

## Multi-Dimensional Organizational Intelligence Scale (Muldemorins)

<sup>1</sup>Ş. Şule Erçetin, <sup>2</sup>Bayram Çetin and <sup>3</sup>Nihan Potas

<sup>1</sup>Department of Educational Administration, Supervision,  
Planning and Economy, Hacettepe University, Turkey

<sup>2</sup>Department of Testing and Evaluating in Education, Sakarya University, Turkey

<sup>3</sup>Department of Computer Applications Education, Gazi University, Turkey

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**Abstract:** This study aims to develop an organizational intelligence scale for schools. The scale developed finds its roots in the competencies concerning organizational intelligence and practical dimensions as specified by Erçetin for schools [1]. The scale was administered to a sample of 258 individuals, 177 being teachers and 81 school administrators working in Ankara and Denizli in Turkey. As a result of the explanatory factor analysis, a single “general” factor structure was identified without rotation and this general factor was named as “Organizational Intelligence.” With rotation, it was identified that the organizational intelligence scale had seven sub-dimensions. Concerning the fact that the seven sub-dimensions explain the organizational intelligence as the above-factor, a confirmatory factor analysis was performed. The results established that the total scores of the sub-dimensions, which were highly correlated with one another, of the organizational intelligence scale yield such a single-dimensioned structure as organizational intelligence, being the general factor in this study.

**Key words:** Organizational intelligence · organizational profile · diversity · adaptability · measuring organizational intelligence

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### INTRODUCTION

The Multi-dimensional Organizational Intelligence Scale (MULDIMORINS) is a result of a six-year investigation made up of consecutive studies and examination at both theoretical and conceptual levels in the field of education and school administration. The theoretical and conceptual research forming the bases for the scale is summarized under this title.

Starting from the turn of the century, globalization and global challenges, the increasing need for lifelong learning, rapid and intense developments in information and communication technologies have influenced education and educational organizations to a large extent. It is evident that education with its current philosophy and contents and educational institutions with their present structure and operation are unable to adjust to these developments, which require a complete revision and transformation of the current educational institutions in terms of aims, structure and process within the framework of the new paradigms entailing plurality in nature, periodicity and uncertainty in today’s complicated

and dynamic world. Further, these developments have highlighted organizations that are open and pure so much as to meet the complexity, flexible and ready for transformation so much as to grasp dynamism and periodicity, creative and sharing so much as to change diversity into richness and pioneering enough to become the problem-solvers of the uncertainty. In this sense, it is seen that the most vigorous and rapid reform efforts along with a search for a new organizational profile have been on in almost all parts of the world in the field of education.

As a result of this quest, schools as part of educational organizations have been accepted as self-adaptive complicated systems, or in other words, as living organisms. The idea that schools like the individual have intelligence has been recognized and considering the elements of organizational intelligence operating through interaction, the argument that it must be analyzed in a multi-perspective manner has come out. Consequently, it is reckoned that perspectives and conceptions to identify a new organizational profile for the schools could be developed.

Approaching the issue in this fashion, the answers to the questions that how the intelligence of a given organization could be defined and that what organizational intelligence is have been sought within the five-year period of investigation. The literature review has suggested certain definitions and approaches as to organizational intelligence and organizational intelligence as a concept has been scrutinized according to the theories of multiple-intelligences, triarchic, emotional and bio-ecological intelligences. As a result, organizational intelligence has been defined as the sum and the utilization of the competencies that allow the organization to maintain its dynamism. The competencies in question are 1) rapid action and reaction, 2) quickly adapting to changes, 3) flexible in function, 4) sensitiveness and being predictable, 5) open-mindedness, 6) the use of imagination and 7) innovative [2,3].

In the same period, the common ways of thinking and conduct hindering the formation of organizational intelligence and defined as “organizational stupidity” have been examined in detail. Organizational stupidity is defined as the common ways of thinking and conduct that form the patterns regarding the structure, functioning and climate of the organization leading to organizational failure and / or even death of the organization [4].

Within this context, in another study carried out by Erçetin and Demirebulak in 2002, an in-service training program that allowed the school staff to improve themselves in enhancing and using the organizational intelligence of a primary school was developed. The program covered the definitions of organizational intelligence and stupidity, the competencies concerning organizational intelligence and their utility and the indicators of organizational stupidity. The program was tested using action research technique in a voluntarily-cooperating school in Ankara. At the beginning and at the end of the program, pre-test and post-test were applied so as to identify the perceptions of the participants regarding the indicators of organizational stupidity. It was established that the participants who were, at the beginning of the program, unwilling to think of an organization or a school as having intelligence and being a living organism ended up with the fact that they accepted and even adopted such an idea [5].

An answer was sought through focus group tasks going on for approximately 46 weeks in the educational terms of 2001-2003 to the questions of how to define the organizational intelligence competencies for a given school and what practical dimensions it could have. The

study was carried out with the 48 voluntary graduate students / participants in the Department of Educational Administration, Supervision, Planning and Economy at Hacettepe University, divided into 4 focus groups, each of which was of 12 individuals. Of the participants, 8 were Ph.D. students, 18 were masters students that had to write a thesis and 22 were masters' students that did not have to write a thesis. All of the participants were working in various organizations as well. 4 of the 48 participants were of Turkish Military staff and 4 of them were research assistants. Other 2 participants were principals, 2 others were supervisors (who had teaching experience) and the other 26 were teachers working in the state schools as philosophy, English, biology, chemistry and class teachers. 25 of the participants were male and 23 female, with seniority periods varying between 3 and 15.

The meetings with the two groups were held, each group alternating every other week. In the first of the meetings going on for about 2.30 hour or 3 hours, organizational intelligence was explained and the categories of competencies concerning organizational intelligence were presented. Then, the two issues, of “how to define the organizational intelligence competencies for a given school” and “what practical dimensions it could have”, were focused on and discussed.

After each meeting, a summary of what had been discussed was made and sent to the participants. The re-shaped summary with the contributions of the participants was used at the beginning of the following meeting. At the end of the 2002-2003 Spring term, the participants were asked to identify the competencies coming out as a result of the discussions and to write down the practical dimensions of these competencies. The participants submitted in written form the definitions they made and the practical dimensions. All the data collected from the participants along with all the summaries made as a result of the meetings were closely examined. During the examination, the definitions and the practical dimensions on which almost all the participants agreed were taken into consideration. Consequently, the competencies regarding organizational intelligence and their practical dimensions were identified, analyzed and interpreted for the school context.

All the participants agreed on the 60 actions of the 108 actions identified during the discussions on what the practical dimensions of the competencies concerning organizational intelligence would be. Another point agreed by all the participants was that an action might be

related to more than one competency, for, as a result of the discussions on which competency the 60 actions were related to, it became clear that all the actions were related to at least two competencies. The participants accepted that idea that each competency that was related to another could exhibit a similar relationship in the practical dimension. The first of the two important findings obtained as a result of the study was that the competencies regarding organizational intelligence could be identified for schools and the second was that each competency contained a practical content that paves the way for the formation of another and that shows how interwoven the competencies are.

Whether the competencies expounded in a previous study concerning organizational intelligence and the 60 actions agreed upon were valid for private schools was scrutinized and brought up and discussed in the Educational Administration Symposium held by Private Schools Association [6]. As a result of the discussions, it was maintained that the actions defined would be appropriate in private schools' context.

At this point in the research process, organizational intelligence, which had been conceptually and theoretically defined and the related competencies were re-defined in a more functional, observable and measurable manner. Then, a scale that could measure the organizational intelligence of schools was developed by making use of the definitions (the seven competencies and the 60 actions agreed upon). This paper provides the development process of the Multi-dimensional Organizational Intelligence Scale (MULDIMORINS).

## METHODS

**Sample:** At the end of the 2005-2006 Spring term. The Multi-dimensional Organizational Intelligence Scale was administered to a sample of 258 individuals, 177 being teachers and 81 school administrators working in Ankara and Denizli in Turkey.

**Multi-dimensional organizational intelligence scale:** The scale contains 60 items. The scale is designed as a five-point Likert-type questionnaire. The participants are asked to choose from the five options showing the frequency of encounter with the related occasion in their own schools. The five points are written as "Always," "Usually," "Sometimes," "Seldom," and "Never." The means of the items in the scale and the standard deviations are shown in Table 1.

Table 1: Item Means and Standard Deviations of the Organizational Intelligence Scale

Items	Std.		Items	Std.		Items	Std.	
	Mean	Dev.		Mean	Dev.		Mean	Dev.
Item 1	3.87	1.06	Item 21	3.90	1.01	Item 41	4.12	1.01
Item 2	4.52	0.86	Item 22	3.37	1.06	Item 42	4.35	0.85
Item 3	4.27	0.79	Item 23	4.07	0.92	Item 43	4.03	1.03
Item 4	4.19	0.88	Item 24	3.98	1.04	Item 44	3.96	0.98
Item 5	4.06	0.97	Item 25	4.03	0.94	Item 45	4.04	1.01
Item 6	3.82	1.00	Item 26	3.95	0.89	Item 46	4.05	0.91
Item 7	3.78	1.05	Item 27	3.75	0.99	Item 47	4.00	1.00
Item 8	4.18	0.94	Item 28	3.95	0.87	Item 48	3.83	0.95
Item 9	4.17	0.89	Item 29	3.95	0.92	Item 49	3.85	1.03
Item 10	3.73	1.11	Item 30	4.06	0.91	Item 50	4.08	0.88
Item 11	3.61	1.25	Item 31	3.88	1.04	Item 51	3.84	1.00
Item 12	4.14	0.98	Item 32	3.85	0.98	Item 52	3.47	1.16
Item 13	4.35	0.81	Item 33	3.75	1.07	Item 53	3.94	1.00
Item 14	4.06	0.98	Item 34	3.80	1.13	Item 54	3.75	1.03
Item 15	3.70	0.99	Item 35	4.23	0.90	Item 55	3.88	1.04
Item 16	3.93	1.06	Item 36	4.04	0.93	Item 56	3.75	1.08
Item 17	3.64	1.04	Item 37	4.15	0.92	Item 57	3.94	1.11
Item 18	3.78	1.01	Item 38	3.77	1.09	Item 58	3.87	1.06
Item 19	3.93	1.01	Item 39	3.80	1.03	Item 59	3.31	1.23
Item 20	3.86	1.05	Item 40	3.38	1.14	Item 60	4.12	1.01

The scale includes seven sub-dimensions that are theoretically defined. These sub-dimensions are highly correlated to one another. Each of the items is capable of measuring at least two sub-dimensions and at most six sub-dimensions.

**Data analysis:** To work out the factor structure of the scale, principal components analysis was performed. The dimensions identified as a result of the analysis were named according to the theoretical sides and item test correlations and alpha reliabilities of the sub-dimensions were carried out.

To determine the dimensions in the explanatory factor analysis of the scale, (1) those dimensions whose eigenvalues were 1 and above were counted in [7], (2) the factor loads in the sub-dimensions obtained as a result of the principal components analysis of the items were taken as 0,30 and above as is the usual case [8, 9], (3) the factor whose explanatory ratio for the variance was below 5 % was omitted [10] and [4] as a general rule, the single-item factor was excluded [11]. Due to the fact that one item was used in more than one dimension on explanatory grounds, it became necessary to represent it in all dimensions that provided each item with 0.30 and above factor load. The explanatory factor analysis was carried out first without

rotation and then with VARIMAX rotation. The item test correlations, the reliabilities of the sub-dimensions and the explanatory factor analysis were all processed through SPSS 11.5 software.

A confirmatory factor analysis was performed through using LISREL 8.54, concerning the fact that the scores pertaining to the sub-dimensions obtained as a result of the principal components analysis explained the organizational intelligence variable being an-above-level factor. To test the model, multiple goodness of fit tests, Chi-square ( $\chi^2$ ), Goodness of Fit Index, Adjusted Goodness of Fit Index, Root Mean Squared Error of Approximation and Standardized Root Mean Square Residual were employed. The criterion for the confirmatory factor analysis was formed by excluding those whose t-value regarding the factor load of the sub-scale in the general dimension were smaller 1.96 [12].

**RESULTS**

**Explanatory factor analysis:** To make sure whether the sample was large enough Kaiser-Meyer-Olkin and to test whether the data set was appropriate for factor analysis Bartlett Test of Sphericity values were calculated. It was observed that Kaiser-Meyer-Olkin value was 0.96 and Bartlett Test of Sphericity values were ( $\chi^2=11815.64$ ,  $sd=1770$ ,  $p<0.001$ ), which is psychometrically satisfactory for the factor analysis.

The factor loads obtained both as a result of the explanatory factor analysis without rotation and after the VARIMAX rotation application are given in Table 2. As a result of the analysis without rotation, one single factor that satisfied the criterion was found. The eigenvalue of this factor was 31.9 and the explanatory ratio for variance was 53.16 %. As a result of the VARIMAX rotation, seven factors that met the criterion were identified. The explanatory ratio for variance of these seven factors was 59.31%, for factor 1 being 11.36%, for factor 2% 9.04%, for factor 3 8.73 %, for factor 4 8.47 %, for factor 5 8.23%, for factor 6 6.96 % and for factor 7 6.51 %. In addition, factor 8 and factor 9 were excluded as they were unable to satisfy the explanatory criterion.

As is seen in the table, a “general” factor structure was identified without rotation and this general factor was named as “Organizational Intelligence.” With rotation, it was identified that the organizational intelligence scale had seven sub-dimensions connected with one another. Each item has a 0.30 or above factor load in at least one and at most four dimensions. According to this

Table 2: Factor Loads of General and Sub-dimensions

Oblimin Yüklr	General	Varimax						
		D.D.	İ.E.and	S.and	E. ve			
Items		U.S.	R.O.	Ö.O.	Y	T. Ç.	H.G.K.	A.F.O.
i 1	0.57	0.14	0.10	0.16	0.22	0.65*	-0.06	0.19
i 2	0.47	0.17	0.05	0.12	0.12	0.05	0.08	0.10
i 3	0.64	0.23	0.48*	0.18	0.10	0.17	0.08	0.04
i 4	0.63	0.18	0.66*	0.15	0.20	0.05	0.14	0.20
i 5	0.63	-0.02	0.57*	0.12	0.32*	0.20	0.08	0.24
i 6	0.71	0.16	0.51*	0.21	0.35*	0.13	0.15	0.18
i 7	0.73	0.09	0.42*	0.26	0.54*	0.20	0.11	0.21
i 8	0.52	0.33*	0.48*	0.14	0.26	0.07	0.14	-0.21
i 9	0.75	0.34*	0.29	0.18	0.60*	0.21	0.11	0.05
i 10	0.72	0.11	0.29	0.31*	0.60*	0.34*	0.00	0.25
i 11	0.62	-0.03	0.53*	0.30*	0.15	0.28	0.32*	0.05
i 12	0.70	0.27	0.60*	0.10	0.22	0.21	0.14	0.07
i 13	0.68	0.34*	0.52*	0.06	0.38*	0.08	0.09	0.18
i 14	0.66	0.05	0.44*	0.19	0.47*	0.08	0.07	0.33*
i 15	0.76	0.18	0.24	0.27	0.52*	0.11	0.25	0.24
i 16	0.74	0.24	0.31*	0.09	0.65*	0.11	0.29	0.07
i 17	0.83	0.17	0.29	0.26	0.56*	0.28	0.23	0.26
i 18	0.69	0.40*	0.20	0.11	0.48*	0.29	0.25	-0.03
i 19	0.74	0.31*	0.34*	0.02	0.38*	0.18	0.36*	0.11
i 20	0.75	0.41*	0.09	0.32*	0.13	0.49*	0.24	0.07
i 21	0.77	0.33*	0.22	0.27	0.15	0.59*	0.17	0.02
i 22	0.73	0.11	0.03	0.54*	0.32*	0.23	0.37*	0.19
i 23	0.79	0.46*	0.34*	0.36*	0.16	0.07	0.24	0.13
i 24	0.80	0.38*	0.31*	0.40*	0.25	0.16	0.10	0.25
i 25	0.75	0.48*	0.08	0.36*	0.27	0.24	0.09	0.18
i 26	0.70	0.32*	0.04	0.40*	0.33*	0.30*	0.22	-0.02
i 27	0.78	0.25	0.30*	0.57*	0.33*	0.31*	0.12	0.15
i 28	0.69	0.29	0.11	0.27	0.18	0.15	0.58*	0.07
i 29	0.71	0.33*	0.30*	0.58*	0.13	0.12	0.07	0.12
i 30	0.71	0.37*	0.26	0.60*	0.04	0.18	0.22	-0.03
i 31	0.79	0.24	0.38*	0.51*	0.12	0.23	0.12	0.30*
i 32	0.78	0.25	0.16	0.46*	0.30*	0.23	0.11	0.38*
i 33	0.77	0.21	0.14	0.49*	0.36*	0.21	0.28	0.22
i 34	0.67	0.27	0.07	0.48*	0.31*	0.11	0.27	0.23
i 35	0.66	0.69*	0.06	0.12	0.18	0.20	0.12	0.06
i 36	0.75	0.45*	0.24	0.15	0.19	0.16	0.33*	0.27
i 37	0.68	0.67*	0.13	0.18	0.22	0.06	0.19	0.16
i 38	0.70	0.21	0.19	0.23	0.26	0.24	0.49*	0.19
i 39	0.78	0.43*	0.31*	0.38*	0.11	0.23	0.23	0.28
i 40	0.75	0.15	0.16	0.40*	0.26	0.31*	0.44*	0.25
i 41	0.65	0.28	0.20	0.24	0.15	0.17	0.19	0.19
i 42	0.73	0.73*	0.15	0.21	0.10	0.13	0.11	0.19
i 43	0.79	0.37*	0.14	0.27	0.20	0.19	0.46*	0.33*
i 44	0.82	0.40*	0.26	0.37*	0.20	0.18	0.37*	0.38*
i 45	0.77	0.53*	0.29	0.25	0.06	0.37*	0.26	0.12

Table 2: Continued

Oblimin Yütkler		Varimax						
Items	General	D.D.	İ.E.and		S.and	E. ve		
		U.S.	R.O.	Ö.O.	Y	T. Ç.	H.G.K.	A.F.O.
i 46	0.77	0.52*	0.28	0.34*	0.10	0.18	0.23	0.24
i 47	0.81	0.29	0.33*	0.32*	0.14	0.14	0.29	0.46*
i 48	0.82	0.34*	0.45*	0.35*	0.08	0.36*	0.22	0.26
i 49	0.68	0.31*	0.30*	0.13	0.08	0.13	0.63*	0.15
i 50	0.79	0.43*	0.17	0.13	0.22	0.30*	0.23	0.45*
i 51	0.75	0.27	0.21	0.13	0.21	0.22	0.20	0.67*
i 52	0.77	0.25	0.18	0.29	0.16	0.47*	0.12	0.55*
i 53	0.83	0.43*	0.13	0.16	0.25	0.28	0.27	0.51*
i 54	0.76	0.23	0.18	0.20	0.06	0.49*	0.38*	0.37*
i 55	0.77	0.23	0.33*	0.10	0.26	0.41*	0.36*	0.22
i 56	0.78	0.19	0.22	0.18	0.24	0.47*	0.24	0.34*
i 57	0.73	0.22	0.18	0.13	0.23	0.63*	0.30*	0.17
i 58	0.72	0.14	0.19	0.17	0.27	0.48*	0.28	0.28
i 59	0.73	0.19	0.14	0.20	0.25	0.49*	0.48*	0.20
i 60	0.77	0.59*	0.16	0.20	0.12	0.22	0.14	0.34*

Table 3: Cronbach  $\alpha$  Reliabilities of the Sub-dimensions

Dimensions	1	2	3	4	5	6	7	General
Cronbach $\alpha$	0.96	0.95	0.96	0.95	0.95	0.93	0.94	0.98

components analysis without rotation, vary between 0.37 and 0.78. However, in the seven sub-dimensions emerging as a result of the VARIMAX rotation the item test correlations vary for factor 1 between 0.47 and 0.76, for factor 2 between 0.61 and 0.74, for factor 3 between 0.56 and 0.76, for factor 4 between 0.58 and 0.81, for factor 5 between 0.54 and 0.75, for factor 6 between 0.57 and 0.73 and for factor 7 between 0.55 and 0.81. As is clear from these item test correlations, the item test correlations of the scale are psychometrically high enough.

The fact that the seven sub-dimensions are closely related to one another, considering the theoretical structure of the dimensions obtained after the VARIMAX rotation, indicated that these seven factors could confirm a single general factor. Thus, to see this, a Confirmatory Factor Analysis was performed.

The Cronbach  $\alpha$  reliabilities of the sub-dimensions identified as a result of the principal components analysis were determined (Table 3 for the results). The reliabilities vary between .93 and .96. The reliability of the first dimension is .96, that of the second is .95, that of the third is .96, that of the fourth is .95, that of the fifth is .95, that of the sixth is .93 and that of the seventh is .94.

formulation, the first sub-dimension has 27, the second 22, the third 21, the fourth 18, the fifth 17, the sixth 14 and the seventh 13 items.

**The reliabilities of the general and sub-dimensions:** The item test correlations, as identified in the principal

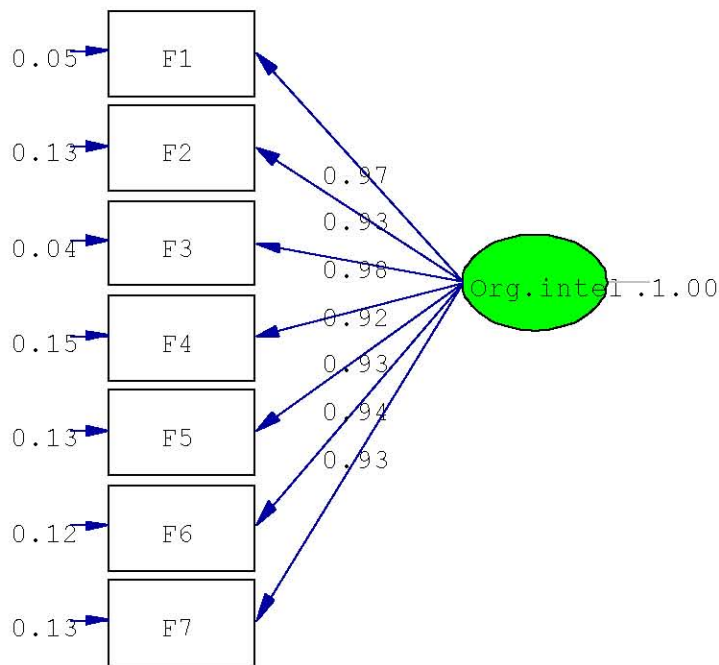


Fig. 1: The general factor PATH Diagram for the Organizational Intelligence Scale with its sub-dimensions

The general internal consistency coefficient of the scale is 0.98. These reliabilities point out that the sub-dimensions of the scale have a considerably high internal consistency.

**Confirmatory factor analysis:** The maximum likelihood estimation was used in the confirmatory factor analysis carried out for the fact that the seven sub-dimensions explained the general factor organizational intelligence. The goodness of fit coefficients of the single-factor model developed for the confirmatory factor analysis are:  $\chi^2 = 13.11$  (sd=8, p=0.11), RMSEA=0.049, GFI=0.99, AGFI=0.95, NFI=0.99, SRMR=0.004. These statistics show that the single-factor model fits the data very well.

It can be inferred from these results that the total scores of the sub-dimensions of the scale form a single-dimensioned structure like organizational intelligence.

## DISCUSSION

The results of the study have established that the functional-practical definitions of organizational intelligence and the related competencies made for schools are observable and measurable and that each competency contains a practical content paving the way for the formation of another and the competencies are interwoven. Further, the scale reflects the practical aspect of a new organizational profile for the schools conceptually and theoretically defined as the self-adaptive complex systems and represented by living organism metaphor. The scale is ready to use and is of a quality to measure the organizational intelligence of the schools and to make it easy to identify the structural and operational inefficiencies existent in the schools. To test feasibility of the scale in various cultural settings will contribute much to educational and school administration literature and the related practices.

### Appendix: Factors and Sample Items from MULDIMORINS

#### Factor 1: Adaptability to changing circumstances I, Sample items:

- Being empathetic in all the relationships within school
- Guidance in case of crises

#### Factor 2: Communication with the stakeholders Sample items:

- Sharing the extra course materials with other schools
- Changing school schedule when needed

#### Factor 3: Promptness in action and response

##### Sample items:

- Setting up a school culture that is open to change
- Transforming school into a learning organization

#### Factor 4: Being intuitive and far-sighted

##### Sample items:

- Estimating social needs
- Designing the physical setting in a flexible manner

#### Factor 5: Being able to use the power of imagination and creativity

##### Sample items:

- Encouraging the staff and students to produce creative solutions
- Setting up a shared vision within school and sharing it

#### Factor 6: Flexibility and comfort in operation

##### Sample items:

- Taking successful school as an example
- Policy-making as to education and instruction by the school administration

#### Factor 7: Adaptability to changing circumstances II

##### Sample items:

- Taking the support of the stakeholders
- Following local and national press

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