Use of Fuzzy Delphi Method to Design a Local Model of Entrepreneurship Education

Article info

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Abstract

Purpose: Given the effect of entrepreneurship education on improving employment and increasing the economic level of individuals and societies, there is a great demand for these trainings today. The present study was conducted using the fuzzy Delphi method to design a local model of entrepreneurship education.

Methodology: First, using qualitative data obtained from exploratory studies and literature review and interviews conducted in the form of thematic analysis, 60 indicators were developed in the form of 5 dimensions, 16 components and 60 items, and then a questionnaire containing questions in this regard was provided and given to 16 selected experts. For the validity of the results, for the second round, the questionnaires were again sent to the experts. By extracting and fitting the most important factors through fuzzy Delphi method, experts' agreement on common indicators was assessed.

Findings: The results showed that four items had lower scores than the criteria and were excluded. Also, the difference between the two stages was lower than the conventional threshold, so the analysis process was stopped.

Conclusion: According to the results, it can be said that there is a high agreement on the necessity of the indicators of the mentioned model consisting of five dimensions of individual factors, economic factors, social factors, organizational factors and educational factors.

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Introduction

Over the last few decades, educational institutions have witnessed an increasing demand for entrepreneurship and small economic business courses. Because in many countries, the promising strategies of such education have shown their effectiveness on reducing poverty (Wardana et al., 2020; Nowiński & Haddoud, 2018). Hence, today, entrepreneurship education has become part of the curricula in the educational institutions, especially in technical and professional centers (Hosseinikhah, Salimi, & Rastgar, 2016) and the policymakers of Europe and the United States believe that a higher level of entrepreneurship in the shadow of more appropriate education is needed to achieve higher economic goals (Oosterbeek et al., 2010). This hope comes from the point of view that entrepreneurship education at all levels can help the growth of entrepreneurship (Fadaei, 2014). Accordingly, entrepreneurship education should lead to entrepreneurial behavior. Therefore, changing the focus and view from teaching entrepreneurial knowledge to entrepreneurial behaviors based on local models has a significant effect on the approaches and methods of teaching entrepreneurship (Sharafi et al., 2013).

For this reason, the lack of a local model in relation to entrepreneurship education is felt and it is important to develop and validate a model to achieve this goal, and researchers seek to validate the components of business education through the use of the fuzzy Delphi method.

Sustainable entrepreneurship education encourages learners to solve social problems by prioritizing sustainable entrepreneurship (Kummitha & Kummitha, 2021).

The need to include entrepreneurship education in formal education is the concern of many decision-makers and researchers. This is due to the skills and attitudes that are necessary for the life of young people and are taught through entrepreneurship. Entrepreneurship education introduces students to entrepreneurial skills and enables them to enter the world of labor with confidence and a sense of self-esteem (Nkirina, 2010).

Entrepreneurship education is actually the process of taking advantage of opportunities and creating a business in a way that is the product of a lot of efforts, acceptance of financial, social, psychological and innovation risks, and starts with the motivation of earning financial profit - independence. Having entrepreneurial spirit is considered as the basis of the economic progress of the countries. In fact, science and the world of management are identified with the concept of entrepreneurial spirit (Yadollahi Farsi, 2011).

For this reason and in order to strengthen the theoretical principles of entrepreneurship education, this study has been designed and implemented in order to validate the proposed model of entrepreneurship education.

The proposed model (Kor et al., 2019) is the result of another research, the results of which are presented in Table 1 as a model of entrepreneurship education. In this model, five basic dimensions of individual factors, economic factors, social factors, organizational factors and educational factors are extracted and the components and indicators of these dimensions are presented in Table 1.

Table 1. Indicators extracted from literature review and interviews with experts

Selective codes	Axial codes	Open codes
Individual factors	Psychological factors	Skills to avoid or endure failure
		Mental skills such as (self-regulation, self-efficacy, self-esteem, etc.)
		Personality abilities such as motivation for progress and seeking success
	Abilities and talents	Creativity and dynamism
		Risk acceptance and management
		Innate talent and entrepreneurial spirit
		Management and leadership capability
	Experiences and learning	Interactive view and teamwork
		Finding situations that others have not noticed (Opportunism)
		having a role model
		Previous work experience
		Having entrepreneur friends
		Problem solving and flexibility
		Wide communication network
Economic factors	micro	Assets and savings
		Attention to self-employment
		Importance of small businesses
	macro	Unordered economy
		Inflation rate and appropriate interest rate
		Appropriate tax system
		Unemployment rate
		Investment rate
social factors	Cultural factors	Competitive value system
		Existence of ethical and cultural values of entrepreneurship
		Economic religious beliefs
	Intellectual and philosophical conditions	Work conscience
		Social relationships and capital
		Trust and social cohesion
	Rules and regulations	Clear and supportive financial rules and regulations
		Intellectual property laws
	Relationships and social networks	Attention to entrepreneurship in all sectors, including agriculture, sports, etc.
		Social networks for the development of entrepreneurship
		Social movement and community dynamics
Organizational factors	Organizational culture	Organizational atmosphere
		Organizational leadership style
		Importance of the efficiency of the organization and people
	Structures	Rules and regulations of the organization
		Strong infrastructure to connect with industry and market

Educational factors	Management	Inappropriateness of the recruitment and promotion syste
		Existence of long-term macro and national policies
		Strategic managment
		delegation of authority
		Consequentialism and pragmatism
	targeting	Objectives based on needs assessment
		Long-term and innovative objectives
		Integration of objectives
		Freedom of action of the teacher and the learner
	Content	Content update
		Functionality and activeness of the content
		Virtual space opportunities for content
		Existence of a workbook
	teaching-learning strategies	New teaching-learning methods
		Work-oriented and activity-oriented approach
		Using active approaches (participatory, group, etc.)
		Integration of methods
	assessment	New evaluation methods
		Emotional and skill evaluation
		Self-evaluation
		The objective of evaluation is not only to score
		Giving feedback

Many studies were reviewed, and in this section, some of the most important studies are briefly mentioned. Wardana et al. (2020) concluded that training based on appropriate entrepreneurial models has an effect on entrepreneurial attitude, entrepreneurial self-efficacy and entrepreneurial mindset. Another study considers four factors of social networks, lack of funds, risk-taking, economic and political stability as effective on entrepreneurship education (El Nemar et al., 2016). Rahmanian and Zarei (2017) consider selected individual and social structures as effective on entrepreneurship. Khoshmaram, Zarafshani, Mirekzadeh and Ali Beigi (2016) consider the main components of the entrepreneurial model to include human capital, social capital, environmental support, psychological factors and risks. Amiri Lergani et al. (2017) consider four components of organizational culture, leadership style, level of conflict, and rules and regulations as effective on organizational entrepreneurship. Kashani, Rasouli and Suleimanpour (2016) consider personality factors, educational methods, educational content, and management factors as important components of effective entrepreneurship education.
Pourshariat, Mahjoub and Mustafaei (2015) concluded that ten structural factors affecting entrepreneurship are organizational structure, physical equipment and facilities, organizational strategies, work processes, regulatory system, research system, payment system, financial system, human resource management. and information management. Nasirzadeh et al. (2012) mentioned thirteen factors for entrepreneurs, including initiative, decision-making and follow-up power, identifying opportunities, taking risks, concern about quality, commitment, sensitivity to efficiency, self-confidence, flexibility, and convincing others. Nilchian et al. (2013) have considered twelve factors for entrepreneurs, including center of control, dreaming, intellectual fluency, balanced risk-taking, success-seeking, challenge-seeking, and ambiguity tolerance. Sharafi et al. (2011) divide the content of entrepreneurship education into five dimensions of

individual abilities, business, business environment, business management and learning communication skills.

On the other hand, providing the principles, tools and resources necessary for business growth, familiarity with the business culture in other countries and provision of a network of domestic entrepreneurs, trainers, experts and business leaders are among the goals of the entrepreneurship curriculum. It has been (Zhang, 2014). Sharafi, Mazbuhi and Moghadam (2013) considered the most important goals of entrepreneurship education as increasing entrepreneurial awareness, creating a positive attitude towards lifelong learning, identifying opportunities and divergent thinking, strengthening courage and decision-making. Vafaei (2013) also suggests the use of effective methods and models of entrepreneurship.

Also, other studies consider the transition to digital work environments and social networks as effective on determining the long-term and innovative goals of entrepreneurship education, appropriate to the macro economy (Ratten & Usmanij, 2020) and show that entrepreneurship education can significantly improve the self-efficacy, skills, behavior and critical attitude and technological readiness of learners (Cadenasa et al., 2020) and finally researchers while emphasizing the necessity of entrepreneurial universities have investigated reaching the entrepreneurial university (Taucean et al., 2018).

It seems that the successful experience of most developed countries and some developing countries on the development of entrepreneurship education has caused other countries to consider special importance to entrepreneurship and its education. Hence, according to the local factors, the expectations of entrepreneurship education are different in different countries. In Saudi Arabia, it is expected that the content of the entrepreneurship curriculum can strengthen positive attitudes and practical skills in learners, but the evidence of this importance has not been achieved (Albarraq et al., 2020). In Pakistan, it was concluded that the content of entrepreneurship curricula should lead to entrepreneurship in terms of three fields of learning, interests and available resources (Tariq et al., 2020). In Taiwan, the external motivations that arise in the participation and interpersonal interactions between entrepreneurs can be more effective than the internal motivations on their business process (Yeh et al., 2020). In China, they emphasize the use of different strategies of activation and involvement of learners (Ling & Lan, 2019). In France, it was suggested that the teaching-learning strategies in the entrepreneurship curriculum should be understandable and facilitated (Maniu et al., 2019). In Romania, it is necessary to revise the entrepreneurship curriculum in order to increase the participation of learners (Emilia, 2019).

Different aspects of research in the field of entrepreneurship show that entrepreneurship, which can be a source of increasing income and generating wealth, may spread poverty in the absence of local and appropriate models (Halvarssona et al., 2018). While, it can develop individual and social capabilities with balanced development and the use of local models (Shira et al., 2019). In this regard, studies have shown that the current state of entrepreneurship education in our country is undesired and far from the ideal state (Movahedi et al., 2015; Zamanian et al., 2015; Ghanati et al., 2016). Therefore, one of the weaknesses of entrepreneurship education seems to be the lack of a comprehensive model of entrepreneurship education.

In order to expand entrepreneurial capabilities in trainees and students, considering the country's approach in moving towards a resistance and knowledge-based economy and revising entrepreneurship curricula in accordance with international models and frameworks, while considering local and regional needs, reviewing and proposing new models using the latest research methods seems necessary. Hence, the main question of the present study is, according to the experts, to what extent are the indicators of the local model of entrepreneurship education valid?

In addition, researchers have identified and introduced 60 indicators of entrepreneurship education in the form of 5 dimensions and 16 components in a qualitative research while

conducting exploratory interviews and analyzing the content of national and international literature (Kor et al., 2020). The present research attempted to validate the proposed model using fuzzy Delphi method. The relationship between the research literature and the five dimensions of the proposed model is shown in Fig. 1.
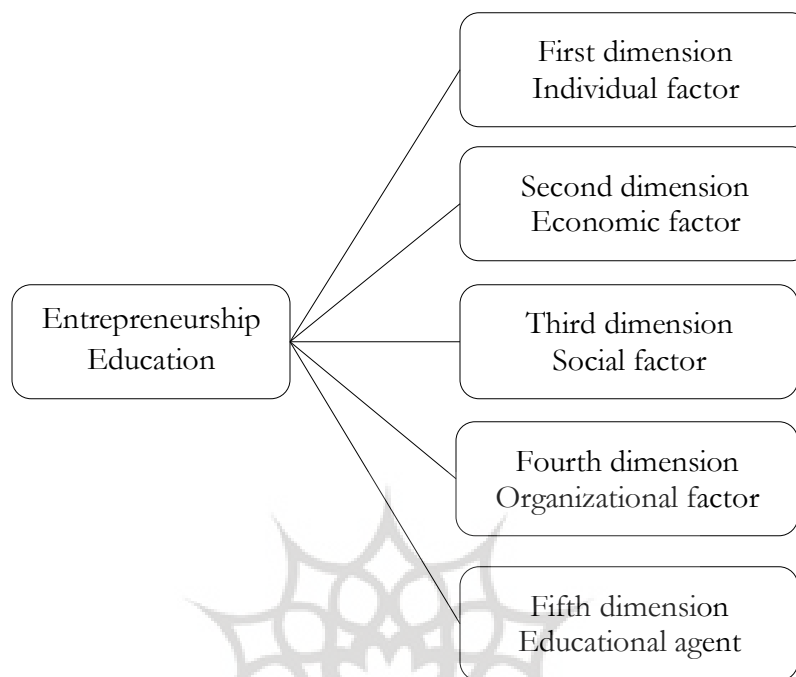.

Figure1. Relationship between the literature and the discovered dimensions

Methodology

Since this study deals with the design of the local model of entrepreneurship education, presents a new plan of the factors of an entrepreneurship education model and attempts to develop the existing knowledge collection about the principles and relationships of the indicators of the entrepreneurship education model, it is considered as a basic research in terms of objective. Also, based on the research plan and in terms of data collection, the present study is a descriptive (non-experimental) research.

In the present study, a non-random purposive sampling method was used to sample experts. This means that samples were selected that are rich in understanding the research problem and objectives. For selecting experts, the main criteria included experience or research in the field of entrepreneurship, membership in university faculty or research centers, and management and entrepreneurship education. The reason for selecting these people was that these members deal directly with entrepreneurship education and have the necessary motivation to explain the model of entrepreneurship education and assessment in this field.

Table 2. Demographic information of experts

		F	%
Gender	male	10	55.5
	female	8	44.5
Age	Below 35 years	3	11.1
	35-45 years	11	61.2
	45 years and above	5	27.7
Work experience	10-20 years	7	38.8
	21 years and above	11	61.2
	total	18	100

In this study, for the indicators of entrepreneurship education, sixty indicators developed in a study by Kor et al. (2019), it has been used. For this purpose, a questionnaire was developed for the importance and necessity of each indicator in the model of entrepreneurship education and sent to the selected experts. Then, the experts scored each of the questions on a five-point scale (very good, good, moderate, weak and very weak).

In this study, the fuzzy Delphi method was used for the views of entrepreneurs, educational planners and researchers in the field of entrepreneurship education as experts in the field of entrepreneurship regarding the validity of the proposed model of entrepreneurship education and its factors. The fuzzy Delphi method is a process based on a group communication structure that is used in cases where incomplete and uncertain knowledge is available to reach a group consensus among experts.

The objective of using the fuzzy Delphi method is to reach the most reliable group agreement of experts on a specific issue, which is done using a questionnaire and asking experts' opinions, repeatedly and according to the feedback. In the fuzzy Delphi method, the mental data of experts is transformed into more objective data using statistical analysis. The important advantage of this method is providing a flexible framework that covers many barriers related to inaccuracy and clarity. Since the possibility of uncertainty is compatible with fuzzy sets, it is better to collect data from experts in natural language format and analyze using fuzzy sets. For this purpose, the integration of the traditional Delphi method with fuzzy theory has been proposed under the title of fuzzy Delphi method (Azar & Faraji, 2002).

Experts usually present their theories in the form of the minimum value, possible value and maximum value (triangular fuzzy numbers). Based on this, the average opinion of the experts (numbers presented) and the disagreement of each expert is calculated from the average, and then this information is sent to get new opinions of the experts. Next, each expert, based on the information obtained previously, presents a new opinion or revises his previous opinion. This process continues until the average of the fuzzy numbers is constant (Feizi & Dehghan, 2009).

Since in the Delphi process, experts should select the appropriate indicators for the model of entrepreneurship education from the proposed indicators, the use of variables with a definite value would cause problems in expressing their opinions. So it seems that use of qualitative variables in with good, moderate and weak options will solve this problem to some extent. Given that people's opinions about qualitative variables such as low or high are not the same and experts also have different mentality in terms of having different views and responding to options based on different mentality invalidates the analysis of variables, fuzzy analysis proposed a solution by defining the range of qualitative variables. Therefore, qualitative variables are defined in the form of triangular fuzzy numbers (Azar & Faraji, 2002).

It seems that the use of fuzzy sets is more compatible with linguistic and sometimes vague human explanations, so it is better to use fuzzy sets to make long-term predictions and make

decisions in the real world. For this reason, this method has been used to model entrepreneurship education in the present study.

Table 3. Fuzzy nine-point scale for valuing indicators (Azar & Faraji, 2002)

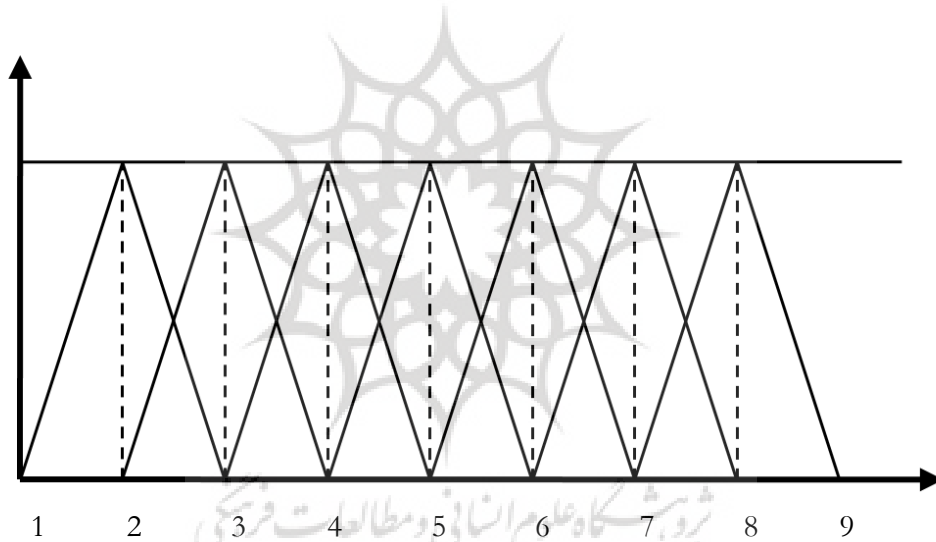| Definitive equivalent	Linguistic variable	Fuzzy number scale
1	very unimportant	(1.1.1)
2	very unimportant to unimportant	(1.2.3)
3	nimportant	(2.3.4)
4	nimportant to moderate important	(3.4.5)
5	moderate	(4.5.6)
6	moderate to important	(5.6.7)
7	important	(6.7.8)
8	important to very important	(7.8.9)
9	very important	(9.9.8)

Figure 1. Valuation of indicators relative to each other using triangular fuzzy numbers

Next, the fuzzy average of scores should be calculated. To calculate the average of the opinions of n respondents, the fuzzy average was roughly calculated. Each triangular fuzzy number for each index is calculated as follows (Azar & Faraji, 2002):

$$\tau_j = (L_j . M_j . U_j) \text{ و } (L_j = \min(X_{ij}) \text{ و } M_j = \sqrt[n]{\prod_{i=1}^{n} X_{ij}} \text{ و } U_j = \max(X_{ij}))$$

i refers to the expert. τ_j = fuzzy average of the criterion j, X_{ij} = expert i evaluation value of the criterion j, L_j= minimum value of evaluations for the criterion j, M_j= geometric mean of the experts' evaluation value of the performance of the criterion j, U_j=the maximum value of evaluations for the criterion j.

In fact, these aggregation methods are experimental methods proposed by different researchers. For example, a conventional method for aggregating a set of triangular fuzzy numbers is considered as minimum (l), mean (m), and background (u) (Equation 2)

$$F_{AGR} = \left(min\{l\}.\left\{\frac{\sum m}{n}\right\}.max\{u\} \right)$$

Fuzzy average is used in this study. The fuzzy average of n triangular fuzzy numbers was calculated using Equation (3):

$$\tilde{F}_{AVE} = (L.M.U) = \frac{\sum l_i^k}{n}.\frac{\sum m_i^k}{n}.\frac{\sum u_k^i}{n}$$

Where the triangular fuzzy number $\tilde{f}_i = \left(l_i^k.m_i^k.u_i^k \right)$ is the fuzzy equivalent of the k expert's opinion about the criterion i. The fuzzy average of the opinion of the expert panel for each of the research indicators is given in the table. Equation (4) is also used for de-fuzzification:

$$DF_{ij} = \frac{\left[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij}) \right]}{3} + l_{ij}$$

Findings
In the present study, the fuzzy Delphi method has been used to investigate the indicators. Therefore, after identifying the indicators of the local model of entrepreneurship education (Kor et al., 2020), the identified components were set in the form of a questionnaire on Likert scale available provided to the sample and analyzed through the fuzzy Delphi method after collecting. When the average difference of experts' opinions about the questions raised in the questionnaire is less than 0.7 during two consecutive steps of fuzzy Delphi method, the Delphi process is stopped and finally the questions with "good" point are used as indicators of the model of entrepreneurship education.
The fuzzy average and the de-fuzzified output of the values related to the indicators were calculated based on the above formulas. The threshold value in this study is 5. The de-fuzzified value higher than 5 is acceptable and any index with a lower score is excluded (Wu and Fang, 2011). At the end of the first round, all items with a score of less than five (four items) were excluded, and the second round of fuzzy Delphi method continued for the remaining indicators. The results of element de-fuzzification in the second round and the difference between the de-fuzzified values of the first and second round are reported in Table 3. It is obvious that due to the large number of indicators and components, it has been avoided to bring the tables of fuzzy average in detail of the fuzzy values (U, M, L).

Table 4. De-fuzzified values of the first and second steps and their differences

indicators	1st round	2nd round	difference	indicators	1st round	2nd round	difference
Skills to avoid or endure failure	7.41	6.81	0.6	Attention to all sectors, including agriculture, sports, etc.	6.80	6.86	-0.06
Mental skills such as self-regulation, self-efficacy, etc.	6.53	6.33	0.2	Social networks for the development of entrepreneurship	6.06	6.16	-0.01
Personality abilities such as the motivation to progress and success-seeking	6.31	6.35	-0.04	Social movement and community dynamics	6.17	6.17	0
Creativity and dynamism	7.14	6.84	0.3	Organizational atmosphere	7.31	6.92	0.39

Indicator				Indicator			
Risk acceptance and management	5.33	5.33	0	Organizational leadership style	5.96	5.86	0.1
Innate entrepreneurial talent	2.31	---	---	Importance of efficiency	5.92	5.92	0
Management and leadership capability	5.96	5.96	0	Rules and regulations of the organization	6.09	6.05	0.04
Interactive view and teamwork	6.41	6.41	0	Strong connection with industry	6.09	6.05	0.04
Finding unknown positions	6.09	6.09	0	Improper recruitment and promotion system	5.96	5.96	0
Having a role model	6.08	5.96	0.12	Long-term national policies	5.92	5.92	0
Previous work experience	5.92	6.21	-0.29	Strategic Managment	6.09	6.09	0
Having entrepreneur friends	6.17	6.27	-0.1	Delegation of authority	6.09	6.09	0
Problem solving and flexibility	5.92	6.72	-0.6	Consequentialism and pragmatism	5.72	5.92	-0.2
Wide communication network	5.92	5.92	0	Objectives based on needs assessment	5.92	5.92	0
Assets and savings	6.06	6.06	0	Long-term and innovative objectives	6.09	6.19	-0.1
Attention to self-employment	5.86	6.36	-0.5	Integration of objectives	5.72	5.82	-0.1
Importance of small businesses	5.96	6.46	-.05	Freedom of action of the teacher and the learner	5.92	5.92	0
Unordered economy	7.15	7.25	-0.1	Content update	5.96	5.92	0.04
Inflation rate and appropriate interest rate	6.80	6.83	-0.03	Functionality and activeness of the content	5.92	5.92	0
Appropriate tax system	6.72	6.72	0	Opportunity of virtual space to produce content	6.09	6.09	0
Unemployment rate	7.54	7.34	0.2	Existence of a workbook	2.31	---	---
Investment rate	6.47	6.47	0	New teaching-learning methods	6.96	6.96	0
Competitive value system	7.21	6.61	0.6	Work-oriented and activity-oriented approach	5.28	5.48	-0.2
Existence of ethical and cultural values of entrepreneurship	89.6	62.6	0.27	Using active approaches (participatory and group)	6.09	6.29	-0.2
Economic religious beliefs	2.31	---	---	Integration of methods	6.72	6.72	0
Work conscience	5.97	5.67	0.3	New evaluation methods	7.15	7.15	0
Social relationships and capital	7.41	6.80	0.61	Emotional and skill evaluation	6.31	6.51	-0.2
Trust and social cohesion	6.41	6.51	-0.1	Self-evaluation	5.28	5.68	-0.4
Clear and supportive financial rules and regulations	6.27	6.47	-0.2	The objective of evaluation is not only to score	6.09	6.39	-0.3
Intellectual property laws	7.15	6.85	-0.3	Giving feedback	6.72	6.72	0

In the first round of fuzzy analysis, three indicators (inherent talent and entrepreneurial spirit, existence of a workbook and religious economic beliefs) did not receive the necessary points to continue the work and therefore were excluded from the round. In the second round of fuzzy analysis, no item was excluded, which is a sign of the end of the Delphi rounds. Despite this, one approach to the end of the Delphi process is to compare the average scores of the items of the first round and the second round. If the difference between the two stages is smaller than the threshold (0.7), the survey process is stopped.

Given that the difference of the de-fuzzified average of the experts' opinions in two steps is less than 0.7, the experts have reached a consensus on the dimensions, components and indicators of the local model of entrepreneurship, and the survey is stopped in this step. This means that the experts in question had almost the same opinion on these indicators. According to the results of Table 3, all indicators were approved in the second round, and 57 indicators out of 60 indicators extracted were appropriate, and 3 indicators were excluded in the first round.

Conclusion

Given the increasing changes in societies and expectations of the beneficiaries from technical and professional education, it seems that providing a single model of entrepreneurship education cannot be responsible forever and using a local model can fill the existing gaps to a great extent and provide the field for the development and updating of entrepreneurship education more than before. In addition to the comprehensive pathology of this field based on the proposed model and identification of strengths and weaknesses; measures and improvement plans should be discussed and the position of entrepreneurship education in the technical and vocational education system should be improved.

As mentioned in the results section, a total of 57 indicators (Table 3) out of 60 indicators have been selected for the final model, which is the contribution of each of the five fields in order for the individual dimension (13 indicators in the form of three components, the economic dimension (8 indicators in the form of two components), the social dimension (10 indicators in the form of three components), the organizational dimension (10 indicators in the form of three components) and the educational dimension (16 indicators in the form of four components). Therefore, it can be said that the conceptual model presented in this study, while having a comprehensive system structure, has theoretical support and a sufficient number of indicators, and has been modified by experts.

The results are consistent with previous studies on various indicators of entrepreneurship education, such as Kummitha and Kummitha (2021), Rahmanian and Zarei (2017) and Khoshmaram et al. (2016) on social dimension; Wardana et al. (2020) Nowiński and Haddoud (2018) Zubiri (2016) and Halvarson et al. (2018), El Nemar et al. (2016) regarding economic dimensions, Amiri Lergani et al. (2017) Tausin (2018) Mehboob Khah et al. (2016) and Pourshariat et al. (2015) on the organizational dimension; and Kashani et al. (2016) Zhang (2014), Vafaei (2011) and Naderi (2012) on the educational dimension, which investigated some indicators, components and dimensions of the present study.

On the other hand, it should be noted that one of the obvious differences between the dimensions, indicators and components of the present study, and the aforementioned research, is about more clearly showing the role of economic, social and organizational dimensions as the main fields of entrepreneurship education. Also, the emphasis on the very important role of curriculum elements in the planning of entrepreneurship education is one of the strengths of the present study, which is rarely seen in previous research.

Given that the present study was conducted at one point in time, instead of considering a long and continuous period of entrepreneurship education, it shows a cross-section of it. Another limitation of this study is the diversity and heterogeneity of technical and professional fields, accordingly, the conditions of entrepreneurship and related training in different fields may be different and finding common indicators among various disciplines sometimes become very difficult. It is suggested to design and assess entrepreneurship education in technical and professional centers based on the proposed model in future studies.

References

Albarraq, A. A., Makeen, H. A, Banji D. 2020. Preconception of Pharmacy Students for the Inclusion of Entrepreneurship Curriculum in the PharmD Program. Indian Journal of Pharmaceutical Education and Research, 54(1):131-148.

Amiri Lergani, M., Khairandish, M. Experts, A and Skow, and. 2017. Analyzing barriers to organizational entrepreneurship in universities: a case study of Gonbad Kavos University. New Applied Studies in Management and Economics, 1 (2): 7-22.

Azar, A. and Faraji, H. 1381. Fuzzy Management Science, Iran Studies and Productivity Center. Tehran: Community Publications.

beloved Y., and Beyzadeh, Y. 2016. Presenting a structural model of entrepreneurial personality traits in nurses based on managers' power sources and the mediating role of organizational justice perception. Nursing Management Quarterly. 6 (6): 17-28.

Cadenasa, G. A., Cantú, E. A, Lynn, N. Spence, T and Ruth, Alissa. 2020. A programmatic intervention to promote entrepreneurial selfefficacy, critical behavior, and technology readiness among underrepresented college students. Journal of Vocational Behavior, 116 (A) 103350.

El Nemar, S., Ghazzawi, K. El Danaoui, S. Tout, S. and Dennaoui, H. 2016. Entrepreneurship Barriers and Entrepreneurial Inclination in Lebanon. Management, 6(1):21-28.

Emilia, H. 2019. Entrepreneurial Intention among Engineering Students and Its Main determinants. The 12th International Conference Interdisciplinarity in Engineering. Procedia Manufacturing, 32(6):318-324.

Fadai, A. 2014. Phenomenology of entrepreneurship education from the aspect of method and content, obstacles and solutions. Doctoral thesis of Razi University. Entrepreneurship group. Under the guidance of Dr. Abdulhamid Popzan.

Faithful, and 2018. Identifying effective teaching methods to nurture budding entrepreneurs in entrepreneurship, work and society education. 2(150):46 to 55.

Faizi, K. and Dehghan, H. 2018. Determining specialized and common measures of comprehensive quality management, timely production and comprehensive maintenance. Journal of Business Studies, 2(1): 109-132.

Halvarssona, D., Korpib, M. and Wennbergc K. 2018. Entrepreneurship and income inequality. Journal of Economic Behavior & Organization, 6(145): 275–293.

Hosseinikhah, A., Salimi, J. and Rostgar, A. 2016. Can entrepreneurship be taught? Work and Society Monthly, (90): 42-50.

Kashani, T., Rasouli, M. and Sulaimanpour, M. 2016. Investigating the effective factors of entrepreneurship skills of agricultural students of Technical and Vocational University in Tehran province. Agricultural Education and Extension Research Quarterly, year 10(1): 53-64.

Khoshmaram, M., Zarafshani, K. Mirkzadeh, A. and Ali Beigi, A. 2016. Designing and explaining a model to identify entrepreneurial opportunities in the agricultural sector of Kermanshah province. Rural Research Quarterly, 8 (3): 391-402.

Kor, A., and Hosseinikhah, A., Kurdestani, F. and Delgoshai, Y. 2019. Presenting the local model of entrepreneurship training in technical and vocational training centers. PhD thesis of Islamic Azad University. Tehran.

Kummitha, H. R., and Kummitha, R. R. 2021. Sustainable entrepreneurship training: A study of motivational factors. The International Journal of Management Education, (19): 1-28.

Ling, H., and Lan, Longyao. 2019. Research on MOOC's Teaching Method About the Category of Innovation and Entrepreneurship Courses. Advances in Economics, Business and Management Research, volume 110. 5th International Conference on Economics, Management, Law and Education, (EMLE 2019): 1322-1325

Maniu, C. S., Sandou, G. and chevalier, v. L. 2019. Feedback on innovative pedagogy for teaching systems modeling. IFAC PapersOnLine, 9(52): 230 – 235.

Mohadi, R., Heydari, Kh. and Saadi, H. 2015. The position of entrepreneurship curriculum in the Faculty of Agriculture of Bu Ali Sina, Razi and Kurdistan Universities. Agricultural Education Management Research Quarterly. 4(36): 64-77.

Naderi Nabi, N. 2012. Examining the role of main activities and academic support in entrepreneurship of Iran's state universities based on the entrepreneurial university model. Doctoral thesis of the Faculty of Educational Sciences and Psychology. Isfahan: University of Isfahan.

Nasirzadeh, A. 2013. Designing and explaining the process model for predicting entrepreneurship of graduates of physical education schools in the country. Doctoral dissertation of Allameh Tabatabai University in the field of sports management.

Nilchian, M., and Kesai, M. 2018. Development strategy of entrepreneurship profile of higher education graduates, Strategic Management Studies, 3(11): 35-47.

Nkirina, S. 2010. The challenge of integrating entrepreneurship education in the vocational training system. Journal of European Industrial Training, 34(2): 153-166.

Nowiński, W., Haddoud, M. Y. 2018. The role of inspiring role models in enhancing entrepreneurial intention Journal of Business Research. Journal of Business Research, 96 (2019): 183–193

Oosterbeek, H., M.V. Praag and A, Ijsselstein. 2010. the impact of entrepreneurship education on entrepreneurship skills and motivation. European Economic Review, 2(54) 442-454.

Pourshariat, A., Mahjoub, H. and Mustafaei, M. 2015. Investigating the status of structural factors and academic entrepreneurship of army universities. Quarterly Journal of Marine Science Education, 4(7): 31-44.

Qanati, S. and Kurd Naij, A. 2018. Investigating the state of the culture of the autonomous organization in the University of Tehran. Entrepreneurship Development, 11(3): 115 – 133.

Rahmanian, Koushakki, M., and Zarei, Y. 2017. Analysis of individual and social structures affecting the development of rural entrepreneurship with an emphasis on the agricultural sector of Kamfirouz, Maroodasht city. Rural Research Journal, 2 (9): 292-308.

Ratten, V., Usmanij, P. 2020. Entrepreneurship education: Time for a change in research direction? The International Journal of Management Education, Available online 22 January 2020, 100367. https://doi.org/10.1016/j.ijme.2020.100367

Sharfi, M., Moghadam, M. and Madbohi, S. 2013. Entrepreneurship education curriculum: purpose, content, teaching method and evaluation method. Journal of Innovation and Creativity in Human Sciences, 1 (3): 97-130.

Shira, N., Nikolaevc, B. N., and Wincent, J. 2019. Entrepreneurship and well-being: The role of psychological autonomy, competence, and relatedness. Journal of Business Venturing, 34(5) 105875.

Taucean, I., Mihai, S. Ana, G and Tion, M. 2018. Roadmap to Entrepreneurial University – Case study. SIM 2017/ 14th International Symposium in Management, Procedia - Social and Behavioral Sciences, (238): 582 – 589.

Wardana, L. W., Narmaditya B. S. Wibowo, A. Mahendra, A. Martha, W. Nyuherno, A. Harwida, G and Rohman, A. N. 2020. The impact of entrepreneurship education and students' entrepreneurial mindset: the mediating role of attitude and self-efficacy, Heliyon, 6(9):1-7.

Yeh, C. H., Wang, Y. S, Wei H. J and Lin, j. 2020. Predicting individuals' digital autopreneurship: Does educational intervention matter? Journal of Business Research,106 (2020): 35–45

Zamaniyan, A., Chavoshian, M. and Motamedi, M. 2015. Evaluation of the content of the training courses held in fixed centers of technical and vocational education in South Khorasan in 2014. The monthly information network of scientific conferences of the country, 2 (12): 15-36.