The structural model of teachers' empowerment indicators with an emphasis on the theory of cognitive flexibility in the first secondary school of Mazandaran province schools

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ARTICLE INFORMATION	ABSTRACT
	Background and Aim: Since the decisions related to the curriculum field, including curriculum engineering, are directly related to the curriculum, it is of great importance to empower and improve the knowledge of ordinary and special education teachers through educational planning. The current research was carried out with the aim of designing a curriculum model based on teacher empowerment with emphasis on the cognitive flexibility theory of the first secondary school in Mazandaran province in 2019. **Methods:** The current research is applied in terms of purpose, which was done with a mixed exploratory approach, with an exploratory design. Delphi method was used in the qualitative approach and descriptive survey method was used in the quantitative approach. The statistical population of this research in the qualitative part includes 15 professors and experts of Islamic Azad University based on the purposeful sampling method and in the quantitative part it includes teachers working in the first secondary schools of Mazandaran province in the number of 5149 people, of which 358 people are determined based on the Cochran formula became The tools used were the researcher-made questionnaire of the teacher empowerment curriculum with a cognitive flexibility approach with 62 indicators. The validity and reliability of the research tool was confirmed. Data analysis was done by confirmatory factor analysis using 21SPSS and SMARTPLS3 software. **Results:** The results showed that there are 15 indicators in the dimension of the goals of the teacher empowerment curriculum with the cognitive flexibility approach, 10 indicators in the content dimension of the teacher empowerment curriculum, and 9 indicators in the dimension of teaching-learning methods of the teacher empowerment curriculum. And in the dimension of teacher empowerment curriculum evaluation, 9 indicators were identified and confirmed. The overall fit of the research model was confirmed using the GOF index calculated at 0.54. **Conclusion:** It can be concluded that the structural model of teachers' ability indicators with emphasis on the theory of cognitive flexibility in the first secondary school of Mazandaran province has a good fit.

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Introduction

In today's world, where the stimulies one receive through media and the internet have increased tremendously, it is essential to quickly shift from one thought to another and from one task to another. This skill, whose enhancement can aid in understanding complex tendencies, improving brain efficiency, and grasping new perspectives, is one of the most crucial abilities for success in the modern world. Without a high level of cognitive flexibility, we would not be capable of living and working in today's environment (Dickesten et al., 2007).

Curriculum design is a process involving steps such as educational foundations (philosophical, psychological, and sociological), setting objectives, selecting content, teaching methods, and evaluation methods (Maleki, 2012). Curriculum design, one of the two primary activities in curriculum planning, brings order to the activities involved in preparing an appropriate curriculum. Agreed-upon curriculum elements subject to design include objectives, content, teaching materials, teaching-learning strategies, timing, space, and evaluation, with four core elements being objectives, content, method, and evaluation (Fathi Vajargah, 2015).

Boshap (2013) believes that the field of curriculum has two sub-theories or minor theories: curriculum design and what he calls curriculum engineering. According to Boshap, curriculum engineering also encompasses three fundamental discussions: curriculum development, implementation, and evaluation. Curriculum design refers to our approach in conceptualizing the curriculum and setting its main elements (subject matter or content, teaching methods, educational materials, and learner activities or experiences) to provide direction during curriculum development (curricular planning) (Ourshan & Hankenz, 2013). In other words, curriculum design means the methods through which the curriculum is developed, created, and produced, especially the methods of organizing and sequencing the actual parts of a curriculum map or plan. Sometimes, curriculum design may be used synonymously with curriculum organization, meaning how curriculum elements (like feasibility, objectives, needs, content, and evaluation) are sequenced within a unified structure. The choice of design depends on the individual's curricular approach and philosophical orientation (Qaderi, 2017).

Since decisions related to curriculum engineering are directly related to the curriculum, curriculum design is the central focus of curriculum theorizing. From a theoretical perspective, curriculum design should be the most important minor theory within curriculum theory (Boshap, 2013). Empowering and advancing the academic qualifications of regular and special education teachers through educational planning is a priority (Behboodi et al., 2022). The concept of empowerment has been the subject of much discussion and debate, yet a definitive definition has not been established. Researchers note that this term is rarely clearly defined and is inherently used in a literal sense. The reason for this is the lack of a comprehensive historical and experiential background for this concept among organizational concepts. In other words, the novelty of the subject has led to a diversity of opinions among scholars in this field, preventing the formation of a scientific foundation (Mehr Mohammadi, 2017).

On the other hand, some researchers define empowerment processes as job enrichment, personal work control, autonomy in performing duties, teamwork, performance-related pay systems, and employee stock ownership. The primary meaning of empowerment refers to granting authority and power. Cognitive flexibility, defined as the ability to change thought (cognition) or a set of thoughts to adapt to new situations, implies that individuals who easily switch between different situations have high cognitive flexibility. The constructivist approach to cognitive flexibility, student-centered and process-oriented, has led to the development and implementation of various programs in many countries. Research shows that this method significantly enhances cognitive growth in students over the long term (Taghipour Zahir, 2016). The establishment of training workshops for the development and utilization of individual abilities also plays a vital role in enabling individuals to recognize their competencies and step towards growth and talent flourishing (Taghinezhad, 2022). The aim of this research is to answer how the curriculum design model based on teacher empowerment, with an emphasis on the cognitive flexibility of middle school students in Mazandaran Province, is formulated.

Method

The current research is applied in nature and was conducted with an exploratory mixed-method approach. In the qualitative approach, the Delphi method was used, while in the quantitative approach, a descriptive research method of the survey type was employed. The statistical population in the quantitative part included all middle school teachers in Mazandaran province who were working in one of the middle schools during the academic year of 2020-2021, totaling 5149 individuals. The sample size for the quantitative section was calculated using Cochran's formula, resulting in a sample of 358 individuals proportional to the population. The sampling method of the current research was a two-stage cluster method.

Materials

1. Researcher-Made Questionnaire: To gather the necessary data on the curriculum empowering teachers with a focus on cognitive flexibility, the Delphi method and consultation with experts were employed. For data collection in the quantitative part, a field method was used. The tool for gathering the required data was a researcher-made questionnaire. This questionnaire contained 62 items on a five-point Likert scale, measuring four dimensions: objectives, content, teaching methods, and evaluation. The scoring range for the questionnaire items was from 'very low = 1' to 'very high = 5'. To assess the validity of the research tool, face, content, and construct validity were examined after deriving the items from the Delphi implementation. Face and content validity were checked simultaneously, and after conducting the questionnaire, the construct validity of the research tool was reviewed and confirmed by advisors, consultants, and experts.

Implementation

After data collection, to evaluate face validity, the question "Is the appearance of the tool appropriately designed for assessing the intended goal?" was addressed. Both quantitative and qualitative methods were used to determine face validity. For qualitative determination of face validity, 2 experts were interviewed, and difficulty level (difficulty in understanding phrases and words), relevance (appropriateness and relation of phrases to questionnaire dimensions), and ambiguity (potential for misinterpretation of phrases or deficiencies in word meanings) were assessed. After revisions based on their feedback, a quantitative method of item impact was used in the next step to reduce phrases, eliminate inappropriate phrases, and determine the importance of each phrase. For qualitative and content validity determination, items were reviewed by experts and necessary revisions were made. For quantitative content validity determination, two indices were used: content validity ratio (CVR) and content validity index (CVI). To determine the CVR of the measurement tool for the curriculum, 2 university experts were asked to review each item based on a three-part scale (essential, useful but not essential, and not necessary). Based on Lawshe's table, the minimum value of CVR was determined, and the CVR for each item was calculated using the following formula. In assessing content validity based on CVI, experts were provided with the designed questionnaire to determine the relevance, simplicity, and clarity of each phrase. Thus, three criteria of simplicity, relevance, and clarity were separately assessed on a four-part Likert scale for each item. To determine the reliability of the research tool, internal consistency was used with Cronbach's alpha test. Cronbach's alpha values for research variables ranged from 0.71 to 0.95, indicating the appropriate reliability of the used instrument.

Results

The frequency analysis indicates that out of the total participants, 215 individuals (60%) were male and 143 (40%) were female. Additionally, the highest frequency regarding educational qualification of the subjects was seen in the bachelor's degree group (266 individuals), and the least was in the diploma group (43 individuals). The Kolmogorov-Smirnov test was used to check the normality of the data, which showed that the acceptable range for assuming normality in terms of skewness and kurtosis is from -2 to +2. Based on the skewness index ranging from -0.301 to -0.539, it can be said that the data are normally distributed, as the values fall within the -2 to +2 range. Factor analysis results showed that 15 indicators with a factor loading above 0.5 were deemed appropriate and were used in the model design. As observed in Table 1, the significance level in the Kaiser-Meyer test is less than 0.01, therefore the test is significant and exploratory factor analysis can

be conducted. Factor analysis results indicated that 54.626% of the variance in scores is explained by 9 indicators.

Table 1. Final Extracted Factor Loadings	
Statistic	Value
Kaiser-Meyer-Olkin (KMO) Test	0.873
Bartlett's Test	
- Chi-Square	891.66
- Degrees of Freedom (df)	36
- Significance Level	0.000
Total Variance Explained	62.254%

Research Question 1: What are the objectives of the curriculum based on teacher empowerment with an emphasis on cognitive flexibility theory for the first secondary level in Mazandaran province? To answer this research question, a qualitative method was used, employing the Delphi technique in four stages. In this part, based on experts' opinions, 23 indicators were identified in the objective dimension. In factor analysis, 8 indicators were removed due to inappropriate factor loading. The Friedman test was used to rank the indicators of the objective dimension, which examines score changes (medians) in several conditions. The results are reported in Table 2.

Table 2. Results of the Friedman Test Regarding the Ranking of Indicators in the Objective Dimension					
Code	Objective	Mean Rank	Chi-Square	p	Rank
q2	Lifelong Learner	2.56	18.21	0.001	1
q3	Constructive Interaction with Peers	3.14	15.36	0.001	2
q4	Decision-Making Skills in Various Situations	4.29	11.48	0.001	3
q5	Professional Flexibility	5.47	9.52	0.002	4
q6	Cognitive and Metacognitive Knowledge Development	6.38	7.63	0.006	5
q7	Research Skills and Problem Identification	7.24	6.15	0.013	6
q8	Specialized and Educational Knowledge Development	8.16	5.07	0.024	7
q9	Digital Literacy	9.51	3.96	0.047	8
q10	Professional Knowledge Production	10.62	2.84	0.092	9
q11	Diverse Teaching Styles	11.38	2.07	0.150	10
q12	Diverse and Innovative Evaluation Methods	12.47	1.30	0.254	11
q13	Inclination Towards Innovation and Creativity in Teaching	13.14	0.94	0.332	12
q14	Philosophical Attitudes and Mindsets Development	14.29	0.58	0.446	13
q15	Learner Organization Development	15.62	0.21	0.647	14
q16	Designing Context-Based Learning Environments	16.38	0.15	0.697	15

According to Table 2, the significance level resulting from the Friedman test for ranking the most important indicators of the objective dimension is significant ($p < 0.05$), indicating that the importance and ranking of the proposed indicators in the objective dimension vary. Based on this table, from the perspective of the study sample, the indicators of cognitive and metacognitive knowledge development, research skills and problem identification, and constructive interaction with peers were effective in teacher empowerment with a cognitive flexibility approach, ranking first to third, respectively.

Research Question 2: What is the content of the curriculum based on teacher empowerment with an emphasis on cognitive flexibility theory for the first secondary level in Mazandaran province?

To answer this research question, a qualitative method was used, employing the Delphi technique in four stages. In this part, based on experts' opinions, 15 indicators were identified in the content dimension. In the implementation of factor analysis, 5 indicators were removed due to inappropriate factor loading. The Friedman test was used to rank the indicators of the content dimension, which examines score changes (medians) in several conditions.

Table 3. Results of the Friedman Test Regarding the Ranking of Dimensions and Indicators of the Content Dimension						
Dimensions	ID	Indicator	Mean Rank	Chi-Square	p	Rank
Content	q25	Development of Reasoning and Expression Power	5.47	150.38	0.000	6
	q27	Development of Adaptability in Environment	6.20	-	-	1

q28	Development of Learning Environment Design Skills	5.69	-	-	4
q29	Development of Self-Regulatory Skills	4.69	-	-	9
q30	Development of Practical Teaching Skills in Context	5.05	-	-	8
q31	Teaching Thoughtful Teaching Skills	4.57	-	-	10
q33	Teaching Problem Identification	5.43	-	-	7
q35	Teaching Knowledge and Metacognitive Skills	5.69	-	-	4
q36	Teaching Research Skills	5.92	-	-	2
q37	Teaching Test Analysis	5.91	-	-	3

According to Table 3, the significance level resulting from the Friedman test for ranking the most important indicators of the content dimension is significant ($p < 0.05$), indicating that the importance and ranking of the proposed indicators in the content dimension vary. Based on this table, from the perspective of the study sample, the indicators of adaptability development in the environment, research skill training, and test analysis training were effective in teacher empowerment with a cognitive flexibility approach, ranking first to third, respectively. In the implementation of factor analysis, 6 indicators were removed due to inappropriate factor loading. The Friedman test was also used to rank the indicators of the teaching-learning method dimension.

Table 4. Results of the Friedman Test Regarding the Ranking of Indicators in the Teaching and Learning Methods Dimension

Dimension	ID	Indicator	Mean Rank	Chi-Square	p	Rank
Teaching and Learning Methods	q39	Exploratory Method	4.43	910.44	0.000	9
	q40	Research Method	4.75	-	-	6
	q41	Flexibility in Teaching Method	4.63	-	-	7
	q42	Problem-Solving Method	5.08	-	-	4
	q43	Creative Thinking Method	5.62	-	-	2
	q46	Creativity and Innovation in Work Method	4.54	-	-	8
	q47	Practical and Applied Method	4.95	-	-	5
	q48	Interactive Technological Tools Method	5.29	-	-	3
	q50	Integrative (Theory and Practice) Method	5.70	-	-	1

According to Table 4, the significance level resulting from the Friedman test for ranking the most important indicators of the teaching-learning strategy dimension is significant ($p < 0.05$), indicating that the importance and ranking of the proposed indicators in the content dimension vary. Based on this table, from the perspective of the study sample, the indicators of integrated method (theory and practice), creative thinking method, and interactive technological tools were effective in teacher empowerment with a cognitive flexibility approach, ranking first to third, respectively. Considering that an appropriate value for Cronbach's alpha and composite reliability is 0.7, and according to the findings in the above table, these metrics have obtained appropriate values for the latent variables, confirming the reliability of the research model.

To examine the structural fit of the research model, beta coefficients and t-values for each dimension, R2, and Q2 criteria were used. Based on the beta and t-value statistics table, the calculated significance level for all dimensions is significant ($p = 0.000 < 0.05$), therefore it can be said that the dimensions of evaluation, objectives, teaching-learning methods, and content have a significant effect in empowering teachers with a cognitive flexibility approach. Also, the resulting beta coefficient value shows an appropriate level in all dimensions. The second criterion for examining the structural model fit in this research is the R2 coefficients related to the model's endogenous latent variables. R2 is a criterion that indicates the effect of an exogenous variable on an endogenous variable and values of 0.19, 0.33, and 0.67 are considered as benchmarks for weak, medium, and strong R2 values, respectively. The Q2 value for the research's endogenous constructs has been calculated, and given the resulting value and its comparison to

the benchmark, strong predictive power for the four dimensions of evaluation, objectives, teaching-learning methods, and content has been confirmed. These results indicate the appropriateness of the structural model fit. One of the indicators for examining model quality is the communal validity index (CV-COM). This criterion indicates the amount of variability in the indicators (questions) explained by their associated construct. The results show that the communal validity verification index of the latent variables for all constructs is positive and at an acceptable level, therefore the developed model is adequately sufficient.
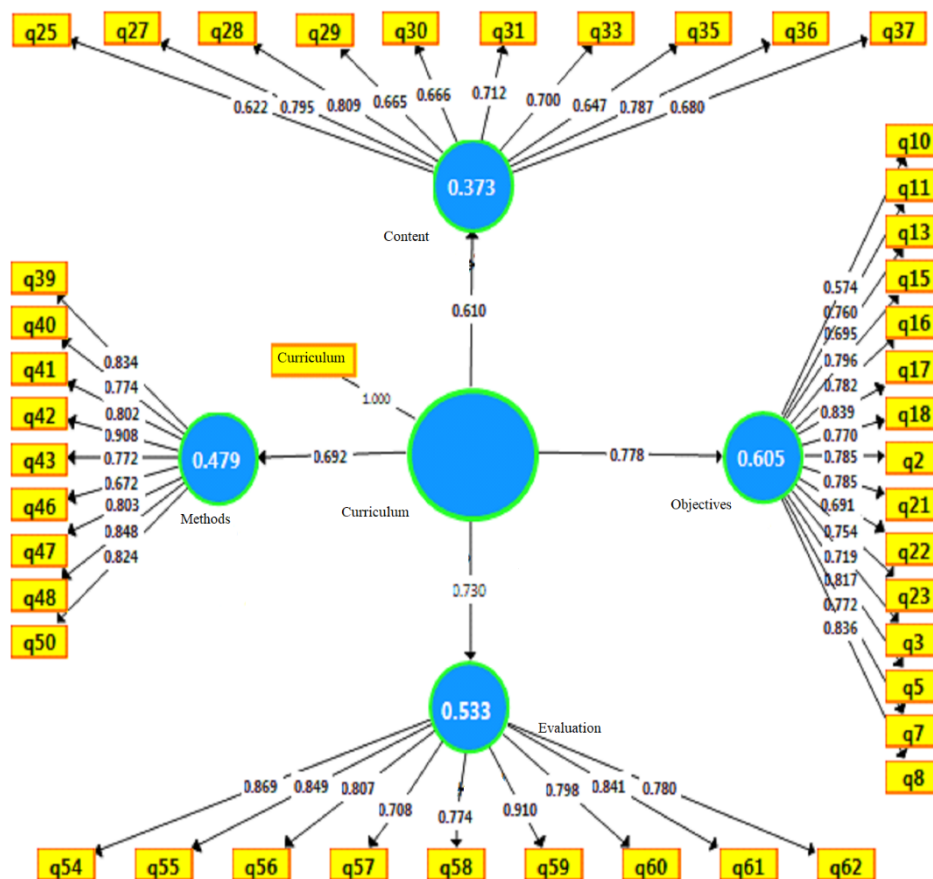

Figure 1. Research Model

Conclusion

The present research, aimed at designing a curriculum model based on empowering teachers with an emphasis on cognitive flexibility theory for the first secondary level in Mazandaran province, was conducted in 2020. The research revealed that the objectives of the curriculum for empowering teachers with a cognitive flexibility approach are influenced by multiple indicators. In the qualitative section of this study, 23 indicators were identified, which were reduced to 15 after statistical analysis. The confirmed indicators included lifelong learning, constructive interaction with peers, decision-making skills in various situations and contingencies, flexibility in professional practice, development of cognitive and metacognitive knowledge, research skills and

problem identification, development of specialized and educational knowledge, digital literacy, professional knowledge production, use of diverse teaching styles, diverse and innovative evaluation methods, inclination towards innovation and creativity in teaching, development of philosophical attitudes and mindsets, learner organization development, and designing context-based learning environments. Among these, the three most important indicators were the development of cognitive and metacognitive knowledge, research skills and problem identification, and constructive interaction with peers, ranking first to third respectively. Comparing the results of this research question, it aligns with the findings of Barak & Levenberg (2016), Ali Mohammadi et al. (2018), Taghizade (2018), Ebadi et al.

(2020), and Mohammadi & Soroush (2013). The overall findings of this research question indicate the high importance of considering objectives in the curriculum for empowering teachers with a cognitive flexibility approach, as setting goals is the first element in curriculum planning and design. All curriculum theorists have mentioned objectives as one of the constant elements. The presence of objectives provides direction and meaning to curriculum activities, enables the exploration of various ways to achieve goals, allows for comparison of results, and facilitates the revision of activities. Lack of objectives or comprehensive objectives leads to the inefficiency of the curriculum. In this research, the design of curriculum objectives also involved a cognitive flexibility approach, which has two important aspects: the ability to switch between two or more thoughts or concepts and considering various dimensions of a phenomenon at one time. To develop such characteristics in teachers, curriculum objectives should be foundational, enabling teachers through diverse training to adapt to their specific circumstances and change their approach if necessary. The presented objectives, each in their way, can create a specific orientation for teachers after the program's implementation, strengthening them in that topic and training them to be flexible in teaching.

Moreover, the research showed that the objectives of the curriculum for empowering teachers with a cognitive flexibility approach are influenced by multiple indicators. In the qualitative section of this study, 15 indicators were identified, which were reduced to 10 after statistical analysis. The confirmed indicators included developing reasoning and expression power, adaptability in the environment, designing learning environments, self-regulation skills, practical teaching skills in context, teaching thoughtful teaching skills, problem identification, cognitive and metacognitive knowledge and skills, research skills, and test analysis. Among these, the three most important indicators were adaptability in the environment, teaching research skills, and test analysis in empowering teachers with a cognitive flexibility approach, ranking first to third respectively. An analysis of domestic and international research results shows that the findings of this research question are consistent with those of Ali Mohammadi et al. (2018), Balkar (2015), and

Mohammadi & Soroush (2013). The selection of content in the curriculum for empowering teachers with a cognitive flexibility approach is of great importance as the curriculum content is the essence of any teaching, which, combined with effective teaching methods, ensures the efficiency and effectiveness of the educational system. Flexibility and diversity in content are essential not only due to the increasing demands of daily and professional life but also due to the need to consider the personality, interests, experiences, and unique characteristics of each teacher to enhance learning motivation. Aspects such as relevance, coherence, attractiveness, quality, and flexibility are considered important attributes in the content element of the curriculum. For example, developing self-regulatory skills is one of the identified indicators in the content dimension of the curriculum. Webster-Stratton & Reid (2004) consistently emphasize that curriculum content in education should develop skills such as self-leadership, teamwork, and problem-solving. Therefore, each of the presented indicators considers an aspect of the curriculum content to achieve the objectives of the teacher curriculum, which should be applied to foster teachers' flexibility in the curriculum. Teaching and learning methods in the curriculum for empowering teachers with a cognitive flexibility approach are influenced by multiple indicators. In the qualitative section of this study, 15 indicators were identified, which were reduced to 9 after statistical analysis. The confirmed indicators included exploratory methods, research methods, flexibility in teaching, problem-solving, creative thinking, creativity and innovation in work, practical and applied methods, interactive technological tools, and integrative methods. An analysis of domestic and international research results shows that the findings of this research question are consistent with those of Mohammadi & Soroush (2013), Safari et al. (2010), Talibian & Vafaei (2009), Balkar (2015), Sihaloho et al. (2017), and Almutairi (2020). Teaching and learning methods in the curriculum for empowering teachers with a cognitive flexibility approach are of great importance. If educational content is not taught using the best methods, it will not be effective. To empower teachers with flexibility characteristics, such as switching between different thoughts, multifaceted thinking, updating beliefs and thoughts, reconstructing

thoughts, and broader awareness, we must use methods that provide these features so that teachers can adapt their thinking and behavior to environmental changes and have the necessary ability to choose methods or practical responses among the available and appropriate options and apply their creativity. The results of this research question led to the presentation of methods that professors can use to train teachers in cognitive flexibility, and teachers receive these methods both theoretically and practically. For example, creative thinking is one of the methods identified in this research. This method includes critical thinking, problem-solving, and creativity, which are directly related to cognitive flexibility. Training teachers whose curriculum is based on creative thinking provides opportunities for teachers to critique and analyze any educational content, use problem-solving methods in the face of uncertain topics and materials, and benefit from the resulting creativity and innovations. The evaluation of the curriculum for empowering teachers with a cognitive flexibility approach is influenced by multiple indicators. In the qualitative section of this study, 9 indicators were identified, all of which were confirmed after statistical analysis. These indicators included teaching dynamic and developmental assessment such as continuous evaluation, qualitative assessment like classroom observation, teaching descriptive evaluation skills, group evaluation skills, open evaluation skills, performance evaluation skills, self-evaluation skills, test analysis skills, and the implementation of various tests. The results of this research question are consistent with those of Safari et al. (2010), Mohammadi & Soroush (2013), Ghanbari & Pourshahriari (2015). To address this deficiency, it is claimed that designed educational environments should emphasize the complexity of the real world and the unstructured nature of many knowledge areas. To this end, teachers, who play a key role in the educational process, must be exposed to training related to the cognitive flexibility approach so that they can adequately address complex educational issues for a better understanding of learners. In the research model, multiple indicators for teacher training within the curriculum framework have been presented. Using this curriculum model for teacher training ensures that learners acquire knowledge that is highly flexible and can be used and transferred to real-life contexts. Given the research findings, it is recommended that in developing curricula, the formulation of objectives should be done with attention to the indicators of teacher empowerment with a cognitive flexibility approach, and based on the cognitive flexibility approach, the teacher curriculum should be designed in such a way as to facilitate learning and the practical application of strategies and methods including constructive interaction with peers, designing learning environments, decision-making skills in unexpected situations, digital literacy development, and flexibility in classrooms.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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