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The Role of Information Literacy on Cognitive Skills and Individual Factors (Self-Efficacy and Motivation) in the Curriculum of Secondary School Students

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ABSTRACT

Objective: This study aims to investigate the role of information literacy on cognitive skills and individual factors (self-efficacy and motivation) in the curriculum of secondary school students.

Methods and Materials: This research utilized a descriptive-correlational design with a sample of 382 secondary school students (191 males and 191 females) selected through cluster random sampling. Data were collected using validated questionnaires assessing information literacy, cognitive skills, self-efficacy, and academic motivation. The normality of data was confirmed using the Kolmogorov-Smirnov test, and multiple regression analysis was applied to examine the relationships between variables.

Findings: The results indicated a positive and significant relationship between the information literacy in the curriculum of secondary school students and their cognitive skills and individual factors.

Conclusion: Therefore, identifying the factors affecting self-efficacy and motivation can have a substantial impact on academic success and the advancement of the educational system.

Keywords: *school truancy, parental conflict, parenting style, students.*

1. Introduction

In general, information is essential for every aspect of life. It holds value in social development, economic growth, political enlightenment, technological advancement, knowledge progression, and the process of informed decision-making. Therefore, access to information is crucial as it allows individuals to effectively search for, receive, and disseminate it. However, the world is overwhelmed by an enormous amount of information, raising concerns about its authenticity, credibility, and reliability (Kankam, 2023). Consequently, information users are faced with a flood of data from various sources, making it difficult to verify the accuracy of the information (López-González et al., 2023;

Malliari et al., 2014). There is an urgent need for information users in secondary schools to be able to identify what is relevant for their use, as excessive exposure to information might lead to information overload. Information literacy ability is one of the crucial skills for students in contemporary times (Chan et al., 2017). An essential aspect of improving students' information literacy is the skill of managing and processing information obtained from digital sources, known as cognitive style (Akbari, 2021; Li et al., 2023; López-González et al., 2023). Although cognitive style was initially considered an unchangeable set of attitudes and preferences, recent theories and empirical findings suggest that cognitive styles can be developed and enhanced (Bedenlier et al., 2020). Students with cognitive style abilities can comprehend and organize information obtained from the internet, such as remembering, thinking, problem-solving, and drawing conclusions. With cognitive skills, students can receive, store, shape, and use information (Soheili et al., 2023).

Information literacy skills are essential for secondary school students to succeed in a future filled with information (Malliari et al., 2014). However, despite the importance of information literacy, students in most secondary schools possess low levels of information literacy, as most of them are unable to independently search for information, cannot even use Boolean operators, and are weak in organizing literature and identifying appropriate sources of scholarly literature (Malliari et al., 2014; Nemati Lafmejani et al., 2021). The claim that most students graduate from secondary schools without sufficient information literacy skills has been confirmed by other researchers as well (Yeboah et al., 2017). The implementation of information literacy in education, from elementary schools to higher institutions, focuses on different levels of competence due to the varying expected impacts of information literacy in each learning process. Therefore, the interpretation of information literacy competence has been evolving for a long time. Currently, its development is characterized by an added complexity that not only emphasizes technology use skills but also includes personality components and cognitive attitudes (Blocksidge & Primeau, 2023; Degner et al., 2022). Improving students' information literacy levels is important. Both schools and families should strive to enhance students' information literacy. First, information and communication technology-enriched infrastructures and sufficient digital learning materials should be provided in schools to increase students' exposure to ICT, allowing them to develop their awareness of the application of ICT in learning and everyday life (Kankam, 2023). Information literacy is associated with various components and can influence cognitive skills and individual factors (self-efficacy and motivation) in students' curricula. The school culture can promote collaboration and communication among students. Information literacy often involves group work, as students are encouraged to collaborate with each other in researching, analyzing, and synthesizing information. By creating a collaborative environment, schools provide opportunities for students to engage in discussions, debates, and group projects that require the sharing and collaboration of information. Collaborative activities also allow students to learn from each other, develop different perspectives, and strengthen their problem-solving skills (Al-Qallaf & Aljiran, 2022; Babaei Parsheh & Mosadeghi Nik, 2022; Kankam, 2023; Li et al., 2023; López-González et al., 2023; Soheili et al., 2023).

Another aspect that can support the improvement of students' information literacy is the skill of independently finding information sources without relying on others. These cognitive skills are commonly referred to as self-regulated learning or independent learning. Self-regulated learning involves an individual's preparedness, with or without the help of others, to set learning goals, learning methods, and evaluate learning outcomes (Liwanag & Galicia, 2023). Self-regulated learning emphasizes individual independence, self-efficacy, and self-control to guide, monitor, and regulate learning in order to achieve goals and expertise. Students with appropriate self-efficacy and good self-regulated learning can independently search for scattered digital information on the internet. Hence, students will take the initiative to find the educational resources they need. This ability is necessary to support the required information literacy (Almessabi, 2021; Babaei Parsheh & Mosadeghi Nik, 2022).

When information literacy is explicitly integrated into subject areas of the curriculum, students learn to recognize the importance of information as a valuable resource for learning and decision-making (Putra & Budiningsih, 2023). Thus, it can be said that the mission of educational systems in the information society, rather than focusing on teaching specialized skills and delivering content, emphasizes lifelong learning components, such as information literacy in the curriculum. In our country, attention to information literacy education in the curriculum has been highlighted in the Fundamental Transformation Document of Education. Integrating information literacy into the secondary school curriculum through cognitive strategies and individual

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factors enables learners to master information content, expand their inquiries, strengthen their self-direction, and gain greater control over their learning. In our country, teaching information literacy at the secondary level seems vital and necessary. Incorporating information literacy education into the secondary school curriculum through the mediation of internal factors such as cognitive strategies and individual factors such as self-efficacy and motivation can provide the groundwork for achieving a program-oriented educational system and transforming teaching and assessment methods. Given the aforementioned points, the objective of this study was to examine the role of information literacy on cognitive skills and individual factors (self-efficacy and motivation) in the curriculum of secondary school students in Tehran.

2. Methods and Materials

2.1. Study Design and Participants

The research method employed in this study is applied in terms of its objective and descriptive-correlational in terms of its execution. The statistical population of the research students at this stage consisted of 57,870 male and female secondary school students in the Tehran region during the 2023-2024 academic year, according to the report of the General Department of Education of Tehran. A sample size of 382 students was determined using Cochran's formula and selected through cluster random sampling.

2.2. Measures

2.2.1. Information Literacy

A researcher-made questionnaire based on 5-point Liker scale with 5 items was used to measure information literacy. The content and face validity of the Information Literacy Questionnaire were confirmed by several experts and specialists, and the Cronbach's alpha coefficient for the questionnaire was calculated at 98%, indicating the questionnaire's acceptable reliability.

2.2.2. Cognitive Skills

Nejati (2013) designed the Cognitive Abilities Questionnaire to assess seven distinct factors ("Memory" questions 1 to 6, "Selective Attention and Inhibitory Control" questions 7 to 12, "Decision Making" questions 13 to 17, "Planning" questions 18 to 20, "Sustained Attention" questions 21 to 23, "Social Cognition" questions 24 to 26, and "Cognitive Flexibility" questions 27 to 30). This test includes 30 questions, with each question scored on a 5-point Likert scale ranging from almost never (1) to almost always (5). This questionnaire was administered in three separate cross-sectional studies. A total of 1,095 individuals (444 men and 651 women) completed the preliminary version of the questionnaire for exploratory factor analysis, 50 individuals participated in a test-retest study with a three-week to one-month interval for questionnaire reliability, and 181 elderly and 224 young individuals participated to assess the discriminant validity of the questionnaire. Data were analyzed using factor analysis, Kolmogorov-Smirnov, Pearson's correlation, and t-tests. The Cronbach's alpha coefficient for the questionnaire was 0.83, and Pearson's correlation for the two test administrations was significant at the 0.01 level. All test scales (except for social cognition) were correlated with GPA at the 0.01 level. The t-test showed significant differences between all test indicators (except for planning and social cognition), and the designed questionnaire demonstrated acceptable validity and reliability for evaluating cognitive functions. Responses to the Cognitive Skills Questionnaire (Kahaki, 2024) are scored on a five-point Likert scale ranging from one (almost never) to five (almost always).

2.2.3. Academic Motivation

The standardized Harter Academic Motivation Questionnaire consists of 33 items and aims to assess academic motivation among students. This tool is a modified version of Harter's scale (1981, 1980) as a measure of academic motivation. As mentioned, Harter's original scale assesses academic motivation with bipolar questions, where one pole represents intrinsic motivation and the other pole represents extrinsic motivation, and the respondent's answer to each question can only reflect one of the intrinsic or extrinsic reasons. Since both intrinsic and extrinsic motivations play a role in many academic subjects, Lepper et al. (2005) adapted Harter's scale to the usual format of scales, where each question only considers one of the intrinsic or extrinsic motivations. The Harter Academic Motivation Scale includes 33 questions, and responses are recorded and scored on a 5-point Likert scale (1 = Never to 5 = Almost Always). Internal consistency coefficients for the questionnaire, measured through the correlation of each question with the total score of the scales, ranged from 0.30 to 0.78. Factor analysis conducted on the scale items identified four factors that clearly represented the dimension

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of intrinsic motivation. The subscales for extrinsic motivation were also distinguishable, albeit with less clarity. Test-retest reliability and Cronbach's alpha coefficients calculated for the dimensions and subscales of this tool were satisfactory, indicating stability in measuring the academic motivation of Iranian students. The reliability of this questionnaire was also obtained at 0.92 using the Cronbach's alpha test (Akbari, 2021).

2.2.4. Self-Efficacy

The General Self-Efficacy Questionnaire was designed by Schwarzer and Jerusalem (1992). This questionnaire consists of 10 four-option questions, which collectively represent an individual's successful adaptation to a challenging situation. This questionnaire does not have subcomponents, and a total score is calculated. Each statement is followed by four options: "Not at all true," "Hardly true," "Moderately true," and "Exactly true," with corresponding scores of 1 to 4. In Soleimani's (2013) study, the Cronbach's alpha coefficient for this scale was reported as 0.83 (Tahmasebiboldaji, 2022).

2.3. Data analysis

To analyze the data, multiple regression analysis was applied to examine the relationships between variables using SPSS-26.

3. Findings and Results

Out of a total of 382 students, 191 (50%) were female, and 191 (50%) were male.

Table 1

Descriptive Statistics of Research Variables: Media Literacy Components, Cognitive Skills, Self-Efficacy, and Academic Motivation

Variable	Mean	Standard Deviation
Media Literacy Components	136.7	19.9
Cognitive Skills	105.6	8.7
Self-Efficacy	38.4	3.5
Academic Motivation	116.8	7.02

The results presented in Table 1 indicate that the mean scores for Media Literacy Components, Cognitive Skills, Self-Efficacy, and Academic Motivation are 136.7, 105.6, 38.4, and 116.8, respectively. According to the Kolmogorov-Smirnov test results, the significance level of the variables is greater than 0.05 ($p > 0.05$), indicating the normality of the questionnaire data. Therefore, based on the Kolmogorov-Smirnov test results, the assumption of normality is confirmed, allowing for the use of parametric tests (e.g., multiple regression analysis) for further analysis.

Table 2

Regression Analysis Statistics and Indicators

Indicator	R	R^2	Adjusted R^2	Standard Error	F	p
Regression Coefficient	0.392	0.154	0.147	0.5	22.8	0.001

The results in Table 2 show that the Media Literacy Components in the curriculum have a correlation coefficient of 0.392 ($r = 0.392$) with cognitive skills and individual factors of secondary school students, explaining 15.4% of the variance in the Media Literacy Components of the students' curriculum. The observed analysis of variance ($F = 22.8$, $df = 3, 378$) indicates that cognitive skills and individual factors significantly relate to the Media Literacy Components in the secondary school curriculum ($p < 0.05$). The data suggests a significant positive relationship between Media Literacy Components in the curriculum and the students' cognitive skills and individual factors.

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Table 3

Variables Included in the Regression Analysis

Variable	B	Standard Error	Beta	t	p
Constant	0.915	0.2		4.3	0.001
Cognitive Skills	0.336	0.5	0.316	6.3	0.001
Self-Efficacy	0.199	0.04	0.21	4.2	0.001
Academic Motivation	0.108	0.1	0.108	3.1	0.001

The values in Table 3 show a significant positive relationship between the Media Literacy Components in the curriculum of secondary school students and their cognitive skills and individual factors ($p < 0.05$).

4. Discussion and Conclusion

The comparative analysis of the findings and results of this section of the research aligns with the prior studies (Akbari, 2021; Al-Qallaf & Aljiran, 2022; Arvianto & St Y, 2023; Azzahro et al., 2023; Babaei Parsheh & Mosadeghi Nik, 2022; Blocksidge & Primeau, 2023; Chan et al., 2017; Farrokh & Shahtalebi, 2018; Helyanti, 2022; Kankam, 2023; Li et al., 2023; López-González et al., 2023; Malliari et al., 2014; Mohamed, 2022; Putra & Budiningsih, 2023; Soheili et al., 2023; Yondler & Blau, 2023). The findings of Babaei Porsheh and Mosadeghi Nik (2022) demonstrated a significant positive relationship between teachers' information literacy and students' academic self-efficacy. Furthermore, they found a significant positive relationship between teachers' communication skills and students' academic self-efficacy (Babaei Parsheh & Mosadeghi Nik, 2022). Farrokh and Shah Talebi (2018) demonstrated a significant relationship between self-directed learning, knowledge-sharing behavior, self-efficacy, and information literacy. Their results also indicated significant relationships between the dimension of interest in learning, self-management, and self-control with knowledge-sharing behavior, as well as between self-efficacy and the tendency to initiate behavior, efforts to enhance task efficiency, and resilience in the face of obstacles with knowledge-sharing behavior (Farrokh & Shahtalebi, 2018).

In explaining and analyzing the obtained results, it can be stated that many factors, both direct and indirect, can influence students' cognitive skills and individual factors such as self-efficacy and academic motivation. As this section of the research also demonstrated, one of these influential factors is the components of information literacy. Information literacy equips individuals with the necessary skills to determine when they need information, where to find it, and how to use it effectively and efficiently, enabling them to manage the vast amount of information they encounter. This, in turn, contributes to effective decision-making and improved productivity, which is beneficial for society. Information literacy is a set of skills that enables an individual to recognize their information needs, identify available information sources, develop search strategies, evaluate the obtained information, and link the new information to their existing knowledge to create new information. Therefore, information literacy is a skill that enables individuals to recognize their information needs, find relevant information, and use it effectively. The three predominant aspects of information literacy—recognizing, finding, and effectively using information—are central to all definitions of information literacy. While direct and unmediated access to information resources has increased, increased access does not equate to obtaining useful and relevant information; using that information requires information literacy. Information literacy extends the concept of traditional literacy in response to the society we live in. To be information literate, a person must recognize when information is needed and have the ability to find, evaluate, and use it effectively. Information-literate individuals are those who have learned how to learn. They know how to learn because they understand how knowledge is organized and how to locate the information they need and use it in a way that others can also learn from it. Information-literate individuals are prepared for lifelong learning because they can always find the information they need and use it to make informed decisions. The results of this section of the research clearly demonstrated a close relationship between students' information literacy and their cognitive skills, self-efficacy, and academic motivation. As students' information literacy levels increase, so do their cognitive skills, self-efficacy, and academic motivation. Self-efficacy, as a motivational factor, leads to improved academic performance. When an individual is confident in their abilities in a particular area, they achieve progress in that area. This means that believing in one's abilities leads to success in any task. Therefore, identifying the factors that influence self-efficacy can significantly impact academic

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success and the advancement of the educational system. Self-efficacy is an important factor for successfully performing tasks and mastering the essential skills required for them. Effective performance requires having the necessary skills and believing in one's ability to perform them, enabling an individual to perform tasks excellently in various situations. Numerous studies have shown that self-efficacy can influence all aspects of life; the higher the level of self-efficacy, the broader the range of considered career opportunities and the deeper the interest in the job. Additionally, motivation plays a significant role in academic life and success. Motivation reflects in learners' choice of academic tasks, the time and effort they dedicate to each task, and their persistence in completing academic tasks. It also enables them to properly address the obstacles they encounter in the learning process.

5. Limitations & Suggestions

The study faced several limitations that may have influenced the results and generalizability of the findings. Firstly, the research was conducted within a specific geographic area (Tehran) and limited to secondary school students, which may not reflect the diversity of other regions or educational levels. Secondly, the reliance on self-reported questionnaires could introduce response bias, as students may overestimate or underestimate their abilities. Additionally, the cross-sectional design of the study does not allow for the establishment of causal relationships between information literacy, cognitive skills, self-efficacy, and academic motivation. Lastly, the study did not account for potential confounding variables such as socio-economic status, access to technology, and prior exposure to information literacy training, which could have affected the outcomes.

Based on the obtained results, it is recommended that relevant authorities utilize the knowledge, expertise, and experience of expert university psychologists to accurately and continuously introduce and promote information literacy skills to observe their beneficial effects in schools. Given the undeniable impact of information literacy on students' cognitive skills, it is recommended that this issue be included in the comprehensive educational system for teachers in all schools across the country. Schools should design and implement teacher training in information literacy skills at both basic knowledge levels in a theoretical manner and professional levels in an applied manner, and as much as possible, increase the focus on teacher training in this area. Since information literacy is an essential part of students' lives, influencing their performance and behavior, and contributing to long-term success in all aspects and domains of their lives, continuous and lifelong information literacy education should be a priority for the education system more than ever before. Therefore, equipping all students of the current era with information literacy skills is essential. It can be said that the mission of educational systems in the information society is more focused on lifelong learning components, such as information literacy, rather than merely teaching specialized skills and delivering academic content. In reality, information literacy is the key to lifelong learning. Improving students' information literacy levels is important. Both schools and families should strive to enhance students' information literacy. First, information and communication technology-enriched infrastructures and sufficient digital learning materials should be provided in schools to increase students' exposure to ICT, allowing them to develop their awareness of the application of ICT in learning and everyday life.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics 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.

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