Content Analysis of Emotional Intelligence Components in Farsi Textbook Stories using Shannon's Entropy Approach

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A r t i c l e   I n f o

A B S T R A C T

Purpose: The present research aimed to provide content analysis of emotional intelligence dimensions in Farsi textbook stories of elementary schools using Shannon's entropy approach.

Methodology: The research method was descriptive ad had a content analysis type using "Shannon's entropy" method. The statistical population consisted of 108 stories in Farsi textbooks of the elementary school in 2022. The statistical sample was also equal to the statistical population according to the census approach. The research tool included the emotional intelligence checklist with five components (interpersonal skills, intrapersonal skills, adaptability, general mood, and stress management) based on the Bar-On model. The reliability of the data was desirable using the paired t-test.

Findings: The research findings indicated that there were significant differences in the representation of dimensions of emotional intelligence in stories of Farsi textbooks. Therefore, topics of intrapersonal and interpersonal skills were taken into consideration in a relatively favorable way, but stress management skill was neglected in the textbooks. Furthermore, a comparison of the sixth-grade elementary schools indicated that most of their stories had a general pattern of the importance of interpersonal and intrapersonal skill dimensions, and the adaptability dimension was relatively favorable only in the fifth-grade of elementary schools.

Conclusion: According to the role of emotional intelligence in learners' lives, authors of Farsi textbooks need to provide a necessary revision of emotional intelligence components in the stories of the textbooks.

Keywords: Emotional intelligence, Bar-On model, Shannon's entropy, Farsi textbook.

1. Introduction

Emotions have received great attention in psychology in recent decades, and the level and method of perceiving emotions are considered important indices in measuring the individuals' psychological status as this type of perception is classified as intelligence for several measurement tools have been invented. In the third millennium, the nature of emotional intelligence, as a psychological construct, has been considered a predictor for mental-social health according to Lif & Susan (2003), and it has been significantly important even in occupational and academic success (Liff, 2003). According to Ciarrochi, Forgas, & Mayer (2006), emotional intelligence is effective in the treatment and control of mental disorders in addition to promoting and affecting the individuals' quality of life and mental health (Ciarrochi et al., 2013).

As an index in the classification of human abilities, intelligence has a tortuous history, but it was reduced to logical and mathematical abilities in the dominant paradigm. Psychologists have presented new formulations of intelligence and offered different definitions for it by addressing different aspects of human life and multiple layers of capabilities. Thorndik (1920) was, in fact, the initiator of this trend by inventing the concept of social intelligence, and later Wechsler contributed greatly to the development of this field by inventing and completing the intelligence measurement tool (Gooran Savadkohi et al., 2023; Hasanpour et al., 2020; Miri Rami et al., 2022; Mohkamkar et al., 2024).

In the current common structure, emotional intelligence entered the psychological literature more seriously according to the theories of Mayer & Salovey (1990), Goleman (2001), and Bar-On (1997) (Bar-On, 2006; Goleman, 2001; Keramati, 2021; Masoumparast et al., 2019; Rahmati et al., 2024; Salovey & Mayer, 1990).

Among these theoreticians, Bar-On took an important step in the practical development of emotional intelligence by presenting an operational manual for measuring emotional intelligence. In Bar-On's theory, emotional intelligence includes five main components and 15 sub-components: intrapersonal skills (emotional self-awareness, assertiveness, self-regulation, self-actualization, and emotional independence), interpersonal skills (interpersonal relationships, social responsibility, and empathy), adaptability (problem-solving ability, reality testing, and flexibility), stress management (stress tolerance, and impulse control) and mood (happiness, and optimism) (Bar-On, 2006; Masoumparast et al., 2019).

In numerous studies, Bar-On reported that educability and the ability to improve emotional intelligence are important elements, and individuals' emotional intelligence will be strengthened if suitable conditions are provided (Bar-On, 2006). Aljazi and Alrekebat (2019) also confirmed that developing an educational curriculum focused on emotional intelligence played an effective role in the development of students' cognitive flexibility (Aljazi & Alrekebat, 2019). Nowadays, a major part of the individual's personality system is formed at schools due to the expansion of the formal education system; hence, it is expected that the quality and level of an individual's emotional intelligence have a close relationship with resources presented at schools. Even though the education system utilized many resources to transmit its norms and values (e.g. the teacher, curriculum, hidden curriculum, textbooks, etc.), textbooks are more standardized than others and presented to students in a single and comprehensive format. Textbooks are considered the most important educational resources and tools in centralized education systems, and other resources such as teachers and curricula are based on the structure of textbooks. The common exposure of all students to textbooks is a unique feature, while access to other resources is determined based on the type of school, geographical location, parents' financial and academic ability, etc. Due to such reasons, textbooks have been taken into consideration by many education authorities (Macklem, 2007). Several studies have been conducted about the present research topic inside and outside Iran as follows:

The research results of Kardum, Dadic, and Horvat (2021) indicated that high school history textbooks had a double emphasis on educational and knowledge aspects, while the emotional aspect of historical events has not received much attention (Kardum et al., 2021). Therefore, students do not communicate sufficiently with the events of history. The results of research by Hasani, Fayaz, and Maleki (2015) indicated that components of emotional intelligence were not homogeneously discussed in the "Read" textbooks, and emotional intelligence and its components were discussed more in the fifth grade than in other grades (Hassani et al., 2015).

According to the above-mentioned topics, since the narrative structure and story-telling are among the most important forms of teaching in the textbook, students implicitly get acquainted with wide moral, behavioral, and personality concepts and are psychologically affected due to

exposure to stories in addition to understanding the relevant teachings, the story and narrative structures have significant effects on institutionalization and transfer of psychological concepts and structures, centered on the presence of emotional intelligence components in the story, to students. Focusing on the story in the text of textbooks is important since the story structure is a very suitable opportunity to shape the child's identity, and the fictional characters and their decisions and feelings provide models for children (Kardum et al., 2021). Therefore, the present study sought to focus on stories in Farsi textbooks at elementary schools and examine the position of each dimension of emotional intelligence in these textbooks according to the importance of stories in shaping children's personalities, as well as the importance and multiplicity of stories in Farsi textbooks. Since emotional intelligence has various dimensions, it appears that these dimensions do not have the same place in textbooks, and some dimensions and themes of emotional intelligence are emphasized more, but some receive less emphasis. Therefore, the question is raised: What is the importance of emotional intelligence dimensions (based on the Bar-On model) in stories in Farsi textbooks at the elementary school?

2. Methods and Materials

The present research was descriptive and had a content analysis method. The statistical population consisted of all stories in Farsi textbooks at the elementary school (six books) in 2022 which were compiled and printed by the textbook planning and authoring office. The total number of stories was equal to 108, which were all analyzed by the census method. Therefore, the statistical sample was equal to the statistical population with the census approach.

The emotional intelligence checklist based on the Bar-On model was the data measurement tool and it included 5 main components and 15 sub-components.

According to the checklist, all words and terms containing themes related to the five dimensions of emotional intelligence in the Bar-On model were extracted and categorized. In this research, the analysis unit included sentences, phrases, or at least one word that had a meaning related to one of the five dimensions of emotional intelligence (interpersonal, intrapersonal, adaptability, general mood, and stress management) in the Bar-On model.

The categories extracted from three lessons were given to 4 experts (one expert in educational sciences, one elementary school teacher, one child psychologist, and one psychologist active in the field of emotional intelligence) to examine the validity of the research tool and it was approved and used after applying their comments.

To obtain the reliability of the measurement tool, the researchers coded two lessons from each grade and re-coded the selected lessons after one month. Therefore, the reliability of the coding results was measured two times using the paired t-test.

3. Findings and Results

A summary of the calculation output is presented in this section due to the focus of this manuscript on the use of Shannon's entropy in ranking dimensions of emotional intelligence and determining the importance of these dimensions in stories of Farsi textbooks at the elementary school.

The results of the paired t-test in Table 1 indicated that there was no significant difference in the coding processes in August and September 2021. Accordingly, the mean values of none of the five dimensions of emotional intelligence were significantly different in the August and September 2021. The result was statistical proof of the reliability of the coding process.

Table 1

The difference in the mean coding of extraction of emotional intelligence components in selected courses in August and September 2021

Dimension	Mean difference	Sd	Correlation coefficient	T-value	P-value
Intrapersonal	-0.25	0.62	0.992	-1.39	0.191
Interpersonal	-0.5	1.09	0.981	-1.59	0.139
Adaptability	0.0	1.04	0.984	0	1.0
Stress management	-0.17	0.39	0.683	-1.48	0.166
General mood	-0.08	0.51	0.907	-0.56	0.586

In this manuscript, Shannon's entropy was used to prioritize and determine the importance of emotional intelligence dimensions in stories of Farsi textbooks at the elementary school. Based on the systematic approach and

the information theory, Shannon provides a formula that can extract the rate of information contained in the text relating to each examined concept based on the probability distribution of the data, and then compare and prioritize the concepts. In information theory, the entropy index is used to measure uncertainty in a probability distribution.

The data obtained from counting the terms and phrases involving the five dimensions of emotional intelligence were collected in a data matrix, and the steps of calculating the importance coefficient were taken for each dimension in the following order according to Shannon's formula to calculate the importance of each dimension (Azar, 2001; Azimi, 2021):

Step 1- Calculation of the normal matrix based on the raw data matrix

$$P_{ij} = \frac{F_{ij}}{\sum_{i=1}^{m} F_{ij}}$$

Step 2- Calculation of the information load of each dimension

$$Ej = -K * \sum_{i=1}^{m} \left(P_{ij} * Ln(P_{ij})\right)$$

$$K = \frac{1}{Ln(m)}$$

Step 3- Calculation of the importance coefficient of each dimension

$$W_j = \frac{E_j}{\sum_{j=1}^{n} E_j}$$

i= Item number, m= Number of items, j= Dimension number, n= Number of dimensions

P= Normalized matrix, Ej= Information load, Wj= Importance factor

Finally, the rate of attention to dimensions of emotional intelligence was determined based on the ranking of the importance coefficient of each one (Table 2).

Table 2

Frequency distribution of emotional intelligence dimensions in Farsi stories of the elementary school

		Intrapersonal	Interpersonal	Adaptability	Stress management	General mood	Total	Mean
Educational grade	First	4	7	10	2	2	25	4.2
	Second	122	113	79	27	30	371	61.8
	Third	147	157	88	21	52	465	77.5
	Fourth	134	144	70	9	26	383	63.8
	Fifth	143	152	91	10	29	425	80.7
	Sixth	126	78	54	13	14	285	47.5
Total		676	651	392	82	153	1954	325.7

Table 2 presents the frequency distribution of terms with themes related to dimensions of emotional intelligence in stories of Farsi textbooks at the elementary school in terms of educational grades. The distribution of terms containing the concepts of emotional intelligence indicated that the dimensions and components of emotional intelligence were not well present in stories of Farsi textbooks, and it was more obvious at the lower grades of education, especially the first elementary course. Given the special work of the first elementary school in teaching calligraphy and familiarity with letters, it faced limitations in presenting words. Another important point in the results of the table was related to the sixth grade of elementary school, which did not follow a dominant pattern, and attention to dimensions of emotional intelligence was less in this grade.

Another finding was related to the separation of attention to dimensions of emotional intelligence. Accordingly, the highest frequencies were related to the adaptability dimension in the first grade, the intrapersonal dimension in the second and sixth grades, and the interpersonal dimension in the third, fourth, and fifth grades. The stress management and general mood dimensions had the lowest numbers in all elementary education grades. In general, the intrapersonal dimension had the highest number of frequencies compared to other dimensions.

Table 3 reports the data analysis output based on Shannon's entropy formula. According to Shannon's three steps, the information load of each dimension of emotional intelligence was calculated after calculating the normal matrix of the data, and finally, the importance coefficients of the dimensions were determined. The calculation of the coefficient of importance was performed in several steps, and this formula was calculated and reported separately for the six elementary grades in addition to determining the

coefficient of importance for the emotional intelligence dimensions.

Table 3

Frequency distribution of emotional intelligence dimensions in Farsi stories of the elementary school

	First	Second	Third	Fourth	Fifth	Sixth	Information load	Importance coefficient
Intrapersonal	0.258	0.203	0.203	0.22	0.208	0.206	0.919	0.2016
Interpersonal	0.201	0.209	0.205	0.219	0.219	0.19	0.920	0.2019
Adaptability	0.241	0.206	0.194	0.213	0.209	0.196	0.914	0.2004
Stress management	0.167	0.173	0.197	0.139	0.167	0.203	0.901	0.1976
General mood	0.133	0.207	0.201	0.208	0.197	0.205	0.905	0.1985

Figure 1

Importance coefficient of emotional intelligence dimensions in stories of Farsi textbooks at the elementary school
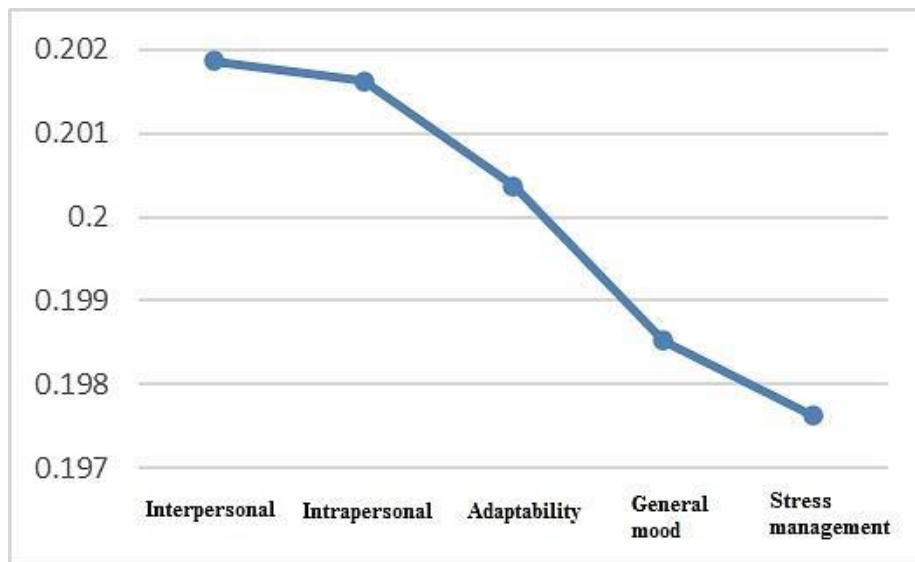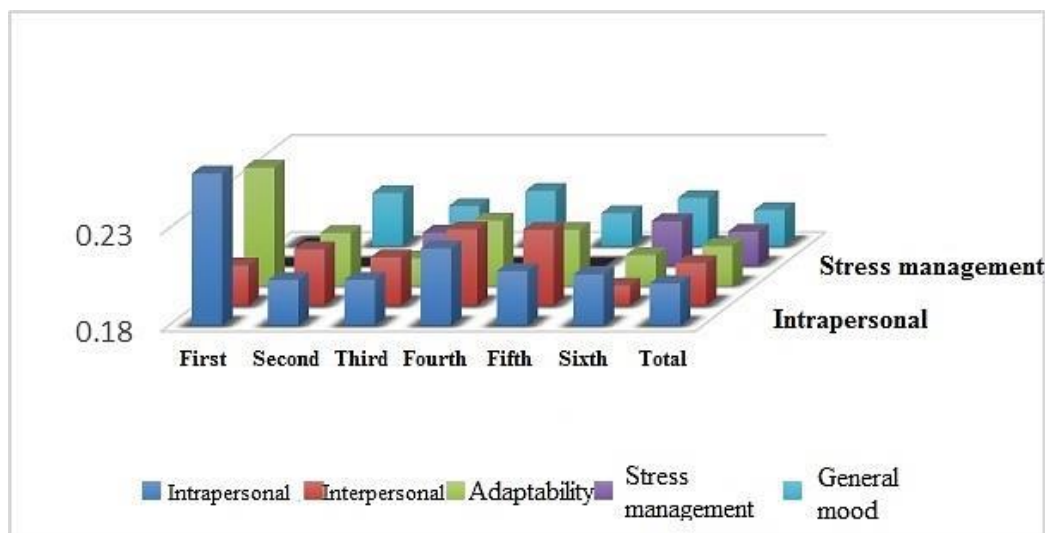

Figure 2

The importance coefficient of emotional intelligence dimensions in stories of Farsi textbooks at the elementary school separately for each education grade

Based on the results of Table 3 and figures, the highest information loads belonged to interpersonal, intrapersonal, adaptability, general mood, and stress management respectively. The results of the information loads were repeated in the importance coefficient, indicating that each dimension had a higher degree of importance. The interpersonal (0.2019) and intrapersonal (0.2016)

dimensions of emotional intelligence received the higher attention in stories of Farsi textbooks, and the words and sentences containing these themes had the highest repetition and application in stories of Farsi textbooks. The adaptability (0.2004), general mood (0.1985), and stress management (0.1976) dimensions were also in the next ranks of importance.

Table 4

Dimensions of emotional intelligence in stories of Farsi textbooks at the elementary school separately for each education grade in order of

importance

Row	First	Second	Third	Fourth	Fifth	Sixth	Total
1	Interpersonal	Interpersonal	Intrapersonal	Intrapersonal	Interpersonal	Interpersonal	Interpersonal
2	General mood	Intrapersonal	Interpersonal	Interpersonal	Adaptability	Intrapersonal	Intrapersonal
3	Adaptability	General mood	Adaptability	Adaptability	Intrapersonal	Adaptability	Adaptability
4	Intrapersonal	Stress management	General mood	General mood	General mood	General mood	General mood
5	Stress management	Adaptability	Stress management	Stress management	Stress management	Stress management	Stress management

Table 4 presents the order of importance of emotional intelligence dimensions in stories of Farsi textbooks at the elementary grades based on Shannon's entropy output. On this basis, there was a relatively specific pattern for attention to dimensions of emotional intelligence in different educational grades, and interpersonal and intrapersonal dimensions had the highest importance and the stress management dimension had the least importance in most of them.

4.   Discussion and Conclusion

Nowadays, attention to the development of emotional intelligence in applied psychology has become more

necessary, and numerous studies have examined the role of emotional intelligence in individuals' successful and forward-looking life experiences, and extensive empirical literature has been created in this field. The educability of emotional intelligence and the key and special role of textbooks in the education and socialization of children were the most important fields that induced the researchers to focus on stories of Farsi textbooks at the elementary school and seek an answer to the question of whether dimensions of emotional intelligence have received the same level of attention in the textbooks considering their breadth and diversity and whether children face the same level of dimensions of emotional intelligence in Farsi textbooks. In this regard, the present research aimed to provide the content

analysis of dimensions of emotional intelligence in stories from Farsi textbooks at the elementary school using Shannon's entropy approach. The research findings generally indicated that components of emotional intelligence in stories from Farsi textbooks had a low frequency. This issue had different intensities at different educational grades and was much lower in the sixth grade, and especially the first grade. The finding was consistent with prior (Kardum et al., 2021; Soltani Nejad et al., 2017) and confirmed their findings. The limitation of words in the first grade of elementary school and the focus on teaching letters for students of this grade played an effectives role in the lack of different concepts in Farsi textbooks, but it appears that including words containing emotional intelligence themes to convey the teachings of Farsi calligraphy can have a dual function and be effective in dealing with the concepts of emotional intelligence.

In response to the main question of the research, the present research compared dimensions of emotional intelligence using content analysis and Shannon's entropy tool. The results indicated that the dimensions of emotional intelligence had no balanced and homogeneous distribution in stories of Farsi textbooks. This finding was consistent with prior research (Hassani et al., 2015).

Other results of the present research indicated that intrapersonal and interpersonal skills dimensions received higher attention than other dimensions due to the heterogeneity and imbalance in attention to components of emotional intelligence. The results of the separate examination of these dimensions in the six elementary grades indicated that interpersonal skills in the first, fourth, and sixth grades, and emotional intelligence in the second, third, and fifth grades had higher importance coefficients. This finding was consistent with prior research (Aljazi & Alrekebat, 2019; Soltani Nejad et al., 2017).

Even though the attention to intrapersonal and interpersonal skills is more favorable, it should be noted that general mood, and especially stress management dimensions are neglected and these concepts are not properly represented in the stories of Farsi textbooks at the elementary school. Therefore, it is suggested to consider the content of stories containing the above-mentioned concepts in the revision of textbooks. To compensate for this status, it is suggested that other educational resources such as other textbooks, teaching aids, and strengthening courses should provide a more serious look at these dimensions of emotional intelligence to strengthen students' emotional intelligence in a balanced way.

Authors' Contributions

The first author was responsible for conducting the interview and collecting data, and the other authors were responsible for analyzing the data and writing the article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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