Policies of performance assessment to improve educational situations and to focus on consulting for students

- Because policies of performance assessment are for improving educational situations and supporting student learning, they should be designed to present data needed to improve educational situations including not only students but also curricula.
- Policies of performance assessment should be enforced to conduct consulting for students from consideration of problems of students including process of academic achievements, attitudes in classrooms, human relations, and extreme competitiveness on academic results of students.

Establishment of teacher professionalism and right to assess students

- Recognition of key activities of teachers as professionals on instruction (right to teach) and on assessment (right to assess) and allowance of autonomy.

Performance assessment as a catalyst for educational reform

- Performance assessment should function as enhancement and demonstration of validity of educational reform.
- The process of and methods of utilization of the results of performance assessment should function as a “motive system” to induce settlement of directions and philosophy of educational reforms in the field.

Securing ethics of performance assessment

Suggestions of policies on performance assessment

- Gradual implementation: It is needed to maintain the principle that teachers in charge shall implement the assessment autonomously based on the actual status or educational conditions of the relevant region.
- Changes in directions of the assessment: The purpose of the performance assessment is not only to change the methods of assessment but to improve and to guide & give advice on teaching and learning activities of individual students.
- Implementation with appropriate rate
- Directions of not applying only summative assessment but for formative and diagnostic assessment

Measures to improve performance assessment policies that are being enforced

- Weight and strength of its introduction: gradual enhancement and autonomous implementation by school principals
- Self-regulation of teachers and storage: Efforts to secure the right of assessment of teachers and improvements in data storage
- Contents of assignments and appropriateness of levels: Implementation of performance assessment with appropriate levels and amounts by connection of instruction with assessment
- Teacher training and material distribution: training centered on practices for actual status and distribution of materials for performance assessment by connection of materials with teaching and learning
- Reducing works of teachers besides teaching and size of classes
Ⅰ. Introduction

Need for and Goals of the Research

- A need was raised to design a new evaluation framework as the National Assessment of Educational Achievement (NAEA) expands to include all students in order to provide information helpful to increase the academic abilities of individual students.
- There should be a plan to implement equating and optimize data gathering and designing in the overall evaluation by analyzing the factors that damage the stability of test equating in the current academic achievement evaluation system.
- There is a need to propose ideas about the development of scale points and the scoring process by reviewing the scaling process in the current academic achievement evaluation system.
- There should be a plan to utilize the results of academic achievement on each level including individuals, schools, educational agencies, government and educational research institutions as well as enhance the methods of individual score reporting.
- It aims to suggest ideas and models for utilizing the results as well as the ways to improve the current scoring system including scaling and equating in the design of a new framework for academic achievement evaluation according to the full-scale implementation of the NAEA.

Content

■ Plans for Test Equating

- Analyzing the problems with test equating and data gathering and designing in the current academic achievement evaluation system according to its full-scale implementation.
- Examining the methods of test equating theoretically.
- Reviewing the testing agencies of foreign countries in charge of large-scale evaluations in terms of the scoring systems of each major test and equating methods: focusing on the NCA of the UK and the agencies in charge of the full-scale implementation in each state in the US (CTB, Pearson, ETS, and ACT).

■ Plans for Resetting Scoring and Achievement Levels

- Comparing the scoring methods based on classical test theory and item response theory.
- Reviewing the scoring and scaling
- Analyzing and comparing cases of setting cut scores of achievement levels home and abroad.
- Reviewing the plans for resetting cut scores of achievement levels in academic achievement evaluations.

■ Reporting the Results and Plans for Their Utilization

- Reviewing the ways to report the results of the current NAEA.
- Analyzing the cases of reporting the results of other nations’ academic achievement evaluations and the plans for utilizing the results.

II. Need for Changes to the Scoring System in the National Assessment of Educational Achievement

The Scoring System of the Current Academic Achievement Evaluation

■ Academic Achievement Evaluation Design and Implementation

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Areas</th>
<th>Scope</th>
<th>Time</th>
<th>Types of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary school 6th graders</td>
<td>Korean Social studies, Mathematics, Science, English (Survey)</td>
<td>Entire curriculum from 1st grade to 6th grade</td>
<td>40 minutes for each subject</td>
<td>Multiple choice and essay test</td>
</tr>
<tr>
<td>Middle School 3rd graders</td>
<td>Korean Social studies, Mathematics, Science, English (Survey)</td>
<td>Entire curriculum from 1st grade to 3rd grade</td>
<td>70 minutes for each subject</td>
<td>Multiple choice and essay test</td>
</tr>
<tr>
<td>High School 1st grade</td>
<td>Korean Social studies, Mathematics, English (Survey)</td>
<td>Entire curriculum of H.S. 1st grade</td>
<td>70 minutes for each subject</td>
<td>Multiple choice and essay test</td>
</tr>
</tbody>
</table>

Reporting the Results and Plans for Their Utilization

- Proposing plans for reporting the results of the academic achievement evaluations from 2010.
- Exploring the ways to utilize the results of the academic achievement evaluations from 2010.

■ Goal Characteristics of the Evaluation Scale of the Current Academic Achievement

<table>
<thead>
<tr>
<th>Grade</th>
<th>Subject</th>
<th>Scope</th>
<th>Raw score characteristics</th>
<th>Goal characteristics of scale scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School 6th grade</td>
<td>Korean Social studies, Mathematics, English</td>
<td>0–70, 0–70, 0–70, 0–40</td>
<td>0.5, 0.5, 0.5, 0.5</td>
<td>160, 8.5, 130, 190, 1</td>
</tr>
<tr>
<td>Middle School 3rd grade</td>
<td>Korean Social studies, Mathematics, Science, English</td>
<td>0–70, 0–70, 0–22, 0–22</td>
<td>0.5, 1.0, 0.5, 0.5</td>
<td>260, 8.5, 230, 290, 1</td>
</tr>
<tr>
<td>High School 1st grade</td>
<td>Korean Social studies, Mathematics, Science, English</td>
<td>0–70, 0–70, 0–22, 0–22</td>
<td>0.5, 1.0, 0.5, 0.5</td>
<td>360, 8.5, 330, 390, 1</td>
</tr>
</tbody>
</table>
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Content

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  - Analyzing the problems with test equating and data gathering and designing in the current academic achievement evaluation system according to its full-scale implementation.
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  - Collecting and comparing the overseas cases of designing data gathering and designing for equating in high-stake evaluations.

- **Plans for Resetting Scoring and Achievement Levels**
  - Comparing the scoring methods based on classical test theory and item response theory.
  - Reviewing the scoring and scaling.
  - Analyzing and comparing cases of setting cut scores of achievement levels home and abroad.
  - Reviewing the plans for resetting cut scores of achievement levels in academic achievement evaluations.

- **Reporting the Results and Plans for Their Utilization**
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II. Need for Changes to the Scoring System in the National Assessment of Educational Achievement

The Scoring System of the Current Academic Achievement Evaluation

- **Academic Achievement Evaluation Design and Implementation**

  <Table 1> Design and implementation of the NAEA in 2009

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Areas</th>
<th>Scopes</th>
<th>Hours</th>
<th>Periods</th>
<th>Types of Items</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School 6th grad</td>
<td>Korean Social studies</td>
<td>Entire curricula from 5th grade to 6th grade</td>
<td>40 minutes</td>
<td>October 13 and 14 for each subject</td>
<td>Survey, Multiple-choice, and essay test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>English (Survey)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle School 3rd grad</td>
<td>Korean Social studies</td>
<td>Entire curriculum from 1st grade to 3rd grade</td>
<td>70 minutes</td>
<td>October 13 and 14 for each subject</td>
<td>Survey, Multiple-choice, and essay test</td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School 1st grad</td>
<td>Academic school</td>
<td>Entire curricula of H.S. 1st grade</td>
<td>70 minutes</td>
<td>October 13 and 14 for each subject</td>
<td>Survey, Multiple-choice, and essay test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vocational school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Goal Characteristics of the Evaluation Scale of the Current Academic Achievement**

  <Table 2> Goal characteristics of the evaluation scale of the NAEA (as of 2003)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Subject</th>
<th>Raw score characteristics</th>
<th>Goal characteristics of scale scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scope</td>
<td>Increment</td>
<td>Mean</td>
</tr>
<tr>
<td>Elementary School 6th grade</td>
<td>Korean Social studies</td>
<td>0~70</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>0~70</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>English (Survey)</td>
<td>0~70</td>
<td>0.5</td>
</tr>
<tr>
<td>Middle School 3rd grade</td>
<td>Korean Social studies</td>
<td>0~70</td>
<td>0.5</td>
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</tr>
</tbody>
</table>

- Proposing plans for reporting the results of the academic achievement evaluations from 2010.
- Exploring the ways to utilize the results of the academic achievement evaluations from 2010.
1. Being aware of criteria for substantiality of performance assessment application

2. Linear conversion of raw scores converted with an arcsine: calculating scale scores

3. Adjusting scale scores and the scope of scoring: determining the scale scores

4. Reviewing the statistical characteristics of the scale scores

5. Making a conversion table of raw and scale scores

Procedure of Developing the Scale of the Current Academic Achievement Evaluation

- Not using the data of “test equating for single groups” and “test equating for equivalent groups” in the gathering and designing process for test equating of annual tests.
- When applying the non-equivalent group design with anchor items, external anchor items will be preferred to internal ones.
- When using external anchor items in a non-equivalent group design with anchor items, the subjects should not be informed about which items will be included in the scoring process and which will not.
- Feasibility should be considered when gathering and designing test equating data.

Plan to Improve Scale Scores

- Proposing Ability Criteria based on Item Response Theory: Since the test equating process in the academic achievement evaluation is based on the item response theory, consistency can be achieved between the measuring model used in the test equating process and that used in the scaling process.
- Proposing Alternatives for Criteria Conversion based on Classical Test Theory

Plan to Improve Scale Scores

- The old way of combining the cut scores of achievement levels through test equating is no longer valid since the criteria of achievement levels were set in 2003.
- When adopting the ability scale of the item response theory, it is the right approach to apply the bookmark or IDM method based on the theory in order to set the achievement levels.
- When using the scale scores based on the raw scores, it is the right approach to adopt the Angoff method, which offers cut scores on the scale of raw scores, to set the achievement levels.

Improving individual score reports:
It was pointed that the current reporting system did not provide detailed achievement information.

III. Improvement Measures for the Scoring System of the National Assessment of Educational Achievement

Plan to Improve the Gathering and Designing of Test Equating

Criteria for Selecting the Methods to Gather Test Equating

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Plan to Gather and Design Test Equating Data in Academic Achievement Evaluation (security data)

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IV. Improving the Report of the Results of the National Assessment of Educational Achievement and Utilizing Them

Improving the Report of the Results of the Academic Achievement Evaluation

- **Basic Direction of Improving the Reporting of Students' Grades**: Visual reporting should accompany the current achievement levels for each subject and detailed information about their sub-areas.

<Table 4> Common features of grade reporting for each student

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic information</td>
<td>Student information</td>
<td>Name, grade, Student No.(student code)</td>
</tr>
<tr>
<td></td>
<td>School information</td>
<td>Name and educational agency</td>
</tr>
<tr>
<td>Degree of academic achievement</td>
<td>Areas of evaluation</td>
<td>Title of subject</td>
</tr>
<tr>
<td></td>
<td>Achievement level</td>
<td>Overall achievement level for each subject</td>
</tr>
<tr>
<td></td>
<td>Subareas</td>
<td>Achievement level of the subareas included in the test</td>
</tr>
<tr>
<td></td>
<td>Skills of achievement level</td>
<td>Explaining the ability and performance represented by each achievement level</td>
</tr>
<tr>
<td></td>
<td>Goals of evaluation</td>
<td>Explaining the goals of the NAEA</td>
</tr>
<tr>
<td></td>
<td>Graph</td>
<td>Visual reporting for achievement levels and places</td>
</tr>
</tbody>
</table>

- **Plan to Improve Student Grade Reporting Methods (Example)**
  
  - Of the several improvement plans, Plan 2 determines the achievement level by subjects and offers the rate of right answers for each subarea.

<table>
<thead>
<tr>
<th>Plan 2: Determines the achievement level by subject and offers the rate of right answers for each subarea.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determines the achievement (excellent, common, basic, and below basic) of individual students across five subjects and reports their scale scores, the number of total items in each subarea, and the number of right answers of multiple-choice and essay items.</td>
</tr>
</tbody>
</table>

(Figure 1) Results of math achievement of Middle School 3rd graders in the academic achievement evaluation (Plan 2 was applied)

**Plans to Utilize the Results of Academic Achievement Evaluation**

- **Model to Utilize the Results of Academic Achievement Evaluation**
  
  - Disclosing education-related information will mark a revolutionary turning point in the history of information utilization. One will be able to compare schools and regions beyond any limitations and utilize the analysis results of relationships among the different variables of educational contexts when making decisions about educational policies.
  - A model for utilizing the results will be suggested by making the links of a virtuous cycle to utilize the results of academic achievement evaluation in three dimensions.
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- A model for utilizing the results will be suggested by making the links of a virtuous cycle to utilize the results of academic achievement evaluation in three dimensions.
Implementation Plans for Each Subject of Utilization and Their Expected Effects

Practical implementation plans for utilizing the academic achievement evaluation will be reviewed along with their expected effects by aligning such functions as feedback, planning, development, implementation, and application for the roles and results of those who are involved with academic achievement to each individual who utilizes them.

1. **Educational agency**
   - **Teachers, headmasters, and schools**
     - Understanding individual students’ academic achievement levels
     - Understanding level differences among the subjects
     - Understanding differences in areas of achievement in content among the subjects
     - Understanding the degree of cross-sectional improvement of academic achievement
     - Announcing the participation of individual schools in evaluation and their achievement levels by subject
     - Applying the instructional programs to individual students
     - Improving the teaching and learning methods by the contents of each subject
     - Applying programs to increase academic skills or corrective programs
     - Applying a support system by comparing the degree of improvement by year

2. **National Government**
   - Providing information about individuals’ academic achievement levels
   - Understanding academic achievement level of each educational agency and school across the nation
   - Understanding the degree of cross-sectional improvement of each region
   - Checking accountability of educational agencies for educational achievement
   - Providing basic data for supportive policies by examining changes to academic achievement and comparing the degree of improvement
   - Providing practical information to encourage study by examining each school within the jurisdiction of an educational agency for advantages and disadvantages
   - Providing basic data to implement projects to increase basic academic skills

3. **Nation**
   - Providing information about individuals’ academic achievement levels
   - Understanding academic achievement level of each educational agency and school across the nation
   - Understanding the degree of cross-sectional improvement of each region
   - Checking accountability of educational agencies for educational achievement
   - Providing basic data for supportive policies by examining changes to academic achievement and comparing the degree of improvement
   - Providing practical information to encourage study by examining each school within the jurisdiction of an educational agency for advantages and disadvantages
   - Providing basic data to implement projects to increase basic academic skills

4. **Expert group**
   - KICE and other concerned agencies and expert groups
   - Understanding the goals of the NAEA
   - Providing the framework of academic achievement evaluation and plans for utilizing the results
   - Understanding the relationships among the background variables of academic achievement
   - Analyzing the results of academic achievement evaluation in-depth
   - Developing variety of educational indexes including one for academic achievement
   - Developing criteria to evaluate agencies including the model to evaluate educational results and selecting models
   - Providing a research framework for cross-sectional and longitudinal improvement
   - Analyzing contextual factors to affect academic achievement
   - Proposing policies based on academic achievement and educational contextual variables
   - Proposing policies to improve the curriculum and increase academic skills

5. **Demand for learning support**
   - Checking achievement level
   - Checking the degree of cross-sectional improvement of each school
   - Setting up and implementing support plans for each school
   - Guiding and supervising plans for each school implementing support
   - Establishing educational policies to enhance academic abilities and policies to enhance educational quality
   - Setting directions for supporting educational agencies and schools

6. **Civil group**
   - Checking achievement level
   - Demand for learning support
   - Improving learning method
   - Monitoring education
   - Managing academic information
   - Announcing school corrective study
   - Developing in-service training programs to help teachers to improve their teaching and learning methods
   - Providing a research framework for cross-sectional improvement of academic achievement
   - Improving the teaching and learning methods by the contents of each subject
   - Applying programs to increase academic skills or corrective programs
   - Applying a support system by comparing the degree of improvement by year

7. **Policy making and enforcement**
   - Implementing policies to guarantee basic academic skills for each student
   - Improving overall improvement of students’ academic skills
   - Examining school information and expanding choice
   - Minimizing the number of students below the basic level

- **Table 5** Implementation plans for each subject of utilization and their expected effects
### Implementation Plans for Each Subject of Utilization and Their Expected Effects

Practical implementation plans for utilizing the academic achievement evaluation will be reviewed along with their expected effects by aligning such functions as feedback, planning, development, implementation, and application for the roles and results of those who are involved with academic achievement to each individual who utilizes them.

- **Individual Students and parents**
  - Understanding individuals' academic achievement levels
  - Setting directions for supporting educational agencies and schools
  - Providing basic data for supportive policies by examining changes to academic achievement and comparing the degree of improvement
  - Providing basic data to implement projects to increase basic academic skills
  - Examining school information and expanding choice
  - Minimizing the number of students below the basic level

- **Educational agency Teachers, headmasters, and schools**
  - Understanding students' academic achievement levels
  - Understanding levels of differences among the subjects
  - Improving the teaching and learning methods by the contents of each subject
  - Applying programs to increase academic skills or corrective programs
  - Providing practical information to encourage study by examining each school within the jurisdiction of an educational agency for advantages and disadvantages
  - Increasing school accountability within the region
  - Minimizing the number of students below the basic level

- **Region Educational agencies**
  - Understanding the degree of cross-sectional improvement of each school
  - Providing basic data for supportive policies by examining changes to academic achievement and comparing the degree of improvement
  - Providing practical information to encourage study by examining each school within the jurisdiction of an educational agency for advantages and disadvantages
  - Providing basic data to implement projects to increase basic academic skills
  - Minimizing the number of students below the basic level

- **Nation Government**
  - Providing information about individuals' academic achievement levels
  - Understanding the degree of cross-sectional improvement of each region
  - Checking and improving the curriculum and guarantee national basic education
  - Providing basic data to implement projects to increase basic academic skills
  - Minimizing the number of students below the basic level

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Subject</th>
<th>Goals</th>
<th>Utilization of results and implementation plans</th>
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<tr>
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<td>Understanding individuals' academic achievement levels</td>
<td>Analyzing the results of academic achievement evaluation in-depth</td>
<td>Examining school information and expanding choice</td>
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<tr>
<td>Educational agency Teachers, headmasters, and schools</td>
<td>Understanding students' academic achievement levels</td>
<td>Providing basic data for supportive policies by examining changes to academic achievement and comparing the degree of improvement</td>
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</tr>
</tbody>
</table>

**Table 5** Implementation plans for each subject of utilization and their expected effects
V. Conclusion and Suggestions

Conclusion

- Each country in the world demonstrates its strong determination for accountability for public education by regularly checking the result or academic achievement of school education on the national level and providing corrective programs for individual students.
- They try to induce positive competitions and results among public educational agencies by disclosing information about the academic achievement levels of each student and school.
- The overall evaluation framework, development, implementation, and scoring should be done in a reliable manner, the legitimacy of the full-scale implementation should be secured, and checking each school's accountability should be understood in order to help bring about the model of a virtuous cycle for results for academic achievement evaluations to settle down in a stable fashion.

Suggestions

- There should be discussions with experts and independence should be given to the development of evaluative tools including the number of items, scope, and required time by subject in order to determine a new evaluation framework of academic achievement.
- There should be separate experiments and research on the sample size of preliminary studies in order to maintain test equating error at an appropriate level and minimize the possibility of item leakage.
- There should be a positive consensus for checking the accountability of school education and an effort to develop an effective evaluation model.
- There should be numerous follow-up studies within each research framework in order to devise meaningful educational policies with considerable data and applying them to schools by making active use of the expert group.
- KICE should play the role of a bridge between the expert group and the decision makers of educational policies and thus take active part in the establishment of educational policies to minimize trials and errors.