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Design and Validation of a Discipline-Oriented Curriculum Model for Elementary Education with an Emphasis on Gardner's Five Minds Approach

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ABSTRACT

Objective: The aim of this research was to design and validate a discipline-oriented curriculum model for elementary education with an emphasis on Gardner's Five Minds approach.

Methods: This study employed a mixed exploratory sequential research method. Initially, the desired model was developed through qualitative methods (synthetic literature review and semi-structured interviews). Subsequently, the proposed model's validity was assessed using quantitative method (survey) with input from the experts. Among the various theoretical and empirical studies conducted in this area, several were analyzed using synthetic literature review. Additionally, semi-structured interviews were conducted with seven experts and scholars in the field of Gardner's Five Minds approach, and their opinions were coded and analyzed to formulate the proposed model. Furthermore, to validate the research's proposed model, a researcher-made questionnaire was administered, completed by 22 experts through purposive sampling.

Results: The research findings indicated that the discipline-oriented curriculum based on Gardner's Five Minds for elementary education comprises 8 dimensions and 17 sub-dimensions. These dimensions encompass goals, content, teaching-learning methods, learning opportunities, learning resources, learning environment, learning time, and assessment. Moreover, the results suggested that, from the perspective of experts and scholars in this field, the proposed model in this research enjoys good credibility.

Conclusions: Based on the research findings, it can be concluded that Gardner's Five Minds approach is more critical than multiple intelligences, and education based on these approaches can better prepare students for the complex world of the future. Therefore, it is recommended that educational stakeholders consider the proposed model for designing education for elementary school students.

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Introduction

The primary period assumes a crucial role in shaping the child's understanding and interpretation of the elements encountered in their daily experiences. It signifies the extension of the child's cognitive, biological, and social growth within the familial context. This phase offers a conducive environment for the child to engage in educational activities, upbringing, and acquiring effective communication skills, enabling each child to nurture their talents gradually (Chapman, 2015). The principal aim of the primary education phase is to equip children with essential competencies including listening, reading, writing, critical thinking, and enhancing cognitive abilities such as self-awareness, conceptual comprehension, logical reasoning, emotional intelligence, as well as understanding religious principles and moral values. Through this phase, children also develop ethical values, recognize their social roles, and position in society. Fundamentally, the primary period lays the foundation for education and serves as the cornerstone for shaping a nation's ideals and ideologies. Consequently, the significance of primary education surpasses that of other educational levels (Fotaris et al., 2017).

Curriculum models provide a structured and transparent framework that assists educators in designing specific teaching, learning, and assessment strategies. Professionals in the curriculum field utilize these models to enable educators and stakeholders to articulate their perspectives and translate them into curricular content. Hence, a curriculum framework serves as a specialized structure for delving into the essential components of an educational program, with the choice of model guiding the nature of activities or instructional methodologies. The curriculum model must align with children's developmental stages, educational practices, advancements in science and technology, and the practical resources available for implementation. Additionally, it should be tailored to suit the duration of the educational process, capture children's interests, and cater to the societal needs and demands of the child's environment (Tighbakhsh et al., 2018).

Gardner (2008) introduced an additional theory in his publication "Five Minds for the Future". Within this literary work, he addresses the challenges anticipated in the upcoming era and emphasizes the necessity for individuals to develop certain skills essential for the technologically advanced world that lies ahead. He asserts that the 21st century will favor those capable of a specific mode of thinking, while those lacking in cognitive abilities may encounter unfavorable prospects (Chiofalo et al., 2022).

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After devoting twenty-three years to intensive research, Gardner unveiled a new theory in 2008 through his work "Five Minds for the Future", outlining five distinct cognitive approaches. He highlights the evolving landscape of the third millennium and criticizes the inadequacy of current educational systems in fully equipping students for the complexities of the future. Thus, he advocates for the adoption of the five minds framework, comprising of:

1) The disciplined mind: This mindset is characterized by proficiency in a particular domain of knowledge, be it in fields such as mathematics, science, history, art, or professions like medicine, law, and management.

2) The synthesizing mind: Demonstrating the ability to sift through vast amounts of information, extract relevant data, and organize it in a comprehendible manner.

3) The creative mind: Capable of transcending established knowledge, generating novel inquiries, and innovating new solutions and concepts.

4) The respectful mind: Exhibiting empathy and openness towards diverse perspectives, fostering understanding and collaboration among individuals from varying backgrounds.

5) The ethical mind: Operating on a higher abstract level than the respectful mind, this mindset is concerned with ethical conduct in professional settings and societal responsibilities. It aspires to fulfill a harmonious role as a conscientious citizen in the professional sphere (Gardner, 2008).

It is imperative and crucial to underscore Gardner's five minds when formulating elementary school curricula. It is anticipated that, in the forthcoming times, individuals will necessitate proficiency in at least one domain to attain success. Moreover, they will need to assimilate a plethora of information from diverse sources and amalgamate it in a coherent manner to safeguard their interests and those of others. The prevailing advantage will lie with individuals who cultivate a specific mindset and transcend it. Consequently, there is an obligation to show regard towards those who hold contrasting opinions as individuals with whom we share numerous ideologies. Subsequently, as members of society and social agents, it is essential to adopt an ethical approach towards both work and life. This implies making decisions that transcend personal interests and conform to ethical standards. Conversely, individuals lacking expertise tend to engage in menial tasks within work settings. Those unable to synthesize information are overwhelmed by data and struggle to make informed choices concerning personal and professional matters. Moreover,

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individuals deficient in the creativity of technology and other innovative fields risk being replaced. Those who lack respect are undeserving of appreciation in professional settings and broader society. Similarly, individuals devoid of morals face rejection from colleagues and responsible citizens, leading to social isolation (Roy, 2019). Consequently, based on the aforementioned points, this study will be devised and executed with the goal of crafting and assessing a model for elementary school curriculum that highlights Gardner's five minds. Hence, the principal query of this investigation is: "What should characterize the elementary school curriculum model with a focus on Gardner's five minds?"

Material and Methods

The research method was mixed method study sequential exploratory, so that in the first part, the desired model was obtained using qualitative method (research synthesis and semi-structured interviews), and then using quantitative method (survey), the validity of the proposed model was determined and evaluated by experts.

Population and statistical sample: in the qualitative part, among all the theoretical and experimental research conducted in the field of this research, a number of studies were identified and analyzed using the synthesis research method, and on the other hand, by conducting semi-structured interviews. With seven professors and experts in the field of the five minds approach (which achieved theoretical saturation), their opinions were reviewed and coded, and finally the proposed model was formulated. In the quantitative part, in order to validate the proposed research model, a researcher-made questionnaire was completed by 22 experts using purposive sampling.

Research tools: In the qualitative part, research synthesis and semi-structured interviews were used to collect data, and in the quantitative part, a researcher-made questionnaire was used for internal validation of the model. Each of the questionnaire questions were designed to evaluate certain aspects of the model. The validity of this questionnaire was investigated by a group of experts and after solving its problems, it was determined to be valid. The reliability of the questionnaire using Cronbach's alpha method in SPSS software was equal to 0.78, which indicates high reliability of the questionnaire. Two types of questions have been used for this questionnaire, the first type was in the form of items with a five-point Likert scale (I completely disagree, I disagree, I have no opinion, I agree, I completely agree). The second type of questions was

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designed as a matrix table that asked the respondents to assign a score between 1 and 5 according to the desirability of that part of the model. The validation of the model was carried out by the Delphi method, after designing the questionnaire, we started to identify the members of the Delphi panel, and 30 specialists were identified as the members of the Delphi panel.

Data analysis: In order to analyze the data in the qualitative part, open, axial and selective coding was used, so that finally the qualitative data were analyzed and the output is the research model. It should be noted that MAXQDA-12 software was used for coding. In the quantitative part, descriptive statistics (mean and standard deviation) and inferential statistics (one-sample t-test) were used to validate the model.

Results

The findings from the interviews and research synthesis are as follows.

Table 1. Objectives component coding

Interpretative codes	Descriptive codes	Frequency
Expertise centered	Identify topics and concepts	4
	Spend time exploring topics	7
	Trying to get more skills	3
	Examining topics from different angles	5
	Create conceptual functions	4
	Ability to balance and summarize	6
	Identify important and necessary information	4
	Adding information to individual knowledge	5
Synthesis	Ability to choose various strategies	5
	Preparation for assignments through organizing materials	6
	Ability to receive feedback and improve processes	4
	Ideation ability	7
Creativity	Moving beyond the course material and asking new questions	5
	Thinking outside the box	5
	Providing new methods regarding work procedures	4
	Ability to perform new methods	3
	Working effectively with peers	6
Receptiveness	Participation and cooperation	5
	Respect the beliefs of others	4
	Understanding classmates	4
Ethical focused	Forgive others	4
	Preparing for a citizen to the norm	5
	Thinking about the role as a student and trying to fulfill it	6
	Ability to understand social responsibilities	5
	Identifying the original values of society	6

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Based on the findings of research synthesis as well as the results of interviews with experts, 25 semantic codes with 122 frequencies have been obtained with an emphasis on Gardner's five minds approach in the objectives section for the elementary curriculum.

Table 2. Content component coding

Interpretative codes	Descriptive codes	Frequency
Expertise centered	Identify topics and concepts	4
	Spend time exploring topics	7
	Trying to get more skills	3
	Examining topics from different angles	5
	Paying attention to inclusiveness	6
	Creating conceptual functions	4
	Ability to balance and summarize	6
	Identify important and necessary information	4
	Adding information to individual knowledge	5
Synthesis	Ability to choose various strategies	5
	Facilitating the teacher's role and paying attention to the enriched environment	4
	Preparation for assignments through organizing materials	6
	Ability to receive feedback and improve processes	4
	Ability to generate ideas	7
Creativity	Moving beyond the course material and asking new questions	5
	Story writing and role playing	4
	Thinking outside the box	5
	Providing new methods regarding work procedures	4
	Ability to perform new methods	3
	Working effectively with peers	6
	Participation and cooperation	5
Receptiveness	Respect the beliefs of others	4
	Paying attention to the lived experiences of prominent cultural people	5
	Understanding classmates	4
	Forgive others	4
Ethical focused	Preparing for a citizen to the norm	5
	Thinking about the role as a student and trying to fulfill it	6
	Ability to understand social responsibilities	5
	Identifying the original values of society	6
	Attention to religious teachings	5

Based on the findings of research synthesis as well as the results of interviews with experts, 30 semantic codes with 146 frequencies were obtained for the curriculum with an emphasis on Gardner's five minds approach in the content section.

Table 3. Coding of the component of teaching-learning methods

Interpretative codes	Descriptive codes	Frequency
Teaching-learning methods	Brainstorming	4
	Collaborative methods	7
	Group discussion	6
	Integration strategy	5
	Game strategy	2
	Role play	3

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Based on the findings of the research synthesis and also the results of the interviews with the experts that were discussed in the table 3, the teaching and learning method was identified with 6 codes and 27 frequencies.

Table 4. Learning environment component coding

Interpretative codes	Descriptive codes	Frequency
Psycho-affective climate	Determine class rules	3
	Feeling safe from bullying	6
	Attention to all learners	2
	The existence of supportive relationships	4
	Attention to class capacity	5
	Attention to light	6
Physical environment	Class color	4
	Class temperature	5
	Class layout	3

Based on the findings of the research synthesis as well as the results of the interviews with experts who were discussed in the table 4, 38 frequencies were identified for the design of the learning environment that includes the psychological, emotional and physical atmosphere of the classroom environment.

Table 5. Coding of learning opportunities component

Interpretative codes	Descriptive codes	Frequency
Learning opportunities	Being school oriented	3
	Be numerous, diverse and based on students' abilities	5
	The necessity of combining methods in designing activities	3
	Attention to multiple consequences	4
	Being comprehensive	4
	Design based on goals	6
	Being challenging	5
	Persuading students	3
	Gain satisfaction	4
	Proper exercise	4
	Attention to the multi-theoretical approach to learning	7

Based on the findings of the research synthesis and also the results of the interviews with the experts that were discussed in the table 5, 11 codes with 48 frequencies were identified for the learning opportunities component.

Table 6. Time component coding

Interpretative codes	Descriptive codes	Frequency
Time	Official time, using the time of other courses (consolidation)	6
	The official training time is one session per week	7
	Use of informal school time	9

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Based on the findings of the research synthesis and also the results of the interviews with the experts that were discussed in the table 6, 3 codes with 22 frequencies were identified for the learning time component.

Table 7. Coding of learning resources component

Interpretative codes	Descriptive codes	Frequency
Learning resources	Using poetry in the curriculum of emotional intelligence	8
	Using movies in emotional intelligence curriculum	9
	Using story books in emotional intelligence curriculum	8
	Using multimedia content in emotional intelligence curriculum	6
	Using music in the curriculum of emotional intelligence	7

Based on the findings of the research synthesis and also the results of the interviews with the experts that were discussed in the table 7, 5 codes with 37 frequencies were identified for the learning resources component.

Table 8. Coding of evaluation component

Interpretative codes	Descriptive codes	Frequency
Diagnostic evaluation	Knowing the status of learners	3
	Knowing the starting point of the design	4
Formative evaluation	Awareness of the development process	3
Summative evaluation	Changes if necessary	4
	Check the success rate of the program	6
	Examining the success rate of learners	5
Peer evaluation	Understanding the teaching-learning process	3
	Awareness of children's learning process	4
Self-evaluation	Check your weaknesses	4
	Multiple reviews	7

Based on the findings of the research synthesis as well as the results of the interviews with the experts that were discussed in the above table, 10 codes with 43 frequencies were identified for the evaluation component which included diagnostic, formative, final, peer evaluation and self-evaluation.

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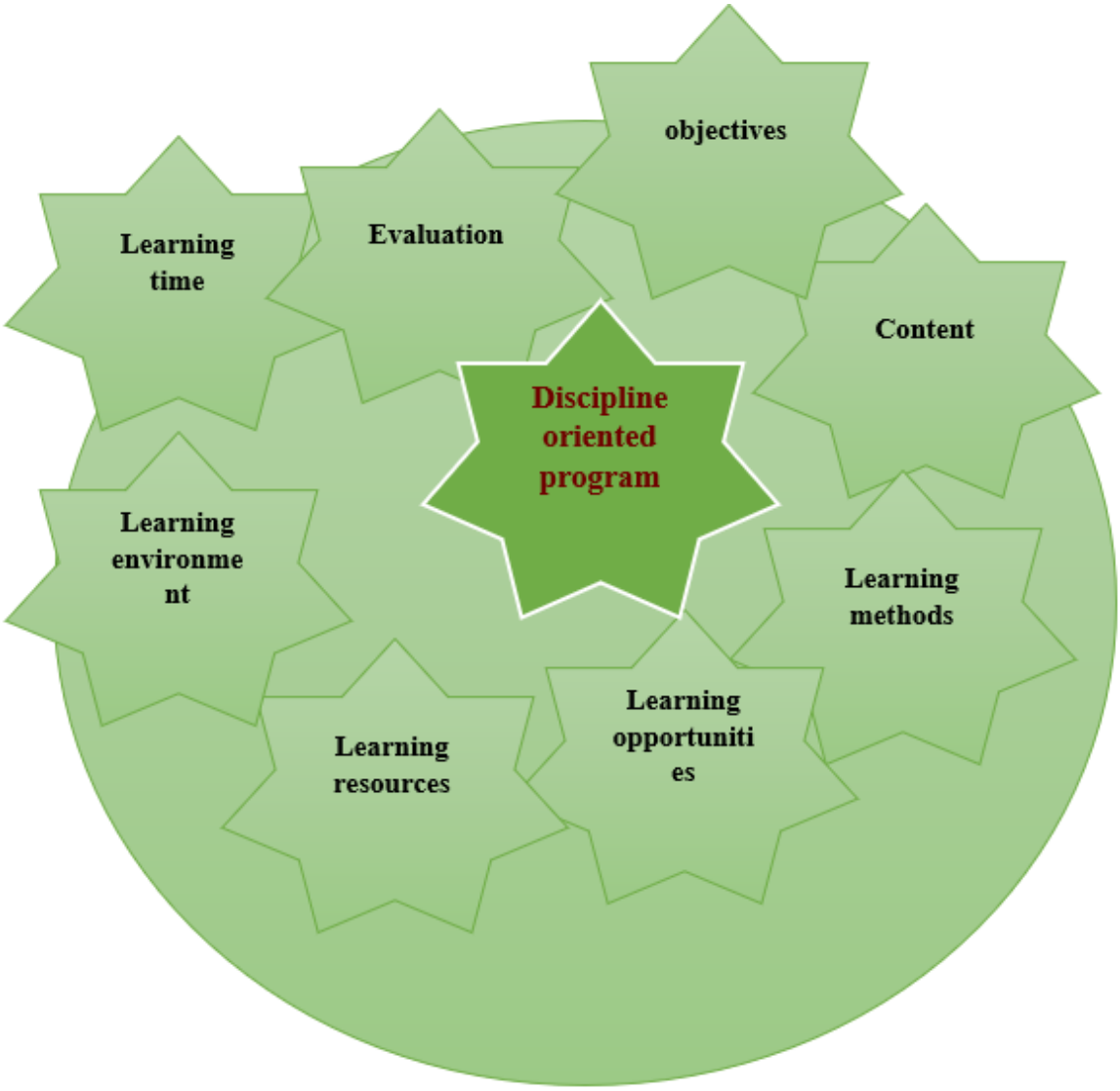


Figure 1. The conceptual model of discipline-oriented curriculum based on Gardner's five minds approach in elementary school

How is the validity of the presented curriculum model?

A researcher-made questionnaire was used to validate the model and its elements. Each of the questionnaire questions were designed to evaluate certain aspects of the model. The validity of this questionnaire was investigated by a group of experts and after solving its problems, it was determined to be valid. The reliability of the questionnaire using Cronbach's alpha method in SPSS software was equal to 0.78, which indicates high reliability in the questionnaire. Two types of questions were used in the questionnaire, the first type was in the form of items with a five-point

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Likert scale (I completely disagree, I disagree, I have no opinion, I agree, I completely agree). The second type of questions was designed as a matrix table that asked the respondents to assign a score between 1 and 5 according to the desirability of that part of the model. The validation of the model was carried out by the Delphi method, after designing the questionnaire, we started to identify the members of the Delphi panel, and 30 specialists were identified as the members of the Delphi panel.

Table 9. Descriptive statistics of the internal validation questionnaire of the proposed model

Questions	Mean	SD
1- Discipline-oriented model of Gardner's five minds approach has the advantage of communication between components and elements.	4.04	0.43
2- The discipline-oriented model can be implemented and used in the elementary course of the Iranian education system.	4.09	0.65
3- Discipline-oriented model of Gardner's five minds approach in the elementary course is suitable for design.	4.13	0.71
4- To what extent is the degree of compliance and comprehensiveness of the curriculum elements of the discipline based on Gardner's five minds approach?	4.48	0.67
5- To what extent is the degree of cohesion and continuity of the elements of the curriculum of the discipline based on Gardner's five minds approach?	4.10	0.49
6- To what extent is the degree of clarity of the elements of the curriculum of the discipline based on Gardner's five minds approach?	4.21	0.98

Table 10. T- test of internal validation of the model

Variable	Mean	SD	T value	DF	P
1- Discipline-oriented model of Gardner's five minds approach has the advantage of communication between components and elements.	4.64	0.51	3.37	21	0.001
2- The discipline-oriented model can be implemented and used in the elementary course of the Iranian education system	4.59	0.82	3.34	21	0.001
3- Discipline-oriented model of Gardner's five minds approach in the elementary course is suitable for design.	4.45	0.65	7.42	21	0.001
4- To what extent is the degree of compliance and comprehensiveness of the curriculum elements of the discipline based on Gardner's five minds approach?	4.56	0.71	8.36	21	0.001
5- To what extent is the degree of cohesion and continuity of the elements of the curriculum of the discipline based on Gardner's five minds approach?	4.64	0.45	3.24	21	0.001
6- To what extent is the degree of clarity of the elements of the curriculum of the discipline based on Gardner's five minds approach?	4.65	0.68	3.34	21	0.001

After collecting the data, the second stage (Delphi validation) was started. In the second stage, the mean and standard deviation of the first stage data were calculated in SPSS and the score of each person was sent to the Delphi panel along with the average score of the group, out of 22 people. 17 of the members of the Delphi panel participated in the second stage survey, then the questionnaires were collected and the following information was extracted. The number of changes between the first and second stage of validation is 0.40.40, which is less than 15%, as a result, part

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of the validation ends in the second stage, considering that the range of scores in the evaluation of each question is considered between 1 and 5, therefore the level of confidence about the appropriateness of each option is equal to 3 that the hypothetical average value of 4.28 is considered and the average value of table number 10 is equal to 4.58, so most of the options have a higher average and all the options are placed at a high level of agreement. Kendall's coefficient of agreement in the whole model is equal to 0.65, which indicates high agreement.

Discussion

The elementary period is considered the most important educational period in all education systems of the world, because the formation of personality and all-round development of a person takes place in this period. The primary period is the continuation of the biological, cognitive and social formation of the child who has been raised in the family. The period of entry to the land is reading and writing and familiarization with the social and biological environment. It is the period of play, pleasure and joy of life, and the period of having the blessing of developing the senses and getting into social customs and familiarity with painting, poetry and children's stories. In our educational system, there is also the problem that only academic ability is emphasized and attention to the capacity of the child's mind, i.e. a set of attributes that are immensely important in the fate of people, is ignored, because the capabilities and social skills and Emotions are considered as determining and influencing factors on academic success (Levitt & Piro, 2012). First, we will discuss the features of the proposed model and then we will examine the internal validation of the model.

What are the features of the discipline-oriented curriculum model of the elementary school with emphasis on Gardner's five minds approach?

In the upcoming research for the curriculum model (discipline-oriented) based on the five minds approach of Klein's curriculum elements (goal, content, learning activities, teaching-learning process, evaluation, learning materials and resources, space and time), as foundations an opinion was used.

Objectives: According to the results of research synthesis and of course the results of interviews with experts, the objectives that were identified for education based on Gardner's Five Minds approach for the primary course are: respect for others and the development of altruistic and

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empathetic attitudes, understanding differences and similarities, self-evaluation , having a positive feeling and positive self-talk, influencing others, adaptability, responsibility, cooperation and participation, respect for others, being a good citizen, social responsibility, understanding the current situation and presenting creative ideas to solve problems and problems.

Content: In every program, the content is defined and determined based on and in line with the goals of the program, and at the time of designing the program, content suitable for each of these components should be included in the program.

Teaching-learning methods: According to the results of the research, the optimal teaching-learning methods for education based on Gardner's five minds approach include: collaborative methods, role playing method, group discussion, brainstorming, group games method, storytelling method and it is a combination.

Learning opportunities: According to the results obtained in this study, in the design of learning opportunities, principles should be taken into consideration, including: attention to multiple consequences in activities, appropriate practice, gaining satisfaction, persuading students, Challenging activities, designing based on goals, the necessity of combining methods in designing activities, were comprehensive, being school-oriented, numerous, diverse, and designing based on students' abilities can be mentioned.

Time: Education based on Gardner's Five Minds approach to students in the curriculum of the first elementary school, one 40-minute session (that is, one bell) per week, and in the curriculum of the second elementary school, 45 minutes (that is, one bell) are dedicated to teaching Gardner's Five minds is given

Learning environment: For the optimal learning environment for education based on the Five Minds approach, Gardner paid attention to the two parts of the psychological, emotional and physical atmosphere of the class, which include: feeling safe against the bullying of other students, determining the rules of the class, attention For all students, the presence of supportive relationships in the physical dimension of the classroom arrangement, the amount of ambient noise, the class capacity, keeping the classroom temperature between 18 and 22 degrees, using light is appropriate.

Learning materials and resources: In education based on Gardner's five minds approach, students can use resources such as poetry, story books, multimedia content, music and movies.

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Evaluation: The things obtained for evaluation are: the need to use students' self-assessment, the lack of competition in evaluation, the need for appropriate feedback to students, the lack of emphasis on the result, the process of evaluation, and the participation of students in evaluation. The findings of this part of the research were aligned with some research findings (Duening, 2010; Levitt & Piro, 2012; Lockerbie & Williams, 2019; Roper, 2016).

How is the validity of the presented curriculum model?

According to the results of Tables 9 and 10, to measure components such as: the desirability of communication between components and elements, feasibility and use in the elementary course, desirability in design, degree of conformity and comprehensiveness of curriculum elements, degree of coherence and continuity of program elements. The curriculum and the degree of clarity of the elements of the curriculum were discussed and the average obtained was higher than the average t in the table and also according to the professors and experts, the proposed model of this research has a favorable validity. In the explanation of the findings, it can be said that each Minds can be associated with certain intelligences, and some of the five minds have a functional nature rather than being defined as computational capabilities and can be cultivated in school, university, and work environments (Gardner et al., 2022)

There are common points between the concepts used in Gardner's theory of five minds with Martin Seligman's positive psychology. The topic of positive psychology at the individual level is related to personal characteristics such as compassion, commitment, courage, interpersonal skills, love of beauty, perseverance, forgiveness, originality, foresight and wisdom (Kubzansky et al., 2020)). At the group level, this theory is related to the virtues of citizenship, such as a sense of responsibility, honesty, sacrifice, politeness, moderation, tolerance and work ethics. These topics have common features with Gardner's five minds, especially the respectful and ethical mind. However, the main difference between Gardner's theory and the theory of positive psychology is the functional area of these theories. Gardner's theory of minds is also related to Daniel Pink's new complete mind theory. In his book, Pink refers to two terms, high concept and high sense. The above concept includes the ability to create artistic and emotional beauty, recognize patterns and opportunities, artistically construct a satisfying story, and combine seemingly unrelated ideas and novel innovations. High sense is the ability to empathize, understand the subtleties of human relationships, find happiness in oneself and arouse it in others (Pink & Anderson, 2004). Gardner

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brings up other topics such as specialization, ethics, respect, responsibility, creativity and tries to show that in in today's advanced world, in addition to specialization and knowledge, we also need ethics.

Considering the spread of the Internet and the availability of a large amount of information for elementary school students, it is a new and interesting idea; A mindset that helps students to choose the most valuable ones from a multitude of information and use them in a way that is meaningful for themselves and others (Lockerbie & Williams, 2019). According to the studies conducted in this the research on the five intelligences and the education based on it in the elementary school can be acknowledged that the importance of these five intelligences is more than the multiple intelligences because the learners without specialization in one or more fields are limited to perform very low tasks in the work environment and people who they don't have the ability to combine information and data, they are immersed in information and they don't have the ability to make informed decisions about personal and professional issues.. People without creative capacities will be replaced by computers and more creative people. People without dignity will not deserve to be valued and respected in the workplace and society. People without morals will be rejected by employees and responsible citizens. In the 21st century, we are facing changes in science and technology that have an important impact on the future life of mankind. These changes require new processes and methods of education. Students should cultivate their minds in five ways so that they can prepare for tomorrow's world.

Data availability statement

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The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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