

The New York State Education Department's Preliminary Research Study of the Essential Elements of Middle-Level Education Spring 2000

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Background and Introduction: In May 1999, all public school students in grade eight took new State tests designed to assess how well they had mastered the State's intermediate (middle-level) learning standards in both English language arts and mathematics. Predictably, student performance varied greatly from one middle-level school to another - in some schools, many students met the standards; in other schools, few were successful.

The results of the initial administration of the State's intermediate assessments served as a "wake-up call" for reflection and change. Middle-level schools, regardless of the performance of their students on the State's intermediate assessments, now wanted advice and guidance on what programs work best to improve academic achievement and support personal growth. Those that performed well wanted to know what needed to be done (or needed to be continued) to maintain their high achievement and, at the same time, insure that the individual needs of students were well served. Schools that did not perform well wanted to know what works so they could establish the conditions that would foster increased student achievement while at the same time address effectively the personal growth and development needs of young adolescents.

In response to these needs, the New York State Education Department released a new document in January 2000 -- the *Essential Elements of Standards Focused Middle-Level Schools and Programs*¹. This publication described the attributes and characteristics of a model middle-level school or program - the "Essential Elements", if you will. It was prepared as a companion and an update to the *Regents Policy Statement on Middle-Level Education and Schools with Middle-level Grades*² originally adopted in 1989. The intent of this Essential Elements document was to provide schools with the requisite guidance to establish a middle-grades program designed to insure that all students met the State's intermediate learning standards in the various areas.

¹ Essential Elements of Standards-Focused Middle-Level Schools and Programs. New York State Education Department: Albany, N.Y. 2000.

² Regents Policy Statement on Middle-Level Education and Schools with Middle-Level Grades. New York State Education Department: Albany, N.Y. 1989.

Essential Elements: The seven Essential Elements described in the Department's new publication are:

1. A philosophy and mission that reflect the intellectual and developmental needs and characteristics of young adolescents.
2. An educational program that is comprehensive, challenging, purposeful, integrated, and standards-based.
3. An organization and structure that support both academic excellence and personal development.
4. Classroom instruction appropriate for young adolescents provided by skilled and knowledgeable teachers.
5. Strong educational leadership and a building administration that encourages involvement, participation, and partnerships.
6. A network of academic and personal support available for students.
7. Professional training and staff development that are ongoing and purposeful.

Preliminary Research Study: The Essential Elements reflected best practice and current research done on a national scale. It did not, however, represent any research done specifically in New York State. In an effort to rectify this shortcoming, the State Education Department undertook to study the degree to which two groups of schools - those whose eighth-grade students had high achievement on the State's English language arts and mathematics intermediate assessments in May 1999 and those whose students did not perform well - had implemented the *Essential Elements of Standards Focused Middle-Level Schools and Programs*.

The hypothesis of this preliminary research study was simple: the degree of implementation of the Essential Elements is directly - and positively - related to the achievement of students on the State's intermediate assessments. In other words, the greater the implementation of the Essential Elements, the higher the achievement on the State's new tests.

Preliminary Research Study Procedures: The preliminary research study was conducted systematically:

Step One: The State Education Department, using its BEDS information, identified 10 middle-level schools whose students did well on both the English language arts and mathematics intermediate assessments administered in May 1999. The schools included in the sample had to meet several criteria:

- They had to be schools that were not in the Buffalo, Rochester, Syracuse, Yonkers, or New York City School Districts;
- They had to have tested 85 or more students;
- They had to be ranked among the highest in the State based on mean score in either ELA or math; and,
- They had to be ranked among the highest in the State based on their combined ELA and math scores.

Step Two: The State Education Department, using available BEDS data, identified 12 middle-level schools whose students did not do well on both the English language arts and mathematics intermediate assessments administered in May 1999. Again, schools in the sample had to meet specific criteria:

- They had to be schools that were not in the Buffalo, Rochester, Syracuse, Yonkers, or New York City School Districts;
- They had to have tested 85 or more students;
- They had to be ranked among the lowest in the State based on mean score in either ELA or math; and,
- They had to be ranked among the lowest in the State based on their combined ELA and math scores.

Step Three: A representative from the New York State Education Department personally spoke with each middle-level school principal (or superintendent of the district in which the middle-level school was located) and explained the research study and asked if the middle-level school would participate in the research study. All ten of the high performing middle-level schools and nine of twelve of the low performing schools agreed to participate. The conditions for participation were as follows:

- Schools involved in the research study would remain anonymous;
- All information from the individual schools participating in the study would be confidential;
- Any information from the research study would be reported in the aggregate (either as information about the "high performing schools" group or about the "low performing schools" groups);
- Each school agreeing to participate in the study would be required to host a one-day visit by a two-person team of middle-level educators. The responsibility of this team would be to gauge the degree to which the school implemented the Essential Elements.

Step Four: Each school that agreed to participate in the study was visited for one day by a two-person team. The team members were experienced middle-level practitioners who were well versed in the Essential Elements. The visits were conducted during spring 2000. The leader of the visiting team contacted the school or district and arranged a convenient day for the visit. Schools were not asked to do any preparatory work prior to the visit or any follow-up work after the visit.

The visiting team members met with the building administration, teachers, staff, and students, and visited classrooms and other instructional areas. Their purpose was to collect information in order to gauge the degree to which the school was implementing each of the Essential Elements. The evaluators completed a "Degrees of Implementation" survey with 78 questions (Table 1):

Table 1: Number of Questions for Each Essential Element

Element	Description	Number of Questions
1	Philosophy and Mission	6
2	Educational Program	10
3	Organization and Structure	16
4	Classroom Instruction	18
5	Educational Leadership	14
6	Network of Academic/Personal Support	6
7	Professional Training/Staff Development	8

The rating scale for each question was:

- 0 = No evidence; no indication of any implementation efforts.
- 1 = Trace evidence; a few indications of pre-implementation efforts (e.g., informational sessions, faculty discussions, etc.).
- 2 = Minimal evidence; limited indications of initial implementation efforts (e.g., planning, piloting, etc).
- 3 = Some evidence; several indications of recently begun, broad-based, systemic implementation efforts.
- 4 = Considerable evidence; multiple indications of long-term, broad-based, systemic implementation efforts.
- 5 = Extensive evidence; numerous, compelling indications of significantly broad and deep (but not yet a totally full) implementation.
- 6 = Conclusive evidence; widespread, indisputable indications of full and complete implementation.

Each of the visiting team members independently completed an Essential Elements "Degrees of Implementation" survey form based upon their conversations and observations. The completed forms were forwarded to the State Education Department for tabulation and analysis.

Step Five: The State Education Department staff determined the score for each element for each visitation team member (rater) by averaging the scores of the questions within the element. The inter-rater reliability for the two raters for each element was $r \geq .926$. The score for each element for each school was determined by averaging the scores of the two raters for that element. This number is the average degrees of implementation of each Essential Element for each school participating in the research study (based upon the perception of the visiting team members). The average of the scores for the Essential Elements was used to determine the average score of the school for the implementation of all of the elements.

Step Six: The scores for the low performing schools were compared to the scores for the high performing schools for each variable using correlations and independent t-test procedures.

Results of the Preliminary Research Study: The results of the preliminary research study offer support for the original hypothesis:

The degree of implementation of the Essential Elements of Standards-Focused Middle-Level Schools and Programs is directly - and positively - related to the achievement of students on the State's intermediate assessments. In other words, the greater the implementation of the Essential Elements, the higher the achievement on the State's new tests.

Ten variables were analyzed in bivariate correlations (Table 1):

- The ELA score,
- The mathematics score,
- The seven Essential Elements, and
- The school average of the scores for the Essential Elements.

All of the bivariate correlations were significant and all had a Pearson correlation coefficient over .84. This indicated a very high correlation among all of the variables and between the ELA test score and each Essential Element and between the mathematics test score and each Essential Element. The Pearson correlation for the bivariate correlations among the elements was over .92 for all pairs. Therefore, among this selective sample of schools, those that are implementing the Essential Elements are also scoring high on the State's intermediate assessments. Further, schools that are implementing any one of the Essential Elements seem to be paying attention to all of them.

Table 1: Pearson Correlations of the Essential Elements with the State's Intermediate ELA and Mathematics Assessments

Variable	ELA	Mathematics
ELA	1.000	0.966
Mathematics	0.966	1.000
Element 1: Philosophy and Mission	0.899	0.941
Element 2: Educational Program	0.878	0.915
Element 3: Organization and Structure	0.846	0.904
Element 4: Classroom Instruction	0.854	0.907
Element 5: Educational Leadership	0.862	0.891
Element 6:A Network of Academic/Personal Support	0.889	0.912
Element 7: Professional Training/Staff Development	0.880	0.908
Average of Element scores	0.882	0.925

The schools were grouped based upon the sum of the school's ELA average test score and the school's mathematics average test score. The achievement data for "all" students (including students with disabilities) were used for the ELA and math tests. The mean for the group of high performing schools was higher than the mean for the group of low performing schools for each of the State's intermediate assessments (Table 2) and for each of the Essential Elements (Table 3).

Table 2: Mean Scores and Standard Deviations (S. D.) for the State's Intermediate ELA and Mathematics Assessments by Group

Variables	Score Descriptors	High Performing Schools (N = 10)	Low Performing Schools (N = 9)	All Schools
ELA Average Score	Average	727.00	677.44	703.53
	S. D.	3.80	21.98	29.47
Math Average Score	Average	749.30	671	712.21
	S. D.	8.12	18.95	42.5
ELA and Math Combined Average Scores	Average	1476.30	1348.44	1415.74
	S.D.	11.35	40.47	71.37

Table 3: Degrees of Implementation (D. I.) Means and Standard Deviations (S. D.) for the Essential Elements by Group

Essential Elements	Degrees Of Implementation School Scores	High Performing Schools (N = 10)	Low Performing Schools (N = 9)	All Schools
Essential Element 1: Philosophy and Mission	Maximum	5.415	3.165	5.415
	Minimum	3.745	0.250	0.250
	Mean	4.932	1.763	3.431
	S. D.	.52	1.05	1.81
Essential Element 2: Educational Program	Maximum	5.425	3.300	5.425
	Minimum	3.750	0.350	0.350
	Mean	4.723	1.844	3.359
	S. D.	.46	1.19	1.71
Essential Element 3: Organization and Structure	Maximum	5.500	3.655	5.500
	Minimum	3.795	0.515	0.515
	Mean	4.938	2.157	3.621
	S. D.	.62	1.09	1.65
Essential Element 4: Classroom Instruction	Maximum	5.615	3.375	5.615
	Minimum	3.610	.885	0.885
	Mean	4.711	2.181	3.512
	S. D.	.60	1.02	1.53
Essential Element 5: Educational Leadership	Maximum	5.745	4.180	5.745
	Minimum	4.715	0.785	0.785
	Mean	5.223	2.578	3.970
	S. D.	.38	1.24	1.61
Essential Element 6: Student Support	Maximum	5.500	3.625	5.500
	Minimum	3.125	0.665	0.665
	Mean	4.873	2.226	3.619
	S. D.	.67	0.93	1.56

Essential Element 7: Professional Development	Maximum	5.940	3.910	5.940
	Minimum	4.125	0.565	0.565
	Mean	5.135	2.349	3.815
	S. D.	.58	1.21	1.69
Average for the Seven Essential Elements	Maximum	5.570	3.625	5.570
	Minimum	3.975	0.835	0.835
	Mean	4.922	2.193	3.629
	S. D.	.48	1.05	1.60

The t-tests for each of the ten variables indicated a statistically significant difference between the group of higher performing schools and the group of lower performing schools at $p < .0001$ (Table 4). The Levene's test indicated that six out of the ten variables had unequal variances when comparing the group of higher performing schools to the group of lower performing schools. As a consequence, the results of the t-test for "equal variances not assumed" was used.

Table 4: T-test and Mean Difference for the State's ELA and Mathematics Intermediate Assessments and the Essential Elements by Group

Variables	T¹	Mean Difference
ELA	6.67**	49.56
Mathematics	11.48**	78.30
Combined ELA & Math	9.16**	127.86
Essential Element 1	8.18**	3.17
Essential Element 2	6.83**	2.88
Essential Element 3	6.82**	2.78
Essential Element 4	6.49**	2.53
Essential Element 5	6.20**	2.64
Essential Element 6	6.16**	2.55
Essential Element 7	6.29**	2.79
Essential Element average	7.16**	2.73

** $P < .0001$

1. Equal variances not assumed

Conclusions: The high performing group was statistically significantly higher than the low performing group on all of the variables. The results of the preliminary research study seem to indicate that schools scoring high on the State's intermediate assessments are also schools that are implementing the *Essential Elements of Standards-Focused Middle-Level Schools and Programs*. The results also seem to indicate that schools scoring low on the State's intermediate assessments are schools that are not implementing the Essential Elements.

Additional research was done using the variables of percent of English language learners and percent of free lunch students in the school. A univariate analysis of variance indicated that the variable of combined ELA and mathematics average score on the State's intermediate assessments seemed to be effected by the Essential Elements average score and the percent of

free lunch. When the combined score, formed by the sum of the ELA and Mathematics average scores, was analyzed for the effects of the three independent variables (Essential Elements average for the school, English language learners, and free lunch), the effect of the school group (either high performing or low performing) was not apparent (Table 5). The Pearson Correlation indicates a high correlation between the Essential Elements and the percent of free lunch (Table 6). The negative correlations indicate that as the percent of free lunch students increases or as the percent of English language learners increases, then the combined score, formed by the sum of the ELA and Mathematics average scores, goes down. This analysis highlights the complexity of middle-level education and the need for further research.

Table 5: Univariate Analysis of Variance - Effects of Variables on ELA and Mathematics Combined Score

Effect	Sig.	Partial Eta Squared	Observed Power
Intercept	.000	.995	1
English language learners	.961	.000	.050
Essential Elements average	.005	.444	.875
Free lunch	.011	.383	.783
School group (high or low performing)	.755	.007	.060

Table 6: Pearson Correlations of the Essential Elements, State Assessments, English Language Learners, and Free Lunch

Variable		Average of Essential Elements	ELA	Math
Percent English language learners	Pearson	-.545	-.626	-.645
	Sig.	.016	.004	.003
Percent free lunch	Pearson	-.829	-.914	-.937
	Sig.	.000	.000	.000

Recommendations for Further Research: The results of the preliminary research study conducted in spring 2000, while highly suggestive, are not conclusive and categorical. Further research is needed to confirm the relationship between the *Essential Elements of Standards Focused Middle-Level Schools and Programs* and student achievement on the State's new intermediate assessments.

Two avenues of research need to be pursued. One avenue of study would focus on validating the instrument used to record the degrees of implementation and its component sections (Essential Elements) and questions (within each Essential Element). The concurrent validity of the instrument (tool, research survey) would be established by correlating each question and each Essential Element to each of the State examinations. This correlation would validate the usefulness of each Essential Element and each question for predicting success on the State assessments. The data in Table 1 seem to indicate that there will be a high correlation between

the Essential Elements and the State assessments. Individual questions or Essential Elements that have low correlations to the State tests could be eliminated from future instruments. The correlations would also indicate which Essential Elements (or which combinations of Essential Elements) are most useful for increasing student achievement. Such a study would require a minimum of fifty schools randomly selected from around the State.

Another avenue of study would be to examine, in more depth and in more middle-level schools, the connection between the Essential Elements and success on the new State assessments. Research about the relationship of the Essential Elements to the success of schools needs to acknowledge the complexity of the educational process.

Future research needs to include at least the confounding variables of percent of students receiving free lunch, the percent of students in the district with disabilities, and the percent of students participating in English as a second language programs. The use of these confounding variables as covariates in an Analysis of Covariance study would further identify those schools for which the Essential Elements are more of the missing link to student success than the confounding variables.

Research on the "value-added" effect of the Essential Elements on the success of schools could be done by selecting schools with high free lunch, with high special education populations, and with high percentages of students who are English language learners (ELL). Within this group of schools, the high performing schools could be compared to the low performing schools to determine the Essential Elements (or combinations of Essential Elements) that have the strongest presence in the higher achieving schools compared to the lower achieving schools.

Also, if inter-rater reliability can be established for the persons gauging the degree of implementation, then one observer (rather than a team) could go to each school involved in the research study to determine the presence of the Essential Elements through discussions with administrators and teachers and through direct observation. Each rater would then complete a degrees of implementation instrument for each school visited. Inter-rater reliability would be increased through observation training for use of the Essential Elements instrument.

This research has a suggested hypothesis that there is a relationships between the degree of implementation of the Essential Elements and the level of achievement of students on the English language arts and mathematics State assessments administered in grade 8. Further research will provide more information about the Essential Elements instrument, the implementation of the Essential Elements, and the relationship between the Essential Elements implementation and student success.

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