

Research on the Educational Effects of Class Size
by the Working Group on Teaching and Learning Support
Outline

1. Purpose and Overview of the Research Study

(1) Purpose of the Research

By examining the effect of class size on the design of lessons, teaching methods, and so on, this study aims to obtain basic data about the ideal means to maximize the benefits of small classes.

(2) Outline of the Research

The research was carried out in the fiscal year 2011-12 (Heisei 23-24) led by Bunzo Kudo (Director, Department for Elementary and Secondary Education Research), following the procedure described below.

a) Survey in Shiki city

We conducted a survey involving questionnaires targeting 31 teachers in Shiki city who have experienced teaching both regular size and small (about 25 pupils) classes. We grouped responses to open-ended questions regarding such topics as the effect of implementing small classes on teaching and learning support and extracted key aspects on the benefits of small classes.

b) Discussion of the design of and frameworks for lessons

Based on the results of the survey in Shiki city described in a) above, we had research discussions with officers from the local educational authority responsible for the school and teachers, and considered the key aspects and frameworks for the design of effective lessons (features of today's lesson and lesson plan formats) to make use of the class size.

c) Development of model lesson plans based on the key aspects and the frameworks

The LEA officers and teachers each developed the model lesson plans for some subjects (Japanese language, Social Studies, Math, Science, PE, and Integrated Studies), after examining the lesson plan formats based on the aspects discussed in a) above.

d) Lesson implementation and post-lesson discussions and analysis

After the teachers conducted lessons based on the model lesson plans developed in c) above, we discussed the lessons. We identified the designs of lessons, teaching methods, and so on that small classes can bring, using pre-lesson lesson plan descriptions, videotaped lessons, and reflective comments after lessons as data.

2. Overview of the Research Results

(1) Key aspects and lesson plan formats for the design of lessons, making use of the class size

Based on the findings obtained from the Shiki city survey, we produced a draft of aspects for the design of effective lessons, via discussions, and extracted the following five key aspects, each of which was reflected in the element after the

dash.

1. Student-centered activities [(a) investigation, (b) experience, (c) expression, (d) language activity, and (e) use of ICT]—curriculum unit design.
2. Use of space and teaching materials and equipment [(a) designing learning formats, (b) use of teaching materials and equipment, (c) setting up a learning corner, (d) designing work displays]—space.
3. Participating in learning [(a) expressing views and presentations, (b) frequency and duration of practice, (c) individual learning and interaction with others]—time and opportunities.
4. Individual teaching [(a) preparation of teaching materials meeting individual needs, (b) teaching via walking around the class and monitoring each child, (c) talking to children, (d) guidance on note taking, (e) teaching and consolidating skills, (f) considering special needs, (g) health and safety]—teaching.
5. Detailed evaluation [(a) monitoring children’s performance, (b) checking notebooks, learning journals, self-assessment sheets, etc., (c) recording and evaluation pre-, mid-, and post-lesson performance]—evaluation.

Lesson plan format: It was decided that teachers will be asked to choose a feature of today’s lesson utilizing the class size, attach it to the subtitle for the curriculum unit name, and describe the feature in detail around the key aspects stated above, in addition to the usual unit targets and plans and individual lesson aims and plans.

(2) Lesson implementation and analysis

The main outcome of analyzing lesson plans and actual lessons is as follows:

1. Analysis of the features of today’s lessons by LEA officers

We analyzed the features of today’s lessons by the four LEA officers for four different subjects: Japanese language, Math, PE, and Integrated Studies. The following three points are commonly considered as important in their lesson plans: “paying attention to the individual learning,” “formative evaluation during a lesson,” and “managing lesson progress in relation to learning goals.” On the other hand, we were able to identify such different teaching models for lesson designs making use of small classes as divergent (deepen learning by utilizing differences in individual interests and orchestrating them) and convergent teaching (leading to correct answers by providing guidance and clues, adapting to differences in academic performance and abilities).

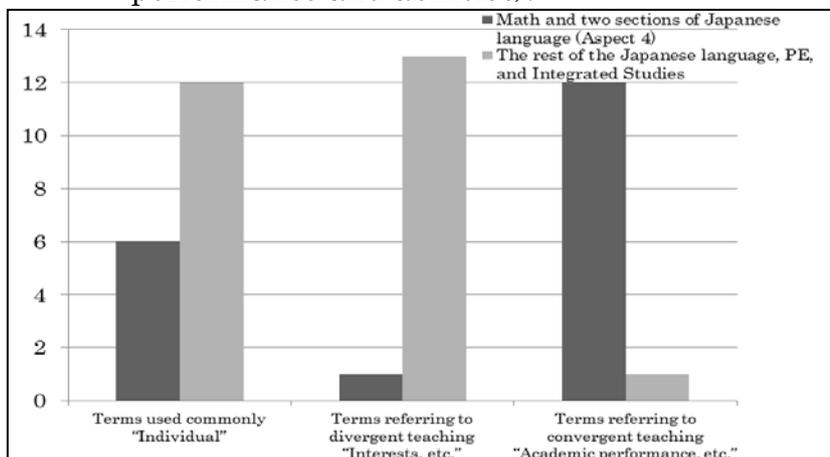


Chart. Expressions used in the officers’ written statements (total frequency).

As can be seen in the bar chart on the left, the term “individual” was seen in every subject area. In Japanese language, PE, and Integrated Studies, there were many references that suggest divergent teaching, such as pupils’ interests, motivation, and diversity,

while in Math and Japanese language for pupils in lower-ability groups, vocabulary was often used suggesting convergent teaching, such as academic achievement, mastery, progress, discrepancy and poor performance.

2. Analysis of teachers' lesson plans

Analyzing teaching plans made by six teachers who were carrying out lessons, it was found that they tended to refer to divergent teaching. This suggests that we can plan lessons incorporating pupils' diversity in small classes. It was intended to link the key aspects in each lesson. For example, providing opportunities for expressing own ideas (tools for externalizing ideas such as post-its, worksheets, etc.) (aspect 2 in (1)) and discussions (aspect 3), which enable the integration of learner's self-directed activities (aspect 1) with teaching and evaluation (aspects 4 and 5). However, there was a glimpse of the influence of subjects. Convergent teaching was expressed by teachers for Math (as expressed by the LEA officers).

3. Analysis of lessons

Through lesson observations and video analysis, we summarized in six lessons whether group activities were incorporated, the number of groups, the number of people in each group, whether the pupils changed seats, and what tools were used to express and share ideas of individuals, groups, and the class as a whole.

Grade/subject	Grade 4. Japanese Language	Grade 3. Social Studies	Grade 4. Math	Grade 4. Science	Grade 4. PE	Grade 3. Integrated Studies
Number of pupils	30	31	27	32	26	33
Group activities	✓	✓	△	×	✓	✓
The number of pupils in each group	2-4	3-4	4	-	4-5	4
X The number of groups	X8	X10	X4		X6	X8
Changing seats	✓	×	△	×	×	✓
Means to express individual ideas and solutions	Post-it, plastic folder	Post-it	Worksheet	Notebooks and something brought	Worksheet	Post-it
Means to share ideas in groups	Whiteboard lined white board, and easel	Colored drawing paper	-	-	Whiteboard	Whiteboard
Means to share ideas in class	Oral expression	Blackboard	Oral expression or demonstration at the front	TV monitor, A0 paper	Presentation	Blackboard
Means to summarize individual ideas	Plastic folder	Notebook	Notebook	Notebook	Worksheet	×

(Note) In the table ✓ means, it was seen in all pupils; △ means, it was seen in only some pupils, and × means, it was not clearly seen.

The results from the table showed the following:

- Four out of six classes introduced language activities such as group work. In addition, grouping (uneven numbers in each) according to children's interests was allowed rather than grouping children mechanically. The number of groups was no more than 10 in any class.
- There was a difference in the amount of preparation, but tools were designed to support expressing and exchanging children's ideas and summarizing at the end of the lesson as a whole class.

4. Analysis of details of lessons and discussions

We performed a detailed qualitative analysis of lesson contents and post-lesson discussions for Math and PE lessons conducted by relatively inexperienced teachers, in addition to format analysis of the lessons described above. In Math lessons, magnets on the blackboard were observed to be used to show how much progress each child made when solving a task (calculating the area of complex shapes), but in the post-lesson discussion, it was pointed out that these magnets could have been used to reflect diversity (i.e., which of the various methods of calculation each child used). In PE lessons, improvement was made in teaching, meeting individual differences. For handball, multiple teachers' pre-lesson formative assessments led to reducing the size of the court to 2/3. From that, how to use tools and the significance of formative assessment became clear. This was not clear in the format analysis described above.

(3) Summary and future challenges

The following suggestions were obtained as a result of analyzing lesson plans and actual lessons based on the proposed five key aspects.

- To link small classes and lesson success, improved designs for lessons, teaching methods, and so on, making use of the benefits of small classes, are important, and it is the interaction of the class size and the quality of teaching that could lead to positive effects such as improved academic performance. The reason is that teachers will be able to adopt a huge variety of teaching methods, following the models of teaching, and that can influence learners' academic performance and developmental changes.
- Divergent teaching, deepening learning by valuing pupils' interests and promoting active participation, is an ideal lesson model. The study suggests that it is possible to plan a lesson of this type in small classes while relating to and incorporating the five aspects ① to ⑤ described above.
- It is easy to improve teaching during and between lessons because it is easy to conduct formative assessments in small classes, especially from the multilayered perspectives of multiple teachers. This leads to empirical research on lesson design (lesson planning based on theory, implementation, improvement, correcting theory).

The future challenge is (1) to study models of teaching in exhaustive detail and seek the evaluation methods and (2) to study larger scale data including comparison with larger classes (recording and analysis of actual lessons in relation to the models).