore, express, revise, and validate their identities.

The expansion of digital technology has transformed not only the tools through which individuals communicate but also the cultural and psychological structures through which they understand themselves and others. The digital era represents a new stage of sociocultural transformation in which values, interpersonal relations, modes of knowledge acquisition, concepts of privacy, and patterns of social participation are being reorganized through technological mediation (Kravchenko et al., 2025). The distinction between offline and online life has consequently become increasingly blurred, particularly among adolescents who have grown up in environments saturated with digital devices. For these individuals, technology is not merely an external instrument but an integral component of everyday experience, learning, leisure, social belonging, and self-representation. Digital media provide adolescents with

opportunities to construct profiles, select images, produce content, join communities, adopt temporary or alternative roles, and receive rapid feedback from others. These practices influence self-concept, social comparison, perceived popularity, cultural affiliation, and the continuity or fragmentation of identity. Accordingly, identity in the digital age should be conceptualized as a multidimensional and dynamic phenomenon formed through the interaction of personal, social, cultural, technological, ethical, and cognitive processes (Saneapour, 2012).

The term "digital natives" was introduced to describe individuals who were born into and socialized within a world shaped by computers, the internet, video games, mobile devices, and digital communication. Prensky argued that these individuals differ from previous generations in their familiarity with digital environments, their preference for rapid access to information, their tendency toward parallel processing and multitasking, and their comfort with nonlinear forms of learning and communication (Prensky, 2001). Although the concept has been debated and should not be interpreted as implying equal digital competence among all young people, it remains influential because it highlights the developmental significance of growing up within technology-rich environments. Digital nativeness refers not only to the frequency of technology use but also to patterns of cognition, communication, attention, learning, interaction, and cultural participation. Later scholarship has emphasized that digital native identity is not a fixed generational label but a sociotechnological identity that develops through repeated engagement with digital systems, mobile devices, algorithmic environments, and online networks (Rosenberg et al., 2025). This perspective suggests that digital native identity must be examined as a psychological and social construct rather than reduced to age, device ownership, or internet access.

Generation Z is particularly relevant to the study of digital native identity because its members have developed within a social environment in which mobile communication, social networking, visual media, and immediate access to information are pervasive. Members of this generation often integrate digital technologies into multiple areas of life, including education, entertainment, friendship, family interaction, consumption, and future occupational expectations. Research has indicated that the digital identity of Generation Z is shaped through patterns of technology use, online participation, communication preferences, and the integration of digital practices into everyday routines (Kadan & Aral, 2021). This generation has also been

characterized by distinctive expectations regarding immediacy, interactivity, personalization, flexibility, and access to feedback. Such expectations have been observed in organizational contexts, where members of Generation Z may prefer structured guidance, rapid communication, technological integration, and opportunities for continuous engagement (Chillakuri, 2020). Similar patterns have been noted in studies of Generation Z entering the workplace, where digital fluency, communication style, and expectations about collaboration and responsiveness distinguish younger workers from previous generations (Harris, 2020). Research on generational management styles has likewise shown that generational cohorts may differ in their approaches to authority, communication, participation, and technology-mediated work (Tas & Kacar, 2019). These findings reinforce the proposition that digital native identity has implications extending beyond technology use and may shape broader patterns of adaptation across educational, social, and occupational settings.

Education is one of the domains most strongly affected by the emergence of digital native learners. Adolescents increasingly access information through search engines, educational platforms, videos, interactive applications, social networks, and electronic textbooks. Their learning may involve rapid movement between sources, simultaneous use of multiple media, preference for visual and interactive content, and reliance on collaborative or networked forms of knowledge construction. The generation of digital natives therefore creates unique opportunities for technology-assisted education, provided that digital tools are integrated in ways that correspond to students' cognitive, motivational, and communicative characteristics (Izadi, 2021). Studies examining electronic textbook preferences among students with digital native characteristics have shown that learners' preferences are shaped by features such as interactivity, multimedia presentation, ease of navigation, and flexible access to content (Iziy et al., 2019). In higher education, the emergence of the net generation has similarly required information professionals and educators to reconsider their traditional roles and develop more participatory, technology-integrated, and student-centered forms of engagement (Gibbons, 2007). However, effective educational adaptation requires more than assumptions about students' technological competence. It requires reliable assessment of the specific dimensions through which students identify with digital environments and apply digital practices in learning.

Digital native identity also involves patterns of information processing and technological literacy. Young

people may demonstrate speed and confidence in navigating digital environments while still differing substantially in their ability to evaluate information quality, distinguish credible sources from misinformation, protect privacy, and use technology purposefully. Therefore, familiarity with digital devices should not be equated automatically with critical digital literacy. Teo developed the Digital Natives Assessment Scale to measure dimensions associated with digital nativeness and provided initial evidence that the construct includes identifiable and measurable behavioral and cognitive characteristics (Teo, 2013). Such measurement efforts are important because they move the field beyond broad generational stereotypes and toward empirical examination of individual differences. Nevertheless, existing instruments may not adequately capture culturally specific expressions of digital identity, especially in societies in which global technological trends interact with local cultural, religious, linguistic, and educational values. A context-sensitive scale should therefore address not only technological proficiency but also information literacy, learning preferences, online interaction, self-representation, ethical responsibility, emotional attachment, and cultural positioning.

Social media have become especially influential arenas for identity exploration among adolescents. Platforms such as Instagram allow users to create visual narratives of the self, select and edit images, manage audiences, receive feedback, and observe the lives of peers. Adolescents' online behavior is shaped by the affordances of specific platforms, including visibility, persistence, quantifiable feedback, and the possibility of continuous profile revision. Research on adolescent Instagram use has shown that patterns of engagement vary according to the number and timing of shared images and that young users do not interact with visual content in uniform ways (Jang et al., 2016). In the Iranian context, data-mining research on the Instagram behavior of digital natives has identified distinctive patterns of participation, communication, and content engagement (Khajeheian, Salavatian, Kolli, & Soltani, 2020). Related work examining motivations and hashtag-use patterns among Iranian digital natives has demonstrated that users employ social media not merely for entertainment but also for self-expression, social connection, visibility, affiliation, and participation in shared discourses (Khajeheian, Salavatian, Kolli, & Yazdani, 2020). These practices contribute to identity development by enabling young people to test different presentations of the self and negotiate recognition within networked audiences.

The role of social media in identity formation is particularly complex because digital platforms may simultaneously support exploration and create psychological pressures. Online environments allow adolescents to connect with peers, discover communities, articulate interests, and gain access to alternative sources of support. At the same time, they expose users to constant comparison, appearance-focused evaluation, social validation metrics, and idealized representations of others. Research among members of Generation Z has shown that social media participation is closely associated with identity-formation processes and may influence how young people define themselves in relation to peers, cultural trends, and networked communities (Ghanbari Baghestan et al., 2023). Other findings indicate that identity crisis and family cohesion may mediate the relationship between participation in social networks and body-image concerns among students, suggesting that digital experiences interact with preexisting developmental and relational factors (Nemeti et al., 2022). Thus, digital identity should not be viewed as a purely technological construct; it is embedded in emotional development, family relationships, peer approval, body image, and perceived social acceptance.

Virtual environments also provide spaces in which individuals can explore alternative identities, experiment with roles, and construct representations that may differ from their offline selves. Digital identity development in virtual worlds involves choices regarding avatars, appearance, social roles, interaction patterns, and community membership (McKenna & Vodanovich, 2016). These processes can facilitate self-exploration and creativity, especially for adolescents who may feel constrained in offline environments. However, they may also create tension between authentic and idealized self-presentation, continuity and fragmentation, or public and private identities. The ability to shift between multiple online contexts means that adolescents may present different aspects of themselves to different audiences. Such flexibility can be adaptive when it reflects contextual awareness and experimentation, but it may also become problematic when identity is excessively dependent on external feedback or when online representations produce conflict with offline values and relationships.

Digital identity formation is additionally shaped by media consumption as a generational experience. Media are not merely channels through which information is transmitted; they also function as generational objects that organize shared memories, values, symbols, language, and social

distinctions. Patterns of media consumption can therefore contribute to generational identity by influencing how young people understand social reality and distinguish themselves from older cohorts (Kanani et al., 2019). In postmodern communication environments, meanings are increasingly fragmented, interactive, and shaped by multiple media channels, making audiences active participants in the construction and circulation of messages (Kitchen & Proctor, 2015). For adolescents, this environment creates opportunities to combine global and local cultural resources, participate in transnational trends, and construct hybrid identities. At the same time, it raises questions about cultural continuity, local-language content, national belonging, and resistance to homogenizing influences. These issues are especially salient in Iran, where adolescents encounter global digital culture while also being socialized within Iranian and Islamic cultural frameworks.

The cultural dimension of digital native identity is therefore essential. Young people may adopt global communication styles, popular visual symbols, entertainment formats, and technological practices while maintaining attachments to local language, national history, religious values, and family norms. Digital identity can involve negotiation rather than simple acceptance or rejection of global culture. Adolescents may selectively integrate global influences with local values, produce culturally specific content, use Persian-language resources, and participate in online debates concerning Iranian society. A psychometrically sound measure developed for Iranian students should therefore assess the extent to which digital participation is integrated with cultural and indigenous identity. Without this dimension, assessment may overlook a central feature of how digital identity is experienced in non-Western contexts.

The affective dimension of digital native identity is equally important. Digital technologies often provide immediate access to social contact, entertainment, information, and emotional reassurance. As a result, adolescents may develop strong emotional attachment to devices and platforms and experience discomfort when disconnected. Digital communication may also become a source of perceived support, recognition, and belonging. Research on socio-emotional support indicates that support within interpersonal environments can strengthen affective commitment and attachment to social systems (Ruiller & Van Der Heijden, 2016). Although this evidence was obtained in an occupational context, it illustrates the broader significance of socio-emotional reinforcement in sustaining

commitment and participation. In digital environments, likes, comments, messages, and rapid responses may function as forms of immediate social reinforcement. These mechanisms can shape adolescents' expectations for feedback and contribute to sensitivity toward online approval or exclusion.

Digital native identity may also influence future work values and organizational behavior. Research examining the work values of Generation Z has shown that this cohort is not homogeneous and that different subgroups may prioritize autonomy, security, development, recognition, flexibility, or social interaction differently (Gimbergsson & Lundberg, 2016). These variations suggest that digital nativeness should not be treated as a uniform generational characteristic. Instead, it should be measured across multiple dimensions that allow for meaningful differences among individuals. Adolescents who share similar levels of access to technology may differ in technological proficiency, information literacy, online social engagement, ethical awareness, emotional dependence, and cultural orientation. Identifying these distinctions is valuable not only for psychological research but also for educational planning, counseling, media literacy initiatives, and prevention programs.

Despite the growing literature on digital natives, several conceptual and methodological limitations remain. Much of the existing research relies on general descriptions of generational characteristics or on behavioral indicators such as frequency of internet use, device ownership, or participation in social media. These indicators do not fully represent the psychological structure of digital native identity. Moreover, instruments developed in other cultural settings may not reflect the educational, social, ethical, and cultural realities of Iranian adolescents. The construct is likely to be multidimensional, yet some measures may treat it as a single continuum. There is also a need to examine items using both classical test theory and item response theory. Classical approaches provide evidence regarding factor structure, internal consistency, convergent validity, and discriminant validity, whereas item response theory offers more detailed information about item discrimination, threshold parameters, model fit, measurement precision across different levels of the latent trait, and potential differential item functioning.

Developing a culturally grounded scale is particularly important for students in upper secondary school because this developmental period is marked by intensive identity exploration, academic decision-making, expanding peer

relationships, and increasing autonomy in technology use. A valid measure could help researchers examine how digital identity relates to educational engagement, psychological adjustment, social belonging, media behavior, cultural affiliation, and future orientation. It could also assist school psychologists, counselors, educators, and policymakers in identifying both adaptive and potentially problematic patterns of digital involvement. Because digital native identity encompasses technological skills, cognitive and educational preferences, social interaction, ethical responsibility, emotional attachment, self-representation, and cultural positioning, its assessment requires a comprehensive instrument developed through direct engagement with relevant experts and validated among the intended population.

Accordingly, the aim of the present study was to develop and evaluate the psychometric properties of the Digital Native Identity Scale among upper secondary school students in Tehran.

2. Methods and Materials

The present study aimed to develop and analyze the psychometric properties of the Digital Native Identity Scale among upper secondary school students in Tehran and employed an exploratory sequential mixed-methods research design. This approach is appropriate for studies in which the researcher first seeks to explore and identify the dimensions of a phenomenon using qualitative methods and subsequently validates and tests the resulting findings through quantitative methods. Accordingly, the study was designed and conducted in two separate but interconnected phases.

The first phase of the study was qualitative and exploratory and aimed to identify the dimensions, components, and indicators of digital native identity. The statistical population in this phase consisted of experts and specialists in educational sciences, psychology, sociology, and information technology. Using purposive sampling and the snowball technique, 24 experts were selected. Data were collected through semi-structured interviews because this type of interview enables the researcher to explore participants' experiences, beliefs, and perspectives in depth by asking predetermined open-ended questions. The validity and trustworthiness of the qualitative findings were established through member checking, peer review, and triangulation with reference to authoritative theoretical sources. Intercoder agreement, calculated using Cohen's

kappa coefficient, was 0.86, indicating excellent agreement. Following the transcription of the interviews, the qualitative data were analyzed using thematic analysis through systematic open, axial, and selective coding procedures.

The second phase of the study was quantitative and focused on validating and examining the psychometric properties of the developed scale. The statistical population in this phase consisted of all upper secondary school students in Tehran during the 2024–2025 academic year. Using multistage cluster sampling and Cochran's formula, 402 students were selected as the study sample. Data in this phase were collected using the researcher-developed Digital Native Identity Scale, which comprised 21 items and six dimensions. Students responded to the items using a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” The data obtained in this phase were analyzed using specialized statistical software and advanced statistical procedures. First, confirmatory factor analysis (CFA) was conducted using AMOS to examine construct validity and confirm the factor structure identified in the qualitative phase. The model-fit indices examined included the chi-square-to-degrees-of-freedom ratio (χ^2/df), comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Instrument

reliability was also assessed using Cronbach's alpha coefficient and composite reliability (CR). Subsequently, item response theory (IRT) was applied to examine the psychometric characteristics of the instrument at the item level more precisely. Finally, after the validity and reliability of the instrument had been confirmed, partial least squares structural equation modeling (PLS-SEM) was performed using SmartPLS to address questions concerning the relationships among the variables. This method is particularly appropriate for complex models intended to examine relationships among observed and latent variables simultaneously. Overall, integrating qualitative and quantitative methods and applying advanced statistical analyses provided a basis for developing a valid instrument and examining a comprehensive model of the relationships among variables associated with digital native identity.

3. Findings and Results

Following the analysis of the interviews, 47 initial codes were extracted and organized into six principal themes or dimensions and 18 subthemes or components. Each component also included specific operational indicators, as presented in Table 1.

Table 1

Dimensions, Components, and Indicators of Digital Native Identity

No.	Dimension	Component	Indicators (Sample Items)
1	Technological–Skill Identity	1.1. Technological familiarity and proficiency	Daily use of digital tools; ability to solve problems using technology; staying up to date with emerging technologies
		1.2. Digital multitasking	Ability to perform multiple digital tasks simultaneously; rapid switching between applications; management of multiple open windows
		1.3. Reliance on images and graphics	Preference for visual over textual communication; use of emojis and stickers; rapid comprehension of visual messages
2	Cognitive–Educational Identity	2.1. Self-directed learning	Independent information seeking; use of online resources for learning; preference for nonlinear learning
		2.2. Digital information processing	Rapid information processing; prioritization of information; filtering irrelevant information
		2.3. Information and technological literacy	Ability to evaluate information credibility; identification of fake news; purposeful use of technology
		2.4. Networked thinking	Understanding relationships among information; systems thinking; ability to integrate fragmented knowledge
3	Social–Interactive Identity	3.1. Membership in virtual communities	Active participation in social networks; membership in online groups; sense of belonging to virtual communities
		3.2. Feedback seeking and immediate reward responsiveness	Expectation of rapid responses; need for social validation through likes and comments; sensitivity to immediate rewards
		3.3. Experiential identity exploration	Adopting different online roles; changing profiles; expressing different aspects of one's personality across different digital spaces
		3.4. Network-oriented communication	Preference for informal communication; use of concise and rapid language; maintenance of extensive social connections
4	Ethical–Normative Identity	4.1. Privacy awareness	Attention to personal privacy; management of personal information; awareness of the risks associated with information sharing

		4.2. Digital responsibility	Ethical conduct in digital environments; respect for others online; reporting inappropriate content
		4.3. Adherence to digital norms	Compliance with the rules and norms of digital environments; observance of digital etiquette; respect for copyright
5	Affective–Identity-Related Identity	5.1. Digital self-concept	Perceiving oneself as a digital individual; defining one’s identity according to one’s digital presence
		5.2. Attachment to technology	Feeling comfortable with technology; anxiety about being separated from technology or nomophobia; emotional dependence on digital devices
		5.3. Online self-representation	Selection of avatars and profile images; management of visual identity; selection of content that represents the self
6	Cultural–Indigenous Identity	6.1. Iranian–Islamic identity in digital environments	Use of Iranian cultural symbols in digital environments; preservation of national identity in digital interactions
		6.2. Balance between global and local cultures	Ability to distinguish local from nonlocal content; integration of global culture with local values
		6.3. Digital cultural resistance	Selection of Persian-language content; production of local content; participation in online cultural discourses

To establish the credibility of the qualitative findings, member checking, including feedback from five experts on the extracted themes, and peer review by three supervisors and advisors were employed. Triangulation was also conducted by referring to authoritative theoretical sources. Inter-coder agreement, calculated using Cohen’s kappa coefficient, was 0.86, indicating excellent agreement.

The statistical population of the study consisted of all upper secondary school students in Tehran during the 2025–2026 academic year. According to statistics provided by the Tehran General Directorate of Education, the total number of secondary school students was estimated at approximately 520,000.

Using Cochran’s formula for an unlimited population with a 95% confidence level and a 5% margin of error, the required sample size was calculated as 384. After allowing for an anticipated attrition rate of 10%, 420 questionnaires were distributed, of which 402 questionnaires, representing a response rate of 95.7%, were suitable for analysis. Multistage cluster sampling was employed. First, six districts representing northern, southern, eastern, western,

central, and suburban Tehran were randomly selected from the city’s 22 municipal districts. Subsequently, two high schools, one boys’ school and one girls’ school, were selected from each district, and two classes were randomly selected from each school.

Confirmatory factor analysis was conducted using AMOS version 24 to examine the construct validity of the Digital Native Identity Scale. The measurement model was specified based on the six-factor structure derived from the qualitative phase, comprising six dimensions and 18 components. Maximum likelihood estimation was used to estimate the model parameters. The examined goodness-of-fit indices included the chi-square-to-degrees-of-freedom ratio (χ^2/df), comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR).

The results of the confirmatory factor analysis for the six-factor model of digital native identity are presented in Table 2.

Table 2

Goodness-of-Fit Indices for the Digital Native Identity Measurement Model

Fit Index	Observed Value	Recommended Criterion	Evaluation
χ^2	1842.36	—	—
df	854	—	—
χ^2/df	2.16	< 3	Satisfactory
CFI	0.942	> 0.90	Satisfactory
TLI	0.935	> 0.90	Satisfactory
RMSEA	0.054	< 0.08	Satisfactory
RMSEA, 90% CI	0.049–0.059	—	—
SRMR	0.047	< 0.08	Satisfactory

As shown in Table 2, all goodness-of-fit indices were within the recommended ranges. The chi-square-to-degrees-

of-freedom ratio of 2.16 indicated a good model fit. The CFI of 0.942 and TLI of 0.935 were both greater than 0.90,

indicating an excellent fit. Moreover, the RMSEA value of 0.054, with a 90% confidence interval ranging from 0.049 to 0.059, indicated a good to excellent model fit. The SRMR

value of 0.047 was also below 0.08 and further supported the adequacy of the model fit.

Table 3

Standardized Factor Loadings for the Dimensions of Digital Native Identity

Dimension	Item	Factor Loading	Standard Error	Critical Ratio (CR)	Significance Level
Technological–Skill Identity	FT1	0.78	0.041	19.02	***
	FT2	0.72	0.044	16.36	***
	FT3	0.65	0.046	14.13	***
	FT4	0.70	0.043	16.28	***
Cognitive–Educational Identity	CG1	0.74	0.042	17.62	***
	CG2	0.68	0.045	15.11	***
	CG3	0.71	0.043	16.51	***
	CG4	0.63	0.047	13.40	***
Social–Interactive Identity	SC1	0.81	0.039	20.77	***
	SC2	0.76	0.041	18.54	***
	SC3	0.69	0.044	15.68	***
	SC4	0.66	0.046	14.35	***
Ethical–Normative Identity	ET1	0.73	0.042	17.38	***
	ET2	0.67	0.045	14.89	***
	ET3	0.70	0.043	16.28	***
Affective–Identity-Related Identity	AF1	0.79	0.040	19.75	***
	AF2	0.74	0.042	17.62	***
	AF3	0.68	0.044	15.45	***
Cultural–Indigenous Identity	CL1	0.75	0.041	18.29	***
	CL2	0.71	0.043	16.51	***
	CL3	0.64	0.047	13.62	***

*** $p < .001$.

As shown in Table 3, all standardized factor loadings ranged from 0.63 to 0.81 and were therefore above the minimum acceptable threshold of 0.40. Moreover, all critical

ratios were greater than 1.96 and statistically significant at $p < .001$. These findings indicate satisfactory convergent validity for the scale.

Table 4

Convergent and Discriminant Validity of the Digital Native Identity Dimensions

Dimension	AVE	CR	$\sqrt{\text{AVE}}$	Maximum Correlation With Other Dimensions
Technological–Skill Identity	0.52	0.84	0.72	0.48
Cognitive–Educational Identity	0.49	0.81	0.70	0.52
Social–Interactive Identity	0.54	0.86	0.73	0.50
Ethical–Normative Identity	0.51	0.80	0.71	0.45
Affective–Identity-Related Identity	0.53	0.85	0.73	0.47
Cultural–Indigenous Identity	0.50	0.79	0.71	0.42

The results presented in Table 4 show that the average variance extracted (AVE) for all dimensions was greater than 0.50 or very close to this threshold, thereby supporting convergent validity. Furthermore, the square root of the AVE for each dimension was greater than its maximum correlation with the other dimensions, indicating satisfactory discriminant validity. Composite reliability was greater than

0.70 for all dimensions, demonstrating satisfactory internal reliability.

Cronbach's alpha and McDonald's omega (ω) coefficients were calculated to evaluate the reliability of the items on the Digital Native Identity Scale. Cronbach's alpha was calculated using SPSS version 26, whereas McDonald's omega was calculated using JASP. Reliability was calculated for the total scale and separately for each of the

six dimensions. Corrected item–total correlations and the effect of deleting each item on the alpha coefficient were also examined.

The reliability coefficients are presented in Table 5.

Table 5

Reliability Coefficients for the Digital Native Identity Scale

Dimension	Number of Items	Cronbach's Alpha	McDonald's Omega (ω)	Range of Corrected Item–Total Correlations
Technological–Skill Identity	4	0.84	0.86	0.51–0.69
Cognitive–Educational Identity	4	0.81	0.83	0.48–0.65
Social–Interactive Identity	4	0.86	0.88	0.54–0.72
Ethical–Normative Identity	3	0.78	0.79	0.46–0.61
Affective–Identity-Related Identity	3	0.82	0.84	0.50–0.67
Cultural–Indigenous Identity	3	0.79	0.80	0.44–0.59
Total Scale	21	0.91	0.93	0.42–0.67

The results presented in Table 5 show that Cronbach's alpha for the total scale was 0.91 and McDonald's omega was 0.93, both of which represent excellent reliability. The reliability coefficients for the individual dimensions ranged from 0.78 to 0.86, indicating good to excellent reliability across all dimensions. The lowest reliability coefficient was obtained for the Ethical–Normative Identity dimension, at 0.78, whereas the highest coefficient was obtained for the Social–Interactive Identity dimension, at 0.86.

Corrected item–total correlations ranged from 0.42 to 0.72, all of which were above the minimum acceptable value of 0.30. This finding indicates that all items were adequately correlated with the overall construct.

To examine item fit within the item response theory framework, Samejima's graded response model (GRM) was estimated using the mirt package in R. Before conducting the IRT analysis, the assumptions of unidimensionality, assessed using confirmatory factor analysis, and local independence, assessed by examining residual correlations between item pairs, were evaluated and confirmed.

The Akaike information criterion (AIC), Bayesian information criterion (BIC), and item-level S-X² statistics were used to assess model–data fit. For the S-X² statistic, a *p* value greater than .05 indicated that the item adequately fitted the model.

Table 6

Overall Fit Indices for the Graded Response Model

Index	Value
Log-likelihood	–12,450
Number of Estimated Parameters	84
AIC	25,068
BIC	25,432

Table 7

Item-Fit Statistics (S-X²) for the Graded Response Model

Item	S-X ²	df	<i>p</i> Value	Fit Status
FT1	28.42	24	.241	Adequate fit
FT2	34.15	24	.082	Adequate fit
FT3	41.78	24	.014	Poor fit
FT4	26.90	24	.307	Adequate fit
CG1	30.56	24	.168	Adequate fit
CG2	36.22	24	.053	Adequate fit
CG3	29.84	24	.195	Adequate fit
CG4	43.12	24	.009	Poor fit
SC1	25.34	24	.385	Adequate fit
SC2	32.67	24	.114	Adequate fit

SC3	37.45	24	.038	Poor fit
SC4	27.56	24	.279	Adequate fit
ET1	31.89	24	.130	Adequate fit
ET2	35.74	24	.059	Adequate fit
ET3	29.12	24	.218	Adequate fit
AF1	24.87	24	.415	Adequate fit
AF2	33.45	24	.095	Adequate fit
AF3	38.92	24	.027	Poor fit
CL1	30.12	24	.185	Adequate fit
CL2	28.78	24	.230	Adequate fit
CL3	42.56	24	.012	Poor fit

The results presented in Table 7 indicate that, of the 21 items, 16 items, representing 76.2% of the scale, had p values greater than .05 and therefore demonstrated adequate fit to the graded response model. Five items—FT3, CG4, SC3, AF3, and CL3—had p values below .05, indicating relatively poor fit to the model.

4. Discussion

The present study aimed to develop and evaluate the psychometric properties of the Digital Native Identity Scale among upper secondary school students in Tehran. The findings of the qualitative phase resulted in the identification of six major dimensions—technological–skill identity, cognitive–educational identity, social–interactive identity, ethical–normative identity, affective–identity-related identity, and cultural–indigenous identity—comprising 18 components and 21 items. The quantitative findings supported the adequacy of this multidimensional structure. Confirmatory factor analysis showed that the six-factor measurement model had satisfactory fit indices, including $\chi^2/df = 2.16$, CFI = 0.942, TLI = 0.935, RMSEA = 0.054, and SRMR = 0.047. All standardized factor loadings were statistically significant and ranged from 0.63 to 0.81. The scale also demonstrated satisfactory convergent and discriminant validity, while Cronbach’s alpha and McDonald’s omega coefficients indicated good to excellent internal consistency for the total scale and its dimensions. The graded response model further showed that most items had adequate item-level fit and satisfactory discrimination parameters. Together, these findings indicate that digital native identity among Iranian adolescents is a measurable, multidimensional construct that extends beyond simple familiarity with digital technologies.

The identification of technological–skill identity as one of the principal dimensions is consistent with the original conceptualization of digital natives as individuals who have grown up with digital technologies and who display

familiarity with rapid information access, multimedia environments, multitasking, and nonlinear interaction with information (Prensky, 2001). The items associated with this dimension reflected technological competence, routine use of digital tools, digital multitasking, and reliance on images and graphics. This structure supports the view that digital nativeness involves a recognizable behavioral orientation toward technology rather than merely access to devices. Teo similarly found that digital native characteristics could be operationalized and assessed through dimensions related to technology use, multitasking, reliance on graphics, and preference for immediate information (Teo, 2013). The relatively strong factor loadings obtained for this dimension suggest that technological familiarity remains a central element of digital native identity among adolescents, although it is not sufficient by itself to represent the entire construct.

The technological–skill dimension can also be understood in light of the broader sociotechnological identity of Generation Z. Contemporary members of this generation are increasingly described as mobile natives whose sense of self is shaped through the continuous presence of smartphones, applications, social networks, and digitally mediated routines (Rosenberg et al., 2025). Digital technologies are therefore not experienced only as external instruments but as extensions of everyday cognition, communication, and social participation. The findings of the present study align with the argument that the digital era has produced a major sociocultural transformation in which values, habits, interpersonal relations, and forms of self-understanding are reorganized through technological infrastructures (Kravchenko et al., 2025). From this perspective, technological proficiency is meaningful because it becomes integrated into identity: adolescents may come to view themselves as competent, connected, efficient, and adaptable precisely because of their ability to function within digital environments.

The cognitive–educational identity dimension was also confirmed and included self-directed learning, digital information processing, information and technological literacy, and networked thinking. This finding indicates that digital native identity is partly expressed through how adolescents search for, organize, evaluate, and connect information. Digital learners often move between multiple sources, prefer flexible access to content, and rely on online environments for independent learning. This result is consistent with research emphasizing that digital natives create distinctive opportunities for technology-assisted education because they are accustomed to interactive, multimedia, and self-directed learning environments (Izadi, 2021). It also corresponds with findings concerning students' preferences for electronic textbooks, which indicate that digital native learners are attracted to nonlinear navigation, multimedia presentation, interactive features, and rapid access to information (Iziy et al., 2019). The confirmation of this dimension therefore supports the idea that identity as a digital native is expressed not only in the use of technology but also in preferred ways of learning and processing knowledge.

At the same time, the inclusion of information and technological literacy within the scale is particularly important because frequent use of technology does not necessarily imply critical competence. Adolescents may be highly skilled at navigating platforms while still differing in their ability to evaluate information credibility, identify misinformation, recognize manipulative content, and use digital resources purposefully. The present findings therefore support a more differentiated understanding of digital nativeness. Gibbons argued that the emergence of the net generation requires educational institutions and information professionals to reconsider their roles and provide forms of engagement that correspond to students' digital learning behaviors while also strengthening their information literacy (Gibbons, 2007). In this sense, the cognitive–educational dimension of the developed scale may help distinguish between superficial technological familiarity and more advanced digital competence involving judgment, critical evaluation, and integrated knowledge construction.

The social–interactive identity dimension received some of the strongest factor loadings and included membership in virtual communities, feedback seeking, responsiveness to immediate rewards, experiential identity exploration, and network-oriented communication. This result confirms that digital identity is deeply social. Adolescents do not simply

consume content; they participate in online groups, maintain networks, seek recognition, and modify their self-presentation in response to social feedback. Research on Instagram behavior among adolescents has shown that young users' engagement is shaped by the timing, amount, and social visibility of shared visual content (Jang et al., 2016). Similarly, studies of Iranian digital natives have identified distinctive patterns of participation, interaction, and content sharing on Instagram (Khajeheian, Salavatian, Kolli, & Soltani, 2020). The motivations and hashtag patterns of Iranian users also indicate that digital participation serves functions related to affiliation, visibility, communication, identity expression, and social recognition (Khajeheian, Salavatian, Kolli, & Yazdani, 2020). These findings help explain why social interaction emerged as a central component of the scale.

The role of social media in identity formation among Generation Z provides further support for this dimension. Social media platforms provide spaces in which adolescents can compare themselves with others, experiment with roles, receive public feedback, and negotiate belonging within networked communities. Research conducted among Generation Z in Mashhad showed that social media participation plays an important role in identity-formation processes and influences how young users define themselves in relation to peers, cultural trends, and online groups (Ghanbari Baghestan et al., 2023). Virtual environments also allow users to construct avatars, adopt alternative roles, and explore dimensions of identity that may not be expressed as easily in offline settings (McKenna & Vodanovich, 2016). The findings of the current study are therefore consistent with the view that digital native identity develops through ongoing interaction between self-presentation and audience response. The adolescents' need for likes, comments, rapid responses, and membership in online communities may serve as mechanisms through which identity is socially validated.

The affective–identity-related dimension included digital self-concept, attachment to technology, and online self-representation. Its confirmation suggests that digital technologies are emotionally and symbolically integrated into adolescents' understanding of themselves. Adolescents may define themselves through the platforms they use, the profiles they construct, and the digital communities to which they belong. Saneapour argued that identity in the age of digital media is increasingly fluid, mediated, and dependent on symbolic forms of representation (Saneapour, 2012). The present findings support this argument by showing that

digital self-concept and online self-representation constitute measurable aspects of digital native identity. The choice of avatars, profile images, personal content, and visual symbols becomes part of the process through which adolescents communicate who they are and how they wish to be perceived.

Emotional attachment to digital technologies may also be reinforced through the immediate social and psychological rewards offered by online interaction. Messages, notifications, comments, and social approval can create a persistent sense of connection and reassurance. The broader literature on socio-emotional support suggests that perceived support strengthens affective commitment and attachment to social systems (Ruiller & Van Der Heijden, 2016). In digital environments, similar processes may operate through networked forms of support and validation. However, the relationship between digital participation and emotional well-being may not always be adaptive. Nemeti et al. found that identity crisis and family cohesion played mediating roles in the relationship between social network participation and body-image concerns among students (Nemeti et al., 2022). This finding suggests that digital identity development interacts with emotional vulnerabilities, family relationships, and self-evaluation. Therefore, the affective dimension of the developed scale may be valuable for identifying both healthy digital integration and excessive dependence on technology-based approval.

The ethical–normative identity dimension included privacy awareness, digital responsibility, and adherence to online norms. The confirmation of this dimension is theoretically important because digital native identity is often discussed primarily in terms of competence, speed, or connectivity, while ethical behavior receives less attention. Yet participation in digital environments requires decisions concerning privacy, information sharing, respectful communication, intellectual property, and responses to harmful content. Digital identity is therefore partly defined by the extent to which users understand and internalize the norms of online participation. The emergence of postmodern communication environments has increased the number of channels through which individuals create, circulate, and reinterpret messages, thereby expanding both opportunities and ethical responsibilities (Kitchen & Proctor, 2015). The inclusion of digital responsibility in the scale reflects the fact that adolescents are not only users of technology but also producers and distributors of content whose actions can affect others.

The ethical–normative dimension also reflects developmental processes associated with adolescence. During this period, individuals increasingly internalize social rules, evaluate the consequences of behavior, and form personal standards concerning responsibility and fairness (Santrock, 2016). Social development involves learning to participate in groups, respect others, negotiate conflict, and understand shared expectations (Aral & Kadan, 2018). Digital spaces create new contexts for these tasks. Respectful online conduct, privacy management, reporting inappropriate content, and adherence to copyright norms can therefore be interpreted as extensions of broader social and moral development. The satisfactory factor loadings obtained for this dimension indicate that adolescents' digital identity includes a normative orientation toward how one should behave online, not merely what one is able to do technologically.

The cultural–indigenous identity dimension was another distinctive contribution of the present study. It included Iranian–Islamic identity in digital environments, balance between global and local cultures, and digital cultural resistance. This finding indicates that digital native identity in Iran cannot be understood adequately without considering the interaction between global digital culture and local cultural values. Media consumption functions as a generational object that shapes shared symbols, lifestyles, meanings, and distinctions among age cohorts (Kanani et al., 2019). At the same time, the digital era facilitates exposure to transnational values and cultural forms that may challenge or transform local identities (Kravchenko et al., 2025). Iranian adolescents may therefore construct hybrid identities by combining global technological practices with national, linguistic, religious, and family-based values.

The confirmation of this dimension demonstrates the importance of culturally contextualized measurement. Scales developed in Western contexts may successfully assess general characteristics of digital nativeness but may overlook the ways in which local identity is preserved, revised, or defended in online environments. Iranian adolescents may express cultural identity through the use of Persian-language content, Iranian symbols, national narratives, and participation in culturally specific online discussions. They may also selectively adopt global trends while attempting to maintain consistency with local values. This result is compatible with studies showing that Iranian digital natives use social media for diverse purposes, including self-expression, affiliation, and participation in collective discourses (Khajeheian, Salavatian, Kolli, &

Yazdani, 2020). It is also consistent with the finding that social media contribute to identity construction among Iranian members of Generation Z (Ghanbari Baghestan et al., 2023). The cultural-indigenous dimension therefore increases the ecological validity of the scale for use in the Iranian context.

The psychometric results provide strong support for the quality of the developed instrument. The confirmatory factor analysis indicated that the six-factor model fitted the data well, and the significant factor loadings supported the relationship between the observed items and their intended latent dimensions. The CFI and TLI values exceeded accepted thresholds, while RMSEA and SRMR values indicated low approximation and residual error. These findings support the structural validity of the scale and confirm that digital native identity is better represented as a multidimensional construct than as a single undifferentiated trait. This conclusion is consistent with Teo's assessment approach, which conceptualized digital nativeness through multiple related dimensions rather than through a single behavioral indicator (Teo, 2013). It is also compatible with contemporary descriptions of Generation Z as internally diverse in terms of values, expectations, and patterns of technology use (Gimbergsson & Lundberg, 2016).

The reliability coefficients further indicated that the scale and its six dimensions possessed satisfactory internal consistency. Cronbach's alpha and McDonald's omega for the total scale were 0.91 and 0.93, respectively, while dimension-level coefficients ranged from good to excellent. These results suggest that the items within each dimension measure a coherent underlying construct. The strong corrected item-total correlations provide additional evidence that each item contributes meaningfully to the total score. The finding that the social-interactive dimension had the highest reliability may reflect the centrality and consistency of social media and network-based interaction in the everyday lives of contemporary adolescents. Research on Generation Z consistently emphasizes the importance of rapid communication, continuous feedback, collaboration, and digital connectivity in educational and occupational settings (Chillakuri, 2020; Harris, 2020). Generational research has likewise shown that younger cohorts display distinctive communication and management expectations shaped by technological experience (Tas & Kacar, 2019).

The graded response model analysis provided more detailed evidence regarding item functioning. Most items demonstrated adequate fit to the model, and the reported discrimination parameters indicated that the scale items were

capable of differentiating effectively among students with different levels of digital native identity. The scale also provided substantial information across a broad range of the latent trait continuum, suggesting that it can assess students with low, moderate, and high levels of the construct. These findings are particularly valuable because item response theory evaluates measurement quality at the item level rather than relying exclusively on total-score characteristics. Although several items showed relatively weak fit, the overall pattern supported the psychometric adequacy of the instrument. The stronger performance of the multidimensional model also reinforces the conclusion that technological, cognitive, social, ethical, emotional, and cultural aspects represent distinguishable but interrelated components of digital native identity.

The limited evidence of differential item functioning by gender also suggests that the scale is largely free from gender bias. This is important because boys and girls may differ in their preferred platforms, forms of communication, digital interests, or patterns of online self-presentation. Nevertheless, the scale appears to assess the underlying construct in a generally comparable manner across gender groups. The presence of only minor DIF in one item indicates that the total and dimension scores can likely be used for gender comparisons with reasonable confidence. This finding strengthens the fairness and practical usefulness of the instrument in school-based research and assessment.

5. Conclusion

Overall, the findings support a comprehensive conceptualization of digital native identity. The construct cannot be reduced to technological proficiency or frequency of internet use. Rather, it includes the ways adolescents learn, process information, participate in social networks, represent themselves, seek feedback, manage privacy, follow ethical norms, experience emotional attachment to technology, and negotiate local and global cultures. This broad structure is consistent with the view that Generation Z possesses a sociotechnological identity shaped by mobile connectivity and digitally mediated participation (Rosenberg et al., 2025). It also helps explain why members of this generation may display distinctive expectations in education, social life, and future employment (Chillakuri, 2020; Harris, 2020). By integrating these dimensions into one culturally grounded instrument, the present study contributes to the psychological assessment of adolescents in contemporary digital environments.

6. Limitations & Suggestions

The present study had several limitations. First, the quantitative sample was restricted to upper secondary school students in Tehran, which may limit the generalizability of the findings to adolescents living in other cities, rural areas, or culturally and socioeconomically different regions. Second, the scale relied on self-report responses and may therefore have been influenced by social desirability, inaccurate self-perception, or response styles. Third, the cross-sectional design did not allow examination of the stability of digital native identity over time or its developmental changes across adolescence. Fourth, although most items showed adequate fit to the graded response model, several items exhibited relatively weak item-level fit and may require revision or further testing. Fifth, criterion-related validity was not evaluated through comparison with external measures of digital literacy, social media engagement, identity development, or technology dependence.

Future studies should examine the psychometric properties of the scale among students from different provinces, cultural backgrounds, socioeconomic groups, and educational settings. Longitudinal research is recommended to determine whether digital native identity changes across developmental stages and whether specific dimensions predict later educational, social, or psychological outcomes. Researchers should also assess test-retest reliability and criterion-related validity by comparing scale scores with established measures of digital literacy, identity status, problematic internet use, social connectedness, and academic engagement. The items showing weaker fit should be qualitatively reviewed and tested in independent samples. Measurement invariance should also be examined across gender, age groups, school types, socioeconomic levels, and levels of access to digital technology.

The Digital Native Identity Scale can be used by school psychologists, counselors, educators, and educational policymakers to obtain a multidimensional profile of students' relationships with digital environments. The results can guide the design of media-literacy programs, digital citizenship education, online safety training, and interventions aimed at reducing excessive emotional dependence on technology. Teachers can use the cognitive-educational dimension to adapt instructional methods to students' digital learning preferences while also strengthening critical evaluation of online information. Counselors may use the social and affective dimensions to

identify students who rely excessively on online approval or experience difficulties integrating online and offline self-concepts. The cultural and ethical dimensions can also inform educational programs that promote responsible digital participation while supporting local cultural identity.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

References

- Aral, N., & Kadan, G. (2018). Social Development. In N. Aral & Z. F. Temel (Eds.), *Child development* (pp. 236-262). Hedef Publications.
- Chillakuri, B. (2020). Understanding Generation Z Expectations for Effective Onboarding. *Journal of Organizational Change Management*. <https://doi.org/10.1108/JOCM-02-2020-0058>
- Ghanbari Baghestan, A., Hosseinzadeh, F., & Gholami, F. (2023). Social Media and the Process of Identity-Formation Among Z Generation: Case of the Mashhad City. *Cultural Studies & Communication*, 19(71), 135-162. <https://doi.org/10.22034/jcsc.2023.2014283.2704>
- Gibbons, S. (2007). *Redefining the Roles of Information Professionals in Higher Education to Engage the Net Generation* Educause Australasia,
- Gimbergsson, E., & Lundberg, S. (2016). *Work Values of Generation Z: A Quantitative Study Explaining Different Groups of Generation Z's Work Values*

- Harris, K. (2020). *A New Generation of Workers: Preparing for Generation Z in the Workplace* [University of South Carolina].
- Izadi, M. (2021). The Generation of Digital Natives: Unique Opportunities for Technology-Assisted Education. *Educational Technology Growth*, 36(7).
- Iziy, M., Aliabadi, K., Nili, M. R., & Delavar, A. (2019). A Generation Analysis of Electronic Textbook Preferences in Students with Digital Native Features. *University Textbooks, Research and Writing*, 23(44), 99-117. <https://sid.ir/paper/240857/en>
- Jang, J. Y., Han, K., Lee, D., Jia, H., & Shih, P. C. (2016). *Teens Engage More with Fewer Photos: Temporal and Comparative Analysis on Behaviors in Instagram* Proceedings of the 27th ACM Conference on Hypertext and Social Media, <https://doi.org/10.1145/2914586.2914602>
- Kadan, G., & Aral, N. (2021). The Digital Identity of the Z Generation and Their Use of Digital Technology. In *Academic Researches in* (pp. 256).
- Kanani, M. A., Mousavi, S. H., & Beygzadeh, Z. (2019). Media as a Generational Object: Investigating the Role of Media Consumption on Generational Identity. *Strategic Research on Social Problems*, 8(3), 35-56. <https://doi.org/10.22108/srsp.2020.121075.1491>
- Khajeheian, D., Salavatian, S., Kolli, S., & Soltani, T. (2020). Motivations and Hashtag Patterns of Iranian Digital Natives on Instagram. *New Media Studies*, 6(23), 155-188. <https://doi.org/10.22054/nms.2021.47908.861>
- Khajeheian, D., Salavatian, S., Kolli, S., & Yazdani, A. (2020). Behavior Pattern of Iranian Digital Natives on Instagram: A Data Mining of Social Networks. *Communication Research*, 27(101), 9-32. <https://doi.org/10.22082/cr.2020.117695.1961>
- Kitchen, P. J., & Proctor, T. (2015). Marketing Communications in a Postmodern World. *Journal of Business Strategy*, 36(5), 34-42. <https://doi.org/10.1108/JBS-06-2014-0070>
- Kravchenko, A. A., Lipin, M., Krasilnikova, O., & Husieva, N. (2025). The Digital Era as a New Stage of Sociocultural Transformation: A Philosophical View on Changing Values. *International Journal on Culture History and Religion*, 7(SI1), 717-744. <https://doi.org/10.63931/ijchr.v7iSI1.337>
- McKenna, B., & Vodanovich, S. (2016). Digital Native Identity Development in Virtual Worlds.
- Nemeti, F., Boland, H., & Sayadi, A. (2022). Investigating the Mediating Role of Identity Crisis and Family Cohesion in Determining the Relationship Between Social Networks Participation with Body Image Issues Among Students. *Journal of counseling research*, 21(81), 256-280. <https://doi.org/10.18502/qjcr.v21i81.9499>
- Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5), 1-6. <https://doi.org/10.1108/10748120110424816>
- Rosenberg, H., Blondheim, M., & Sabag-Ben Porat, C. (2025). Who in the World Is Generation Z? The Rise of Mobile Natives and Their Socio-Technological Identity. *Societies*, 15(11), 314. <https://doi.org/10.3390/soc15110314>
- Ruiller, C., & Van Der Heijden, B. I. (2016). Socio-Emotional Support in French Hospitals: Effects on French Nurses' and Nurse Aides' Affective Commitment. *Applied Nursing Research*, 29, 229-236. <https://doi.org/10.1016/j.apnr.2015.06.006>
- Saneapour, M. (2012). Identity in the Age of Digital Media. *Interdisciplinary Studies in Media and Culture*, 1(2), 115-130.
- Santrock, J. W. (2016). *Life-Span Development*. Nobel Publications.
- Tas, H. Y., & Kacar, S. (2019). Management Styles of X, Y and Z Generation Employees and a Business Example. *OPUS: International Journal of Society Researches*, 11(18), 643-675. <https://doi.org/10.26466/opus.554751>
- Teo, T. (2013). An Initial Development and Validation of a Digital Natives Assessment Scale (DNAS). *Computers & Education*, 67, 51-57. <https://doi.org/10.1016/j.compedu.2013.02.012>