

## Identifying Key Drivers Shaping the Future of the Primary Education Curriculum Based on Objectives Integrating the Educational Domains of the Fundamental Reform Document of Education with Components of Brain-Based Education

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### ABSTRACT

**Objective:** This study aimed to identify and analyze the key drivers influencing the future of the primary education curriculum, based on the integrated objectives of the educational domains outlined in the Fundamental Reform Document and the components of brain-based education.

**Methods:** This applied study adopted a descriptive–analytical design within a futures studies approach. An initial set of 110 objectives was identified and screened for content validity, yielding 96 integrated objectives across six educational domains. These objectives were analyzed using a cross-impact matrix with the participation of 10 experts, and the resulting data were processed using MICMAC software.

**Results:** Ten key drivers with the greatest leverage within the structural configuration of the future curriculum were identified, primarily concerning self-regulation, holistic health, responsibility, movement- and art-based experiences, and social interaction. These drivers were: biological self-regulation and health-promoting behaviors; cognitive decision-making regarding safety and public health; awareness of human-induced consequences and environmentally responsible behavior; integration of physical, emotional, and psychological health; calm and mindful health care combined with constructive social interaction; lifestyle self-assessment and individual–social responsibility; sensory–artistic movement and the awakening of spiritual perception; rhythmic movement and the refinement of aesthetic taste; participatory beautification and social responsibility; and sociocultural play and the consolidation of Islamic values.

**Conclusions:** The future primary education curriculum constitutes a dynamic and complex system that cannot be adequately understood through linear or single-domain approaches. Accordingly, designing the future curriculum requires integrated, multisensory, and participatory learning experiences.

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## Introduction

Primary education is one of the most foundational stages of the education system, as it is during this period that students' cognitive, emotional, moral, social, and physical foundations are formed, shaping the trajectory of their development in subsequent stages (Su & Vásquez, 2022: 111). In this context, the primary curriculum is not merely a collection of content and instructional activities, but rather a systematic mechanism for achieving educational goals and providing the conditions for students' balanced development (Askary et al., 2023: 37). Its effectiveness therefore requires simultaneous attention to the various dimensions of the student's existence, and avoidance of a one-dimensional view of learning (Tayeh, 2025: 1697; Rochovska & Čiliaková, 2025: 2827). In this regard, the necessity of providing conditions for students' balanced development across the six educational domains — religious, devotional, and moral education; social and political education; biological and physical education; aesthetic and artistic education; economic and vocational education; and scientific and technological education — within the framework of the Fundamental Reform Document of Education is of great importance (Pashaei, 2022: 204; Vafaei et al., 2017: 135). It can therefore be argued that the realization of these domains becomes more feasible when curriculum objectives are designed in an integrated and coherent manner (Noshadi et al., 2023: 25). Indeed, although distinguishing between domains is useful at the level of analysis, in the actual process of development, the various dimensions of a student's existence are not separate from one another (Mir et al., 2024: 97). Accordingly, an optimal curriculum must be able to establish connections among the objectives of different domains and enable their simultaneous realization (Hamidi et al., 2026: 2).

Nevertheless, one of the main challenges facing the primary curriculum is the dominance of a subject-centered and compartmentalized approach in the design and implementation of instructional activities (Xhemajli et al., 2025: 607). Under such conditions, curricular and educational objectives are often formulated and implemented in isolation from one another, with little attention paid to the systematic relationships between them (Moslimany et al., 2024: 53). The consequence of this situation is fragmented learning experiences, reduced educational coherence, and difficulty in achieving students' balanced development (Salehi et al., 2025). Rethinking the structure of curriculum objectives and moving toward integrated objectives has therefore become one of the fundamental necessities of primary curriculum planning.

Alongside this necessity, attention to the components of brain-based education can also open a new horizon for redesigning the primary curriculum. This approach holds that learning becomes more effective when the design of instructional experiences is aligned with students' cognitive, emotional, social, and physical characteristics (Rodríguez Dueñas et al., 2026). From this perspective, linking the objectives of the educational domains with the components of brain-based education can provide the basis for formulating objectives that simultaneously address students' all-round development and better align the teaching–learning process with the nature of human learning.

Nonetheless, the central issue is not merely the identification of these integrated objectives, but understanding the interrelationships among them. Within the structure of a curriculum, not all objectives occupy an equal position; some play an influencing role, some a mediating role, and others a role of being influenced. Therefore, understanding the future of the primary curriculum requires more than simply listing objectives — the pattern of their influence and dependency must also be clarified, so that the objectives with the greatest capacity to guide and drive change can be identified.

On this basis, the main gap addressed by the present study is the absence of a structural and future-oriented analysis of the relationships among the integrated objectives of the educational domains outlined in the Fundamental Reform Document and the components of brain-based education within the primary curriculum. In other words, it remains unclear which objectives possess the greatest influencing power, which objectives are more strongly influenced by other factors, and which can serve as key drivers determining the future direction of the curriculum.

Accordingly, the main problem addressed by the present study is: among the integrated objectives based on the six educational domains and the components of brain-based education, which components function as key drivers in the future of the primary curriculum, and what is their position — in terms of degree of influence and dependency — within the structure of the objectives system?

## Material and Methods

The present study is applied in terms of purpose and descriptive–analytical in nature, employing a futures studies approach. It was conducted with the aim of identifying and analyzing the key

drivers influencing the future of the primary education curriculum, based on the integrated objectives of the educational domains outlined in the Fundamental Reform Document and the components of brain-based education. For this purpose, the cross-impact analysis method and MICMAC software were used. The research population consisted of 10 experts in the fields of curriculum planning, educational sciences, primary education, the Fundamental Reform Document, brain-based education, and futures studies, who were selected through purposive sampling. The data collection instrument was a cross-impact matrix questionnaire comprising 96 components, in which the degree of direct influence of each component on the others was determined based on the standard MICMAC scale. The face and content validity of the instrument were also confirmed through expert review. After the questionnaires were completed, the data were aggregated into a final matrix and analyzed using MICMAC software in order to determine the degree of influence and dependency of the components and their position within the influence–dependency pattern, and to identify the study's key drivers (Table 1).

**Table 1.** List of integrated objectives of the educational domains

| Educational domain                       | Conceptual summary of integrated objective                                       | Component code |
|------------------------------------------|----------------------------------------------------------------------------------|----------------|
| Religious, devotional, and moral domain  | Religious-cognitive learning and self-directed formation of faith identity       | Var01          |
|                                          | Spiritual processing and cognitive refinement of moral behavior                  | Var02          |
|                                          | Cognitive self-knowledge and responsible review of behavior                      | Var03          |
|                                          | Restraint of instincts and strengthening of moral will                           | Var04          |
|                                          | Cognitive consolidation of religious values in daily behavior                    | Var05          |
|                                          | Interactive understanding of religion and personal spiritual experience          | Var06          |
|                                          | Artistic experience of worship and spiritual self-motivation                     | Var07          |
|                                          | Emotional self-knowledge, empathy, and refinement of moral relationships         | Var08          |
|                                          | Emotion and will management in group artistic activities                         | Var09          |
|                                          | Practical experience of Islamic ethics and social responsibility                 | Var10          |
|                                          | Movement-based experience of faith identity and social belonging                 | Var11          |
|                                          | Devotional–movement practice and interactive moral orientation                   | Var12          |
|                                          | Strengthening will and restraining instincts through physical activity           | Var13          |
|                                          | Group practice of honesty, respect, and social responsibility                    | Var14          |
|                                          | Biological self-regulation and health-promoting behaviors                        | Var15          |
| Biological and physical education domain | Health information processing and social responsibility                          | Var16          |
|                                          | Lifestyle self-assessment and analysis of biological consequences                | Var17          |
|                                          | Cognitive decision-making in safety and public health                            | Var18          |
|                                          | Awareness of human-induced consequences and environmentally responsible behavior | Var19          |
|                                          | Integration of physical, emotional, and psychological health                     | Var20          |
|                                          | Calm and mindful health care combined with constructive social interaction       | Var21          |
|                                          | Lifestyle self-assessment and individual–social responsibility                   | Var22          |
|                                          | Participation in safety and collective biological responsibility                 | Var23          |
|                                          | Artistic experience of nature and ethics-based biological responsibility         | Var24          |
|                                          | Physical self-regulation and psychological balance through play                  | Var25          |
|                                          | Physical–psychological health through participatory sport                        | Var26          |
|                                          | Movement-based assessment of lifestyle and behavioral consequences               | Var27          |
|                                          | Movement-based simulation of safety and collective decision-making               | Var28          |
|                                          | Movement-based activity in nature and strengthening of biological belonging      | Var29          |

|                                               |                                                                       |       |
|-----------------------------------------------|-----------------------------------------------------------------------|-------|
| Social and political education domain         | Cognitive empathy and preservation of dignity in social relationships | Var30 |
|                                               | Understanding family roles and emotion regulation                     | Var31 |
|                                               | Rule-abidance and understanding of social structures                  | Var32 |
|                                               | Understanding justice and social participation through role-play      | Var33 |
|                                               | Intercultural interaction, peace, and global identity                 | Var34 |
|                                               | Interactive practice of etiquette, empathy, and mutual respect        | Var35 |
|                                               | Dialogue, acceptance of differences, and human dignity                | Var36 |
|                                               | Family communication, empathy, and responsibility                     | Var37 |
|                                               | Social participation and experience of civic behavior                 | Var38 |
|                                               | Civilizational unity and humanitarian responsibility                  | Var39 |
|                                               | Cultural self-knowledge and identity integration                      | Var40 |
|                                               | Simulation of participation, justice, and social role-playing         | Var41 |
|                                               | Sociocultural play and consolidation of Islamic values                | Var42 |
|                                               | Collective decision-making and sociopolitical insight                 | Var43 |
|                                               | Dialogue, acceptance of differences, and social self-esteem           | Var44 |
|                                               | Enacting family roles and practicing commitment                       | Var45 |
|                                               | Rule-based play and strengthening of citizenship skills               | Var46 |
|                                               | Cultural play and strengthening of civilizational unity               | Var47 |
|                                               | Biological self-regulation and health-promoting behaviors             | Var48 |
|                                               | Cultural-movement activity and Iranian-Islamic identity               | Var49 |
|                                               | Practicing justice, voting, and social responsibility                 | Var50 |
| Aesthetic and artistic education domain       | Multicultural play and peaceful global understanding                  | Var51 |
|                                               | Cognitive interpretation of art and representation of creation        | Var52 |
|                                               | Artistic symbolism and personal expression of nature                  | Var53 |
|                                               | Discovering divine beauty and cultivating artistic imagination        | Var54 |
|                                               | Cognitive reflection on the beauty of existence                       | Var55 |
|                                               | Moral art and environmental aesthetic responsibility                  | Var56 |
|                                               | Creative learning and cognitive analysis of culture                   | Var57 |
|                                               | Production of artistic works and promotion of cultural heritage       | Var58 |
|                                               | Imagination, calming, and perception of the meaning of existence      | Var59 |
|                                               | Emotional symbolism and group artistic expression                     | Var60 |
|                                               | Calming art and spiritual perception of nature                        | Var61 |
|                                               | Visual-auditory perception of the beauty of creation                  | Var62 |
|                                               | Introspective art and spiritual refinement of the environment         | Var63 |
|                                               | Group production of art of peace and cultural heritage                | Var64 |
|                                               | Sensory-artistic movement and awakening of spiritual perception       | Var65 |
|                                               | Rhythmic movement and refinement of aesthetic taste                   | Var66 |
|                                               | Participatory beautification and social responsibility                | Var67 |
| Economic and vocational education domain      | Movement-based art and strengthening of national-global identity      | Var68 |
|                                               | Cognitive decision-making and economic planning                       | Var69 |
|                                               | Integrative thinking in financial evaluation                          | Var70 |
|                                               | Self-direction in healthy economic participation                      | Var71 |
|                                               | Understanding patterns of production and consumption                  | Var72 |
|                                               | Analysis of justice and Islamic economic ethics                       | Var73 |
|                                               | Talent discovery and informed career decision-making                  | Var74 |
|                                               | Economic justice and cognitive confrontation with corruption          | Var75 |
|                                               | Financial simulation and economic responsibility                      | Var76 |
|                                               | Social learning of production and consumption                         | Var77 |
|                                               | Practicing fairness and ethics in transactions                        | Var78 |
|                                               | Career guidance aligned with interests and values                     | Var79 |
|                                               | Participatory resource management in active learning                  | Var80 |
|                                               | Play involving responsible production and consumption                 | Var81 |
|                                               | Movement-based demonstration of justice and transactional ethics      | Var82 |
|                                               | Movement-based discovery of career interests and abilities            | Var83 |
| Scientific and technological education domain | Group activity to reduce economic inequality                          | Var84 |
|                                               | Conceptual memory and brain-based scientific reasoning                | Var85 |
|                                               | Technological research, creativity, and cognitive innovation          | Var86 |
|                                               | Hypothesis formulation, experimentation, and scientific analysis      | Var87 |
|                                               | Scientific understanding of nature and environmental responsibility   | Var88 |
|                                               | Scientific thinking, anxiety control, and cognitive self-efficacy     | Var89 |
|                                               | Artistic-technological creativity in a safe environment               | Var90 |

|                                                                  |       |
|------------------------------------------------------------------|-------|
| Group research, empathy, and self-direction                      | Var91 |
| Scientific–emotional experience of nature                        | Var92 |
| Scientific–artistic interpretation of the signs of nature        | Var93 |
| Scientific–movement play and critical thinking                   | Var94 |
| Creative discovery and problem-solving through movement activity | Var95 |
| Physical simulation of the stages of scientific research         | Var96 |

## Results

### Cross-Impact Analysis via Futures Studies (MICMAC)

Based on documentary studies and the theoretical foundations of the research, 96 variables influencing the future of the primary education curriculum — derived from the integration of the objectives of the educational domains of the Fundamental Reform Document and the components of brain-based education — were identified and classified into six educational domains. Subsequently, to identify the key drivers, the cross-impact analysis method was applied using MICMAC software. For this purpose, a 96×96 matrix was constructed, and the degree of direct influence of the variables on one another was assessed using a scale from zero to three (ranging from no influence to strong influence), along with the symbol P for potential relationships. Based on the analysis of the interrelationships among the variables, the factors with the greatest structural influence were identified as the key drivers of the future of the primary education curriculum.

According to the results presented in Table 2, matrix stability was achieved after two iterations of calculation. Of the 9,216 total relationships in the matrix, 4,876 relationships were rated 0, 2,377 were rated 1, 842 were rated 2, 663 were rated 3, and 458 were marked with the symbol P. In total, 4,340 direct and potential relationships were identified among the variables, and the matrix fill rate was calculated at 47.90%. This fill rate indicates a moderate density of relationships and the existence of a relatively extensive network of interrelationships among the integrated objectives of the educational domains and the components of brain-based education. Furthermore, the greater frequency of weak relationships compared to moderate and strong relationships indicated that, although a substantial proportion of the variables were interconnected, the intensity of these relationships was not uniform across all cases.

**Table 2.** Initial analysis of the cross-impact matrix data

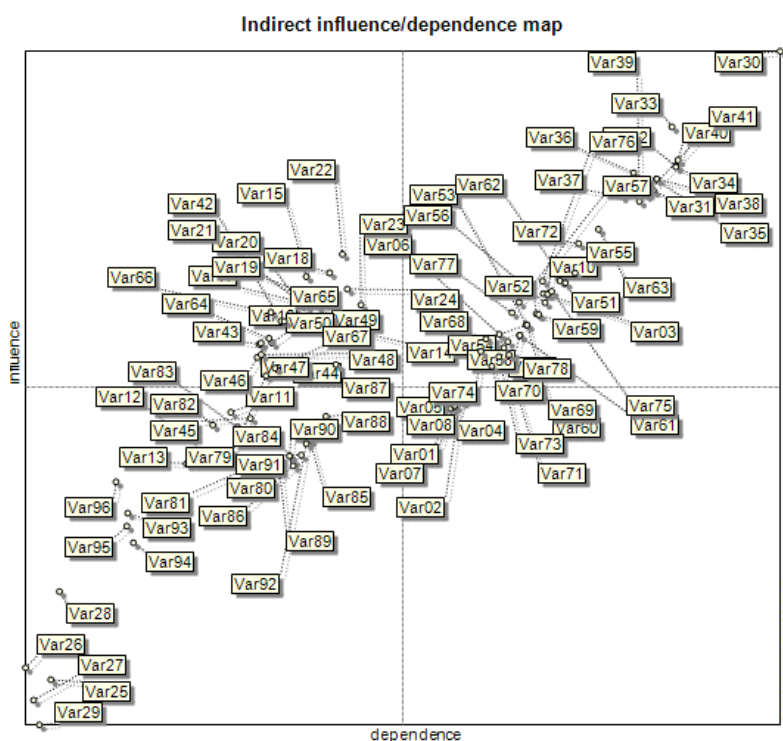
| Indicator | Matrix dimensions | Number of iterations | Number of zeros | Number of ones | Number of twos | Number of threes | Number of Ps | Total | Fill rate |
|-----------|-------------------|----------------------|-----------------|----------------|----------------|------------------|--------------|-------|-----------|
| Value     | 96                | 2                    | 4,876           | 2,377          | 842            | 663              | 458          | 4,340 | 47.09%*   |

**Table 3.** Direct and indirect influence and dependency values of the research components

| Component | Direct influence | Direct dependency | Indirect influence | Indirect dependency | Component | Direct influence | Direct dependency | Indirect influence | Indirect dependency |
|-----------|------------------|-------------------|--------------------|---------------------|-----------|------------------|-------------------|--------------------|---------------------|
| Var1      | 59               | 68                | 245,964            | 294,441             | Var49     | 59               | 97                | 284,424            | 228,860             |
| Var2      | 60               | 70                | 248,852            | 299,039             | Var50     | 60               | 83                | 270,700            | 206,585             |
| Var3      | 70               | 81                | 289,233            | 339,937             | Var51     | 70               | 79                | 294,041            | 348,066             |
| Var4      | 59               | 68                | 246,783            | 296,369             | Var52     | 59               | 74                | 281,653            | 336,513             |
| Var5      | 60               | 69                | 251,586            | 300,523             | Var53     | 60               | 73                | 277,537            | 331,596             |
| Var6      | 64               | 73                | 271,115            | 322,513             | Var54     | 64               | 73                | 277,537            | 331,596             |
| Var7      | 59               | 68                | 246,931            | 296,450             | Var55     | 59               | 79                | 297,012            | 355,535             |
| Var8      | 59               | 68                | 248,617            | 300,135             | Var56     | 59               | 75                | 285,835            | 340,735             |
| Var9      | 64               | 73                | 266,656            | 315,754             | Var57     | 64               | 74                | 285,935            | 328,027             |
| Var10     | 69               | 80                | 289,039            | 342,020             | Var58     | 69               | 72                | 273,501            | 328,355             |
| Var11     | 72               | 74                | 244,540            | 186,448             | Var59     | 72               | 74                | 281,313            | 337,639             |
| Var12     | 69               | 69                | 229,549            | 173,787             | Var60     | 69               | 73                | 277,407            | 331,926             |
| Var13     | 68               | 70                | 225,151            | 164,647             | Var61     | 68               | 72                | 273,501            | 328,355             |
| Var14     | 79               | 81                | 278,931            | 224,324             | Var62     | 79               | 81                | 293,279            | 350,700             |
| Var15     | 106              | 72                | 295,659            | 223,488             | Var63     | 106              | 83                | 313,498            | 367,024             |
| Var16     | 110              | 73                | 286,731            | 226,955             | Var64     | 110              | 74                | 272,400            | 205,222             |
| Var17     | 107              | 72                | 286,019            | 221,381             | Var65     | 107              | 75                | 278,790            | 212,726             |
| Var18     | 112              | 74                | 297,073            | 235,006             | Var66     | 112              | 80                | 282,208            | 206,125             |
| Var19     | 110              | 74                | 286,775            | 231,653             | Var67     | 110              | 77                | 261,185            | 208,153             |
| Var20     | 115              | 74                | 274,853            | 230,197             | Var68     | 115              | 75                | 272,174            | 311,734             |
| Var21     | 105              | 71                | 284,711            | 223,412             | Var69     | 105              | 74                | 268,825            | 320,498             |
| Var22     | 115              | 75                | 304,063            | 241,246             | Var70     | 115              | 72                | 261,865            | 314,613             |
| Var23     | 132              | 80                | 284,985            | 250,377             | Var71     | 132              | 75                | 273,938            | 318,332             |
| Var24     | 122              | 79                | 290,947            | 243,656             | Var72     | 122              | 83                | 308,092            | 357,274             |
| Var25     | 132              | 73                | 143,791            | 98,044              | Var73     | 132              | 73                | 265,492            | 318,110             |
| Var26     | 124              | 70                | 148,310            | 85,644              | Var74     | 124              | 74                | 267,463            | 309,263             |
| Var27     | 127              | 71                | 136,065            | 89,540              | Var75     | 127              | 83                | 290,118            | 344,019             |
| Var28     | 130              | 73                | 176,990            | 102,279             | Var76     | 130              | 81                | 293,943            | 339,558             |
| Var29     | 125              | 73                | 126,767            | 92,392              | Var77     | 125              | 76                | 282,063            | 324,535             |
| Var30     | 86               | 104               | 380,562            | 456,284             | Var78     | 86               | 74                | 266,226            | 323,076             |
| Var31     | 73               | 88                | 328,068            | 393,925             | Var79     | 73               | 85                | 258,314            | 203,689             |
| Var32     | 75               | 90                | 337,394            | 405,134             | Var80     | 75               | 78                | 225,636            | 196,631             |
| Var33     | 79               | 93                | 352,057            | 403,092             | Var81     | 79               | 78                | 224,057            | 196,616             |
| Var34     | 75               | 90                | 336,973            | 405,053             | Var82     | 75               | 71                | 239,728            | 177,595             |
| Var35     | 74               | 88                | 332,380            | 395,338             | Var83     | 74               | 77                | 238,897            | 189,777             |
| Var36     | 75               | 88                | 334,752            | 384,296             | Var84     | 75               | 73                | 226,422            | 217,039             |
| Var37     | 73               | 87                | 325,997            | 378,225             | Var85     | 73               | 75                | 234,024            | 225,190             |
| Var38     | 74               | 88                | 332,486            | 395,640             | Var86     | 74               | 70                | 224,363            | 217,039             |
| Var39     | 72               | 86                | 324,016            | 387,149             | Var87     | 72               | 84                | 262,514            | 238,029             |
| Var40     | 76               | 91                | 339,547            | 406,079             | Var88     | 76               | 75                | 242,986            | 233,158             |
| Var41     | 73               | 88                | 326,551            | 390,165             | Var89     | 73               | 70                | 226,765            | 209,725             |
| Var42     | 87               | 87                | 278,877            | 211,104             | Var90     | 87               | 70                | 228,089            | 215,250             |
| Var43     | 85               | 85                | 270,169            | 200,433             | Var91     | 85               | 71                | 228,426            | 221,017             |
| Var44     | 87               | 90                | 263,060            | 210,126             | Var92     | 87               | 72                | 232,715            | 223,530             |
| Var45     | 82               | 81                | 242,305            | 196,097             | Var93     | 82               | 68                | 206,535            | 135,832             |
| Var46     | 84               | 82                | 265,228            | 199,402             | Var94     | 84               | 69                | 195,391            | 138,595             |
| Var47     | 85               | 85                | 270,616            | 201,263             | Var95     | 85               | 65                | 201,640            | 135,374             |
| Var48     | 84               | 82                | 266,229            | 201,357             | Var96     | 84               | 76                | 218,316            | 130,071             |
| Total     | 6,050            | 6,050             | —                  | —                   |           |                  |                   |                    |                     |

By examining the distribution of the 96 components relative to the diagonal axis and the center of gravity of the plot (the direct and indirect influence–dependency axes), it can be stated that the primary curriculum system, in connection with brain-based education, exhibits an "unstable state." In such systems, variables are dispersed across the entire plot, and a considerable number of them fall within the region of two-way (strategic) factors, indicating high complexity and the system's strong sensitivity to changes in its key drivers. As shown in Figure 1, the distribution pattern of the components influencing the future of the curriculum indicates that the integrated objectives can be classified into five general categories (Table 4).

**Figure 1.** Map of direct influences

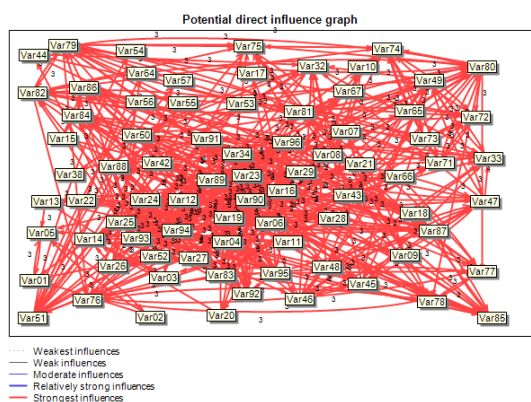


**Table 4.** Distribution of components according to their classification within the system

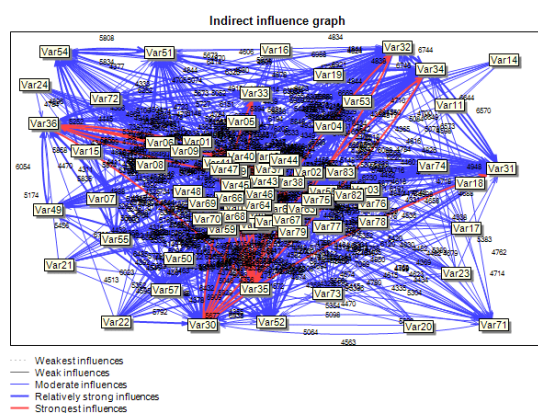
| Classification of factor status                             | Status of factors                                                                                                                     | Location on the map           | Components                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Influencing factors (key factors)                           | High influence and low dependency; shape the structure and direction of the system                                                    | Northwest                     | Var14, Var15, Var16, Var17, Var18, Var19, Var20, Var21, Var22, Var42, Var43, Var45, Var46, Var47, Var49, Var50, Var64, Var65, Var66, Var67                                                                                                   |
| Two-way factors — risk and target (key strategic actors)    | Simultaneously high influence and high dependency; include risk and target factors and the system's key strategic actors              | Northeast                     | Var03, Var10, Var23, Var24, Var30, Var31, Var32, Var33, Var34, Var35, Var36, Var37, Var38, Var39, Var40, Var41, Var51, Var52, Var53, Var54, Var55, Var56, Var57, Var58, Var59, Var60, Var62, Var63, Var68, Var72, Var75, Var76, Var77, Var78 |
| Dependent (output) components of the system                 | Low influence and high dependency; output components reflecting the consequences of system functioning                                | Southeast                     | Var01, Var02, Var04, Var05, Var06, Var07, Var08, Var09, Var61, Var69, Var70, Var71, Var73                                                                                                                                                    |
| Independent or excluded factors                             | Low influence and low dependency; limited connection to the core dynamics of the system                                               | Southwest                     | Var12, Var13, Var25, Var26, Var27, Var28, Var29, Var79, Var80, Var81, Var82, Var83, Var84, Var85, Var86, Var89, Var91, Var92, Var93, Var94, Var95, Var96                                                                                     |
| Secondary lever or outcome-independent factors              | Influence relatively greater than dependency, but with less structural power than key factors; support and reinforce the main drivers | Near southwest / intermediate | Var11, Var44, Var48                                                                                                                                                                                                                          |
| Regulatory factors (intermediary and moderating components) | Located in the middle range or near the intersection of the axes; mediate the transfer of effects among the system's main components  | Central region                | Var74, Var87, Var88, Var90                                                                                                                                                                                                                   |

Through a comparative examination of the component distribution maps in the direct and indirect influence–dependency plots generated by MICMAC software, and considering the variables' position relative to the plot's center of gravity, their degree of influence and dependency, and the stability of their position across the different analyses, 10 components were ultimately identified as the key drivers influencing the future of the primary education curriculum. These drivers are: lifestyle self-assessment and individual–social responsibility (Var22); biological self-regulation and health-promoting behaviors (Var15); sociocultural play and consolidation of Islamic values (Var42); calm and mindful health care combined with constructive social interaction (Var21); integration of physical, emotional, and psychological health (Var20); rhythmic movement and refinement of aesthetic taste (Var66); cognitive decision-making in safety and public health (Var18); awareness of human-induced consequences and environmentally responsible behavior (Var19); group production of art of peace and cultural heritage (Var64); and sensory–artistic movement and the awakening of spiritual perception (Var65).

The placement of these components within the region of influencing factors, and their high degree of influence relative to their dependency, indicates that these factors play an input, driving, and directing role in the structure of the future primary curriculum. Furthermore, the relative consistency of their position across the direct and indirect influence maps indicates that the impact of these components is not limited to direct relationships alone, but is also transmitted to other integrated objectives through chains of mediating relationships. Accordingly, any planned change, reinforcement, or intervention involving these drivers could produce far-reaching consequences for the realization of the integrated objectives of the educational domains of the Fundamental Reform Document and the components of brain-based education.



**Figure 2.** Diagram of direct relationships among components



**Figure 3.** Scatter plot of components based on indirect effects among components (influencing, two-way, dependent, and independent)

The conceptual composition of the key drivers indicates that the future of the primary education curriculum is shaped by an interconnected set of components related to self-regulation, holistic health, individual and social responsibility, artistic and movement-based learning, and the strengthening of cultural and spiritual identity. Among these, components related to physical and psychological health, healthy lifestyle, safety, self-regulation, and health-promoting behaviors occupy a more prominent position within the structure of the curriculum's future drivers. The identified drivers can therefore serve as a basis for prioritizing objectives, formulating future scenarios, and designing transformation strategies for the primary curriculum based on the educational domains of the Fundamental Reform Document and the brain-based education approach. The characteristics of these drivers and the educational domain associated with each are presented in Table 5.

**Table 5.** Key drivers influencing the future of the primary education curriculum

| No. | Key driver                                                                       | Component code | Domain                  |
|-----|----------------------------------------------------------------------------------|----------------|-------------------------|
| 1   | Lifestyle self-assessment and individual–social responsibility                   | Var22          | Biological and physical |
| 2   | Biological self-regulation and health-promoting behaviors                        | Var15          | Biological and physical |
| 3   | Sociocultural play and consolidation of Islamic values                           | Var42          | Social and political    |
| 4   | Calm and mindful health care combined with constructive social interaction       | Var21          | Biological and physical |
| 5   | Integration of physical, emotional, and psychological health                     | Var20          | Biological and physical |
| 6   | Rhythmic movement and refinement of aesthetic taste                              | Var66          | Aesthetic and artistic  |
| 7   | Cognitive decision-making in safety and public health                            | Var18          | Biological and physical |
| 8   | Awareness of human-induced consequences and environmentally responsible behavior | Var19          | Biological and physical |
| 9   | Group production of art of peace and cultural heritage                           | Var64          | Aesthetic and artistic  |
| 10  | Sensory–artistic movement and awakening of spiritual perception                  | Var65          | Aesthetic and artistic  |

Based on the information in Table 5, of the 10 key drivers identified, six components belong to the biological and physical education domain, three belong to the aesthetic and artistic education domain, and one belongs to the social and political education domain. It can therefore be stated that the majority of the key drivers influencing the future of the primary education curriculum were identified within the biological and physical education domain. In addition to having the highest frequency among the six domains, this domain alone accounts for more than half of the selected drivers. The predominance of drivers belonging to the biological and physical education domain

indicates that components such as self-regulation, physical and psychological health, healthy lifestyle, safety, calm, informed decision-making, and health-promoting responsible behaviors play a central role in shaping the future of the primary curriculum. Following this domain, the aesthetic and artistic education domain — with its focus on sensory and rhythmic movement, artistic production, and the strengthening of aesthetic perception — occupies second place. Furthermore, the presence of one driver from the social and political education domain indicates the importance of social play, cultural interaction, and the consolidation of collective values within the structure of the curriculum's future.

## Discussion

The present study sought to identify the key drivers influencing the future of the primary education curriculum based on the integrated objectives of the educational domains of the Fundamental Reform Document and the components of brain-based education. The findings of the present study show that, among the integrated objectives resulting from the linkage of the educational domains of the Fundamental Reform Document and the components of brain-based education, a set of components — including lifestyle self-assessment and individual–social responsibility, biological self-regulation and health-promoting behaviors, sociocultural play and consolidation of Islamic values, calm and mindful health care combined with constructive social interaction, integration of physical, emotional, and psychological health, rhythmic movement and refinement of aesthetic taste, cognitive decision-making in safety and public health, awareness of human-induced consequences and environmentally responsible behavior, group production of art of peace and cultural heritage, and sensory–artistic movement and the awakening of spiritual perception — occupy the position of key drivers of the future of the primary curriculum. These drivers are primarily focused on holistic health, self-regulation, responsibility, movement- and art-based experiences, and social interaction. Furthermore, the predominance of drivers belonging to the biological and physical domain indicates that the future of the primary curriculum is structurally grounded, above all, in physical, emotional, and self-regulatory foundations.

It can therefore be argued that the findings of the present study are consistent with the developmental characteristics of primary school students, as well as with the logic of brain-based education; in this approach, deep and durable learning depends on physical health, emotional

balance, opportunities for movement, multisensory experience, and students' active participation. From this perspective, components such as biological self-regulation, the integration of physical, emotional, and psychological health, informed decision-making in the domain of health, and lifestyle self-assessment are not merely independent objectives, but rather cognitive and emotional prerequisites for the realization of other educational domains.

Furthermore, the fact that some of the identified drivers belong to the aesthetic and artistic domain, as well as to the social domain of education, indicates that a future-oriented curriculum must give serious attention to areas such as art, movement, play, interaction, and cultural identity. Within the brain-based education approach, these elements are not merely supplementary topics; rather, they function as platforms for the simultaneous engagement of perception, emotion, memory, imagination, and meaning, thereby providing the conditions for the formation of multisensory and meaningful learning.

On the other hand, the placement of certain variables within the region of two-way (bipolar) factors indicates that the curriculum system under study possesses a dynamic and feedback-driven nature, and that any intervention in these strategic components could produce far-reaching effects across the entire system. Nevertheless, the predominance of the biological and physical domain among the final drivers does not imply its value superiority over the other domains; rather, it merely reflects its structural priority within the network of relationships analyzed, since in MICMAC analysis, the position of components is determined based on their degree of influence and dependency.

Overall, the findings of the present study underscore the necessity of designing an integrated, multisensory, development-oriented curriculum that is aligned with brain functions, and the identified drivers can serve as a basis for redesigning curriculum elements and formulating its future scenarios.

Furthermore, based on the structural analysis conducted, it can be inferred that, in rethinking the future of the primary curriculum, priority should be given to focusing on the interrelationships among components rather than compiling static lists. The results of this study show that identifying influential variables through cross-impact analysis can provide a basis for understanding the system's internal dynamics and for making decisions grounded in leverage points. Accordingly, the challenge facing curriculum planners is not necessarily the horizontal expansion of curriculum

elements, but rather the recognition of the structural relationships among components whose change would affect other parts of the system.

In this regard, the integration of the educational domains with brain-based functions demonstrates the key role of components such as self-regulation, holistic health, movement, play, and art in the structure of the curriculum's future. These results indicate that these components are important as the foundation for the curriculum's future scenarios. Finally, although the findings of this study are presented as an initial model, they can open new horizons for curriculum planners and education policymakers in moving toward integrated education that is aligned with the cognitive development of primary school students.

#### **Data availability statement**

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 the 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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