

Examining Spiritual Intelligence and Learning Style of High School Students in Lamerd

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Abstract

Background and Objectives: The construct of spiritual intelligence (henceforth SI) encompasses some kind of adaptation and problem-solving behavior. SI also includes the highest levels of development in diverse cognitive, ethical, emotional, and interpersonal domains. The purpose of this study is thus to examine SI and learning style of high school students in Lamerd, Fars, Iran.

Methods: The study employed descriptive methods. The population of the study comprised all high school students who were studying mathematics, physics, experimental sciences and humanities in 2016 and 2017. Using multistage cluster sampling method, the sample was composed of 300 high school students. Data were obtained using King's Spiritual Intelligence Questionnaire and Kolb's Cognitive Style Questionnaire. Descriptive statistics (e.g., Mean and Standard Deviation) and inferential statistics (e.g., correlation coefficient, multiple regression and independent t test) were used to analyze the data.

Results: The results showed that the level of spiritual intelligence in converging, diverging, assimilating, and accommodating learning styles was 0.86, 0.57, 0.64 and 0.74, respectively. In addition, there existed no significant relationship between SI and learning style ($p=0.154$). The results of the study further indicated that, in terms of SI, there was not a significant difference between boys and girls, and that abstract conceptualization and active experimentation can significantly predict SI. Moreover, the results showed that there existed a relationship between learning style and field of study ($p<0.001$).

Conclusion: The present study indicated that abstract conceptualization and active experimentation can significantly predict SI. Overall, abstract conceptualization and active experimentation can potentially help in using practical ideas and theories. Hence, strengthening SI can greatly facilitate the learning processes.

Keywords: Students, Learning, Intelligence.

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Introduction

Kolb categorized learning styles into four groups: (a) converging, (b) diverging, (c) assimilating, and (d) accommodating. Individuals of the first kind of learning style display interest in practical issues. The characteristic features of converging learning style are abstract conceptualization and active experimentation. The second type of learning style (i.e., diverging) is associated with concrete experience and reflective observation. Diverging Individuals tend to look at things from different perspectives, approaching situations through observing rather than doing. Individual with accommodating learning style

desire to do things practically, developing under the slightest pressure and compulsion. The learning characteristics are concrete experience and active experimentation (1). Finally, individuals of assimilating learning style are able to understand, process, and combine a large amount of information logically and analytically. The learning characteristics are abstract conceptualization and reflective observation (2). In the last decade, the importance of spirituality and spiritual development in human has attracted increasing attention from psychologists and mental health professionals. Advances in the field of psychology on the one hand, and the

dynamic and complex nature of modern societies, on the other hand, make the spiritual needs of human more important than the material ones. Importantly, now adding the fourth dimension (i.e., spiritual) the World Health Organization (WHO) defines human existence along the three physical, psychological and social dimensions (3).

Spirituality has been defined as the human's constant effort to respond to life dilemmas. Some scholars recognize spirituality as one of the inner needs of human that contains the highest levels of cognitive, moral, and emotional development. It indeed entails the human's constant effort to seek answers for questions throughout life. Put it another way, in order to seek reasons for their survival and development, humans' optimal use of creativity and curiosity constitutes an integral part of spirituality. By gaining experiencing, awareness of the spiritual dimension of life fosters an immaterial dimension through which recognizable values are identified, and the transcendental sense increases the human's tendency for equity and fairness, leading to conformity and continuity with self and the universe (4).

SI integrates the constructs of spirituality and intelligence into a new construct. It is associated with searching and experiencing holy elements, meaning, heightened consciousness, and transcendence. Although SI requires the ability to use such spiritual subjects to adapt and act effectively and produce valuable products and outcomes (5), Sisk points out that it is a deep self-awareness in which one becomes more and more aware of the dimensions of self, not simply as a body, but as a mind-body and spirit. Sisk also understands that key components of SI are embodied within the concepts of values, experiences, capacities, properties and systems of SI (6). The construct of intelligence has long been investigated with regard to its dimensions, manifestations, features and types. Meanwhile, one of the dimensions of intelligence, called "Spiritual Intelligence (SI)", is one of the areas which has received little and systematic attention in past research particularly regarding its features and

components. (7). In order to fill this gap, the present study investigates SI and learning style of high school students in Lamerd

Methods

A correlational research design was used to examine relationships. The population of the study included all state high school students in Lamerd, Fars, Iran. They were studying mathematics, physics, experimental sciences and humanities in 2016 and 2017. Based on the Cochran's formula, the sample was composed of 300 high school students (boys=150, girls=150). A multistage cluster sampling method was therefore adopted. First, experts working in Education Organization expressed their viewpoints regarding sampling in Lamerd. Then, among high schools in this area, two high schools (one for girls and one for boy) were selected. After collecting the required information from the students, the questionnaire was constructed and thus distributed among them. Data were obtained using King's Spiritual Intelligence Questionnaire and Kolb's Cognitive Style Questionnaire.

A) Kolb's Learning Style Questionnaire: To examine the learning styles of the participants, this instrument was used. Initially, Kolb (1976) developed his own learning style questionnaire, which included 9 self-descriptive questions. Then, in 1985, Kolb changed some parts of the questionnaire and expanded it to 12 self-descriptive questions. The questionnaire used in this research is the revised version of a Kolb's 1985 questionnaire (8). This questionnaire contains an instruction section, indicating how the questionnaire is scored and completed. Each question contains four answers, each of which describing the individual's learning style. Each item contains 'a word' corresponding to one of the learning styles. In other words, feeling is a descriptive example of concrete experience. Therefore, Kolb's four-stage learning cycle includes concrete experience, reflective observation, abstract conceptualization, and active experimentation.

In their study on the relationships between learning styles, personality characteristics and

academic performance, Izard S, Mohammadzadeh Edmolae used this questionnaire in the Iranian context. They developed questions for each subscale, examining the content of subscales. Then, they calculated the correlation coefficients between the mean responses to the questions of subscales, all of which are significant at the level of 0.01. Cronbach's alpha was used to measure the reliability of learning styles questionnaire. The reliability coefficients for learning styles of concrete experience, abstract conceptualization, reflective observation and active experimentation were estimated to be 0.65, 0.67, 0.64 and 0.47 respectively (9).

B) King's Spiritual Intelligence Questionnaire: This instrument has 24 items and includes four factors, namely of Critical Existential Thinking, Personal Meaning Production, Transcendental Awareness, Conscious State Expansion. Items the questionnaire were arranged using 5-point Likert-type scale (strongly disagree, disagree, occasionally, agree, strongly agree). In his preliminary study examining SI of 619 undergraduate students (488 females and 131 males) at the University of Petersburg, King calculated the Cronbach's alpha of the questionnaire which was reported to be 0.95, and the internal consistency of interrelationships among the questions was 0.36. In another study aiming to validate the questionnaire, 305 undergraduate students were asked to complete the instrument, and the Cronbach's alpha coefficient was 95.8% (10). In their study, Hossein Chari et al. (2010) reported the internal consistency reliability of the questionnaire (with α Cronbach's coefficient of 0.938). Also, using Cronbach's alpha coefficients, they reported validity for each factor as Critical Existential Thinking (0.78), Personal Meaning Production (0.68), Transcendental Awareness (0.74), and Conscious State Expansion (0.72). In the present study, Cronbach's alpha coefficient for all the above-mentioned factors besides SI were calculated to be 0.59, 0.51, 0.74, 0.68, 0.73, respectively (11). The validity of the questionnaire was done using face validity and expert judgment. In order to examine the

validity of the questionnaire, designed questionnaires along with theoretical frameworks and research hypotheses were delivered to faculty members and experts, and their professional viewpoints were used in the finalized questionnaire.

Concerning ethical considerations, the participants were informed that their participation is voluntary and their identity and responses to the questionnaire would remain confidential. This was approved by the Ethics Committee. Using SPSS, descriptive statistics (e.g., Mean and Standard Deviation) and inferential statistics (e.g., correlation coefficient, multiple regression and independent t test) were used to analyze the data. The significance level was considered to be 0.05.

Result

The mean and standard deviation of the students' age were 17 and 1.231 respectively. 30 percent (90) of students were studying humanities, 46 percent (138) experimental sciences and 24 percent (72) mathematics and physics. Descriptive statistics of learning style factors and SI are presented in Table 1. As shown, the mean scores for male and female students within the variable SI is 147.8 ± 17.5 and 150 ± 17.8 , respectively, and this difference is not significant ($p=0.88$). Also, regarding the factors of learning style, the mean scores for the female group within components of concrete experience, abstract conceptualization, reflective observation and active experimentation were 25.7 ± 5.61 , 30.7 ± 4.67 , 31.5 ± 4.8 and 31.9 ± 5.6 respectively.

Table 1 Descriptive statistics and independent samples t-test of learning style and SI in male and female students

Variable	Gender	Mean \pm SD	t	p
SI	Female	147.8 \pm 17.5	-1.10	0.88
	Male	150 \pm 17.8		
C.EX	Female	25.7 \pm 5.61	-0.72	0.71
	Male	26.2 \pm 5.90		
A.C	Female	30.7 \pm 4.67	1.25	0.85
	Male	30 \pm 4.7		
R.O	Female	31.5 \pm 4.8	-1.6	0.22
	Male	32.6 \pm 5.4		
A.EX	Female	31.9 \pm 5.6	1.01	0.21
	Male	31.2 \pm 6.3		

SI: spiritual intelligence, C.EX: concrete experience, A.C: abstract conceptualization, R.O: reflective observation, A.EX: active experimentation.

Compared to the female group, the mean scores for the male group were within the components of concrete experience, abstract conceptualization, reflective observation and active experimentation were 26.2 ± 5.90 , 30.4 ± 5.4 , 32.6 ± 5.4 and 31.2 ± 6.3 respectively and these differences are not significant too ($p < 0.05$).

Chi-square test was used to examine the relationship between learning styles and students' field of study, the results of which are presented in Table 2.

Table 2: Relationship between learning styles and field of study

Learning Styles	Humanities, N(Percent)	Experimenta, N(Percent)	Math- physics, N(Percent)	sig
Converging	20 (21.07%)	25 (26.5%)	41 (43.1%)	0.00
Diverging	15 (16.3%)	26 (27.6%)	16 (16.8%)	
Accommodating	33 (35.8%)	27 (28.7%)	14 (14.7%)	
Assimilating	24 (26%)	16 (17%)	24 (25.2%)	
Total	92 (100%)	94 (100%)	95 (100%)	

Statistically significant ($p < 0.001$), the frequency is higher for converging learning style in students of mathematics-physics group, diverging learning style in students of experimental sciences, accommodating learning style in students of humanities, and assimilative learning style in both students of humanities and mathematics-physics.

The Pearson correlation coefficient was also used to examine the correlation between learning styles and students' SI, as shown in Table 3.

Table 3: Correlation matrix of learning styles and SI

	1	2	3	4
1. SI	1			
2. Converging LS	**0.86	1		
3. Diverging LS	**0.57	**0.44	1	
4. Accommodating LS	**0.64	**0.76	**0.51	1
5. Assimilating LS	**0.74	**0.87	**0.35	**0.66

* $p < 0.05$, ** $p < 0.001$

As is evident, there is a significant and positive relationship between SI and a variety of learning styles. In other words, increasing the scores of each type of learning style will result in an increase in SI and vice versa.

Table 4: Stepwise multiple regression analysis for the redictive effect of SI through learning styles

Dependent Variable	Independent Variable	B	SEB	T	Sig
SI	Abstract Concept	0.54	0.19	2.71	0.00
	Active Experiment	0.48	0.16	2.9	0.00

Finally, in order to ascertain the predictive role of the factors of learning style in predicting SI, stepwise multiple regression analysis was conducted, the results of which are displayed in Table 4. The two factors of abstract conceptualization and active experimentation (of converging and assimilating learning styles) significantly predicted the variance of SI scores.

Discussion

The findings showed that there was not a significant relationship between SI and learning styles among male and female students. Regarding the relationship between learning style variables and students' field of study, the frequency was statistically significant and high enough for converging learning styles in students of the Math-Physics group, diverging learning style in experimental students, accommodating in students of Humanities, and assimilative learning style in both students of humanities and mathematics-physics. Results also showed that there was a significant and positive relationship between SI and four types of learning style. It was found that factors of abstract conceptualization and active experimentation could positively and significantly predict the variance of SI scores. The fact that there was no significant difference in the learning style variable between male and female students is in line with Soltani and Peyravi's findings (12) and Seif and Hosseini Lorgani (13). In their studies, these researchers found no significant difference between girls and boys concerning learning styles. This finding is in contrast with results of Kolb (14), Worthley (15) and Philbin et al. (16). However, the findings of these studies are not consistent, showing the superiority of various learning styles in both genders. For example, Kolb's study (14) on 1993 participants (men and women) showed that women achieved higher scores in active experimentation and concrete experience while men gained higher scores in reflective observation and abstract conceptualization. Similarly, Philbin et al. (16) showed that women tended to learn more through concrete experience while men preferred abstract

conceptualization. To justify this finding, it can be argued that society's expectations from different genders and learning styles is a possible contributing factor to learning tasks. In fact, such differences in learning styles are likely to be the result of socialization in traditional sexual roles and are thus reinforced by personal choices, learning, and occupation. Moreover, it is not possible to place all individuals on a converging or diverging pole. In fact, these bipolar learning styles create a continuum at which, one extreme is a field-dependent style and one extreme is a field-independent style. Hence, considering the equity in education and culture, girls and boys are equal and one cannot imagine one of these genders in one side of the gender continuum and the other at the other end of the continuum.

The finding that there existed no significant difference between male and female concerning their SI is in accordance with the findings of Farahangpour et al. (17), Zamiri et al. (18), and Rahimi (19). However the finding is in contrast with those of Sa'adati and Lashani (20) and Ghaffari and Gholipour (21). Sa'adati and Lashani (20) showed that girls achieved higher score in SI, while findings of Ghaffari and Gholipour (21) contradicted with Sa'adati and Lashani (20). This finding might be attributed to a lack of education and employment of individuals in society. According to Astin et al. (22), though male and female students have a high degree of spirituality, more than 56% of them believed that their classroom instructors did not provide them with opportunities to discuss issues germane to spirituality. Therefore, it can be concluded that, despite the importance of intelligence in everyday life among boys and girls, this issue is not taught to them by parents and school, and university, and even if practiced, students face obstacle posed by their teachers and professors.

Findings related to learning style and field of study are consistent with those of Homayouni et al (23), Kolb and Wolfe (24), and Philbin et al (16). In Homayouni et al.'s (23) study, it was observed that testees with a converging and assimilating learning style tended to choose mathematical and experimental fields,

compared to those with a divergent and accommodating learning style (23). Regardless of consistency of the present findings with those of Homayouni et al.'s (23) study, there was a difference in the accommodating learning style. In the present study students of humanities, and in Homayouni et al.'s study, students of experimental science tended to prefer this type of learning style. However, in both these studies, the accommodating learning style is also common in mathematical/physics students. Examining various graduate students, Kolb and Wolfe (24) also found that business students preferred accommodating learning styles, engineering students tended to prefer converging learning styles, and students from history, political science, psychology, economics and the social sciences had a diverging and assimilating learning style. Students in natural sciences preferred abstract conceptualization, having assimilating and converging styles. In addition, Philbin et al. (16) found that students of social sciences and humanities chose diverging learning styles, technical-engineering students preferred converging learning styles, and students of educational sciences disciplines tended to prefer accommodating learning style. In relation to the existing difference between learning style in different fields of study, it can be reasoned that diverging people need time to reflect upon their ideas, especially through thinking and feeling, and they have good performance in brainstorming, though in small groups (13).

Also, individuals with diverging and accommodating learning styles rely more on others for gaining information, thus work better in interpersonal, social, literary and historical situations. In addition, these individuals are extroverted and interested in interpersonal relationships with other people. Hence, they exhibit interest in disciplines, including the humanities whose subject matter is the study of human qualities and relationships. Individuals with an assimilating learning style possess the ability to understand a large amount of information and to combine it logically. These individuals will play useful

roles as experts and professionals (1). Their greatest potential is in deductive reasoning and creating theoretical models, setting hypotheses, assimilating inconsistent observations, and providing an integrated explanation for them (25). Also, Compared to others, individuals with an assimilating learning style have superiority in learning tasks such as organizing information, designing conceptual models, conducting experiments, and analyzing data.

Accommodating individuals are superior in learning strategies, including predicting results and inferences (14). Thus, they prefer experimental and natural sciences such as physics, chemistry and medicine which require extensive mathematical information and organization of information as well. Finally, people with a converging learning style show interest in practical application of ideas. They wish to know how things are done. They also perform better in solving problems and designing structures. This type of learning style is called converging because perform better in intelligence tests where the items are presented with correct and false answers there are indications for the correct answer or problem solving (8). In this type of learning style, knowledge is organized through hypothetical-deductive argumentation. Accordingly, these individuals are interested in abstract conceptualization and analytical skills, choosing technical disciplines such as engineering.

The findings that there exists a positive correlation between SI and the four learning styles, and the positive and significant prediction of SI through abstract conceptualization active experimentation are consistent with Ghaffari and Gholipour's study (21). Regarding these findings, it can be said that both SI and learning style are acquired during development period, mediated by values emphasized by parents, teachers, society, religion and so on,. Similarly, depending on the combination of SI and learning styles, individuals are distinguished on the basis of three broad categories: 1) communication seekers, 2) meaning seekers, and 3) truth seekers.

In conclusion, it should be noted that this study has some limitations. The present study was conducted with students only and hence, caution should be exercised regarding generalization of the findings to other age groups and academic degrees. Also, the research methodology was correlational, failing to show causal relationships among variables. It is therefore suggested that future studies, adopting experimental methods, explore in depth the constructs of SI and learning styles in different age groups, and test their relationships with psychological constructs, demographic characteristics, and other dimensions proposed in intelligence theories so that a deeper understanding of these variables might be gained.

Conclusion

The present study showed that abstract conceptualization and active experimentation can predict SI. It was found that abstract conceptualization and active experimentation can potentially help in using practical ideas and theories. Therefore, strengthening SI can greatly facilitate the processes of learning. The insignificant difference between the constructs of SI and learning style in boys and girls, the dominance of the converging learning style in engineering science, diverging in the humanities and assimilating in the natural sciences, and the relationship between SI and a variety of learning styles can be attributed to gender roles, values, and concepts emphasized in society from family to school, and university. Accordingly, it is possible to provide students with appropriate and timely education to develop spirituality and foster capacity for necessary balance in their leaning styles. Moreover, by gaining a better understanding of the spiritual needs and the learning styles of individuals, we can move forward to strengthen their mental health and guiding them in a way consistent with their internal talents (for example, the Choosing the right field of study).

Conflict of interest

The author declares no conflict of interest.

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