

# NISE Bulletin

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**ORIGINAL ARTICLE**

# The attempt of the practical application of International Classification of Functioning, Disability, and Health (ICF) as a tool for collaboration among various professionals: A perspective on its applicability to “individualized educational support plan”

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**Abstract:** This report describes attempt regarding to the practical application of the International Classification of Functioning, Disability, and Health (ICF) as a tool for collaboration among various professionals in the field of education for children with disabilities, while putting its application to individualized educational support plans into perspective. In concrete terms, with respect to five pupils attending a special school, their class teachers performed the following tasks: ① evaluation using a Japanese version of the ICF checklist, ② confirmation of the various professionals involved with the pupil based on the creation of a life map, ③ organization of the overall situation making a model figure based on the results described in ①; subsequently, on the basis of the results obtained, the class teachers held discussions with various professionals in and outside the schools regarding the present status of and issues concerning the pupil as well as the future policy. As a result, it was found that the discussion aimed at collaboration could be carried out efficiently and effectively through the series of tasks using ICF, indicating that ICF is a useful tool for collaboration among various professionals. The results also indicated that, for the practical application of ICF to an individualized educational support plan, further research on the relationship between ICF and the individualized teaching plan is required, and a manual on how to use ICF should be produced.

**Key Words:** ICF, Various professionals, Collaboration, Individualized educational support plan, Checklist

## 1. Introduction

With respect to the education for children with disabilities, it has been strongly recognized that education cannot be completed within a school or with the involvement only of teachers, but that collaboration among various professionals is required, as indicated in, for example, the “Individualized educational support plan”<sup>8</sup> found in the “Nature of special needs education in the future (final report)” (2003). According to statistics from special schools, with respect to Activities to Promote Independence, which is one of the major issues of the curriculum, there is collaboration with medical institutions and welfare organizations in 83.8% of all schools.<sup>2</sup> Moreover, in the “5-year plan of the priority policy” in the basic plan for the disabled, which was published in December 2002, it is clearly stated that individualized support plans should be drawn up at special schools by fiscal year 2005,<sup>3</sup> supporting the necessity of collaboration among various professionals.

Tokunaga investigated attempts at applying the International Classification of Functioning, Disability, and Health (ICF), one objective of which is its use as a common language between the individual in question and the various professionals involved, for the purpose of collaboration among various professionals. As a result, he reported that ICF is an effective means of collaboration among various professionals, and that the application of ICF can lead to practical effects in teaching. It has also been clarified that, among the issues to be resolved, the complexity of the ICF procedures should be reduced, and that ICF should be integrated into the school system, such as in individualized teaching plans, so that it can be used continuously.<sup>9, 13</sup>

This report describes an attempt at the practical application of ICF as a tool for collaboration among various professionals which will be increasingly required from

now on. In particular, to examine its degree of practicality as a tool to be widely applied in actual school situations, I carried out this investigation while putting the application of ICF to individualized educational support plans into perspective.

## II. Objectives and Methods of Study

### 1. Objectives

To examine the possibility of the practical application of ICF as a tool for collaboration among various professionals, this study is aimed at the clarification of the possibilities and problems of ICF through the examination of case studies.

### 2. Methods

#### (1) Subjects

To examine the possibility of the practical application of ICF to various case studies, it was investigated the cases of five pupils attending a special school in Japan with the cooperation of class teachers and other school staff members, as well as of the pupils themselves, family members, and various professionals involved. The five cases and their major characteristics are as follows.

- A case wherein collaboration among various professionals within the school was attempted.
- A case of at-home education, in which there were multiple contacts between family members and various professionals on a routine basis.
- A case of a high school department wherein consideration is given to transition into after-graduation life.
- A case wherein differences in understanding among various professionals were exposed.
- A case of a facility-affiliated school where collaboration is carried out well among various professionals on a routine basis.

#### (2) Procedure

Tasks were performed using the following procedure in cooperation with teachers at the respective schools (hereafter referred to as research collaborators).

In the following steps 1) to 4), while there was discussion with the author whenever necessary, the actual tasks were carried out mainly by the respective research collaborator. In step 5), the information obtained in the previous steps 1) to 4) was integrated and the future direction was examined. Meanwhile, to promote the research collaborators' understanding of ICF itself, the author explained ICF in reference to publications such as "ICF: International Classification of Functioning, Disability, and Health ?Revised Version of International Classification of Impairments, Disabilities, and Handicaps-," edited by the Society for the Study of Welfare for People with Disabilities

(2002).

### 1) Evaluation using ICF checklist

The author have translated the "ICF CHECKLIST version 2.1a Clinician Form"<sup>15</sup> of the World Health Organization (hereafter abbreviated WHO). Then the modifications listed below were made to facilitate practical application in actual school situations, and each item was evaluated mainly by the class teachers.

- A space for remarks was added at the end of each category, so that specific points can be described.
- Regarding "Capacity" in "Activity and participation," evaluations were performed for both states with and without personal or physical support.

These two modifications were confirmed in all the cases. Furthermore, it was also confirmed that other modifications to facilitate the use of the checklist in each case could be made, and that evaluation was to be performed with reference to "ICF: International Classification of Functioning, Disability, and Health -Revised Version of International Classification of Impairments, Disabilities, and Handicaps-" when necessary.

### 2) Preparation of life map

With the aim of clarifying the presence of professionals as collaborators of the class teacher and visually confirming these professionals quickly, a life map was prepared in which people and organizations involved with the respective children were presented. Here, depending on the school, a similar figure had already been prepared in the individualized teaching plans; in such a case, that figure was used as the life map.

### 3) Preparation of model figure

A model figure representing the relationship among items was prepared using the evaluation results of checklist (1), with the aim of visually confirming the overall situation of the case quickly. The model figure was drawn by the respective class teachers referring to the "figure showing

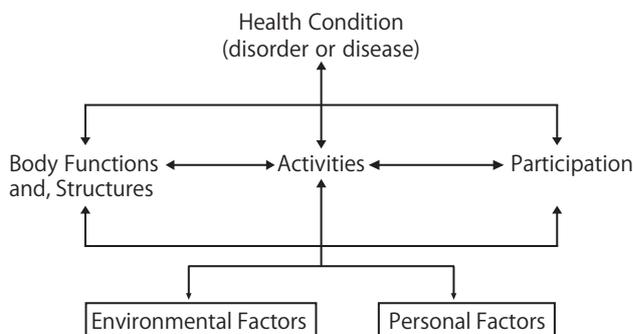


FIGURE 1 Interaction between the components of ICF

interactions between the components of ICF<sup>25</sup> by WHO (Fig. 1), but also with their own modifications.

#### 4) Discussion with the various professionals involved

Using the materials created as described in 1)-3) above, discussion with the various professionals involved was conducted regarding, for example, the confirmation of the actual condition of each case, the sharing of roles among professionals, and future direction, and the contents of the discussion were recorded.

#### 5) Discussion and summation by research collaborators

The author and the research collaborators who had carried out steps 1)-4) discussed the achievements and issues of this examination and its future direction. On the basis of the contents of this discussion as well as various other materials, the author summarized the study on the practical application of ICF as a tool for collaboration among various professionals.

### III. Evaluation of Each Case

With respect to each of the five cases, the processes and results of the evaluation using the checklist and the preparation of a life map and model figure are reported. At the same time, the usability of these examinations and problems are investigated, and some discussion is added.

#### 1. A case of applying ICF to collaboration with dormitory coaches and other school staff

With the term “collaboration among various professionals,” professionals outside the school may come to mind, but a school is essentially a collective of various professionals such as teachers, school nurses, clerical staff, and dieticians,<sup>7</sup> among whom collaboration is naturally very important. Here, I investigated the collaboration between a class teacher and dormitory coaches whose work practices were different, although they both belonged to the same organization and worked in the same place.

##### (1) Outline of this case

Boy A is in the 6<sup>th</sup> grade of elementary school. Because of cerebral palsy, he has physical disabilities accompanied with mental retardation. He requires assistance in maintaining a sitting position and in moving around in a wheelchair. He shows interest in toys with sound and can grab the toy to play with it. He lives in a dormitory in a nearby city from Monday to Friday and returns home on weekends. Various professionals in addition to Boy A’s class teacher are involved with him, including dormitory coaches, staff at a horseback-riding club, in which he participates on weekends, and physical therapists (hereafter,

abbreviated as PTs) from a self-training organization.

##### (2) Actual tasks

The class teacher held discussions with the parents as well as PTs, but collaboration with the dormitory coaches is mainly described here. In the following, the description is given in the order of the tasks actually performed, i.e., 1) evaluation using the checklist, 2) preparation of the life map, 3) preparation of the model figure, and 4) discussion. A similar procedure is applied in other cases.

##### 1) Evaluation using checklist

The class teacher performed an evaluation while consulting with the parents regarding life-related issues, and with the PT who has been involved with Boy A for a long time regarding physical issues. According to the class teacher, while the overall situation of Boy A can be broadly evaluated using the checklist, which is a favorable point, the following issues needing improvement exist with respect to the practical application of ICF.

The first point is related to evaluation criteria. The class teacher indicated that since the evaluation criteria were not clear, the teacher was sometimes unsure about the evaluation. The teacher commented that the establishment of clear criteria, which are not swayed by the subjectivity of the evaluator, is desired. This indicates the necessity of creating an overall manual including such criteria.

The second point is related to the insufficient number of items listed in the checklist. In concrete terms, during the discussion with the PT, a necessity to include items “d415: Maintaining of Body Position” and “b445: Hand and Arm Use” in “Activity” for the evaluation of Boy A was indicated, and these items were added. Originally, the checklist items consisted only of major items in the ICF, so that the addition of necessary items for each case is allowed. However, to do this, it is necessary to know not only the items included in the checklist, but also all the items included in ICF. This suggests that evaluation using only the checklist is sometimes difficult at this stage.

##### 2) Preparation of life map

A life map is not included in the individualized teaching plan of the special school which Boy A involved. However, I requested that Boy A’s life map be prepared with the aim of clarifying the status of individuals involved with him (Fig. 2). The preparation of the life map is effective not only for understanding with whom one needs to collaborate, but also for confirming what daily situations are considered in the tasks taken up by the school. Consequently, the class teacher has indicated the necessity of the life map as material in the future individualized educational support plan.

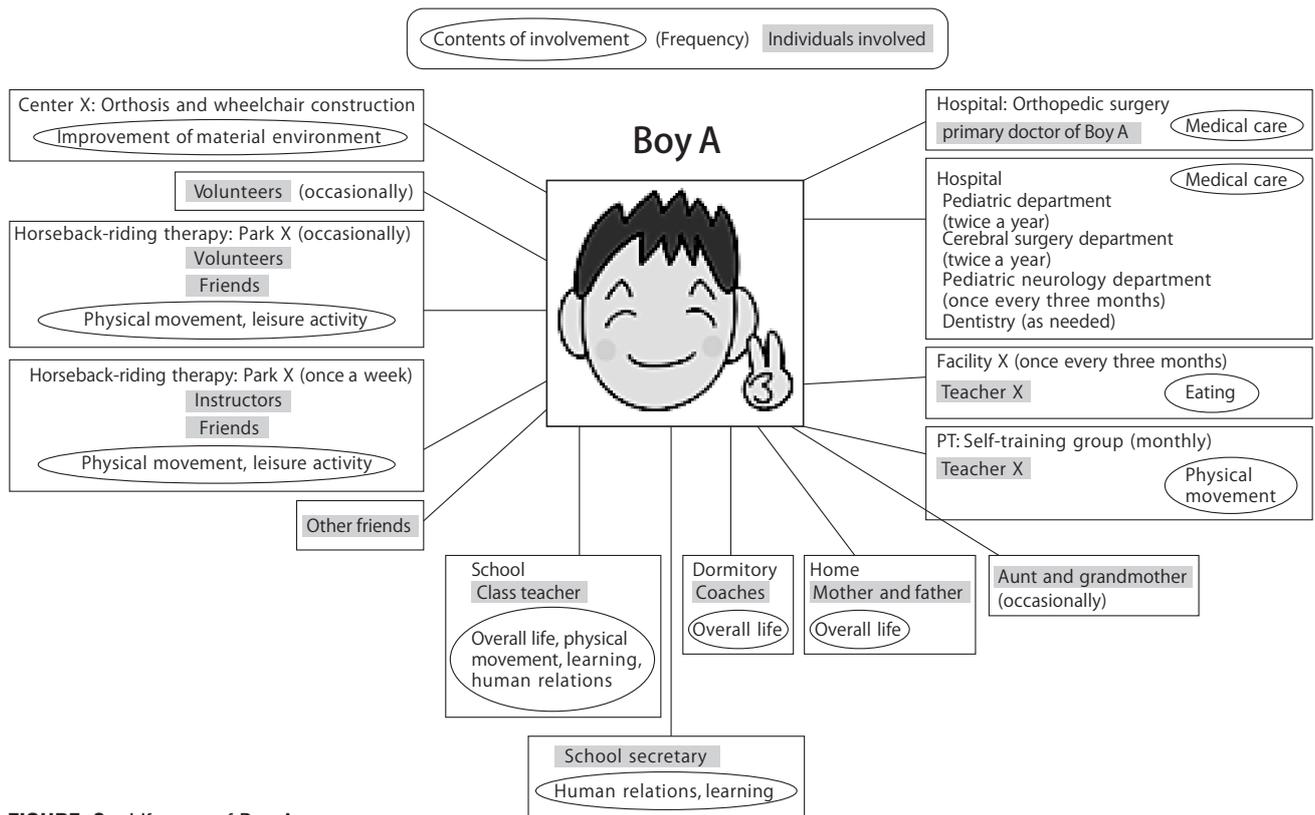


FIGURE 2 Life map of Boy A

### 3) Preparation of model figure

After the preparation of the model figure by the class teacher based on the evaluation using the checklist, I asked the dormitory coaches to mark the contents that they thought were their responsibility (Fig. 3). Here, after discussion with the dormitory coaches, class teacher also held discussions with the guardians and PTs and revised the model figure. However, the original figure used for the discussion with the dormitory coaches is shown here.

Symbols shown in the figure have the following meanings.

- The first (left) of two arrows (e.g., ↓↓) inside each item of “Activity” and “Participation” indicates actual performance in the present life, and the second arrow (right) indicates capacity without the support of another person or of equipment. The direction of these arrows indicates the score of the ICF evaluation criteria determined by WHO: ↑ for 0-2 points, and ↓ for 3 points or more. Similar representations are used for “Body functions” and “Body structures.”
- Score 0: No problem (none, absent, negligible...) 0-4%  
 Score 1: Mild problem (slight, low...) 5-24%  
 Score 2: Moderate problem (Medium, fair...) 25-49%  
 Score 3: Severe problem (high, extreme...) 50-95%  
 Score 4: Complete problem (total...) 96-100%  
 Score 8: Not specified  
 Score 9: Not applicable
- The combinations of the arrows represent the following:  
 (Actual performance↑/ capacity without support↑); the child has an ability regarding this item.  
 (Actual performance↑/ capacity without support↓); item where support is appropriate.  
 (Actual performance↓/ capacity without support↓); item which is not carried out practically.
- Among the “environmental factors,” “barriers” which negatively affect daily life by their presence are represented with “-”, and “facilitators” which positively affect daily life are represented with “+”.
  - Other items related to each “environmental factor” are connected by lines with respective meanings noted in the figure.

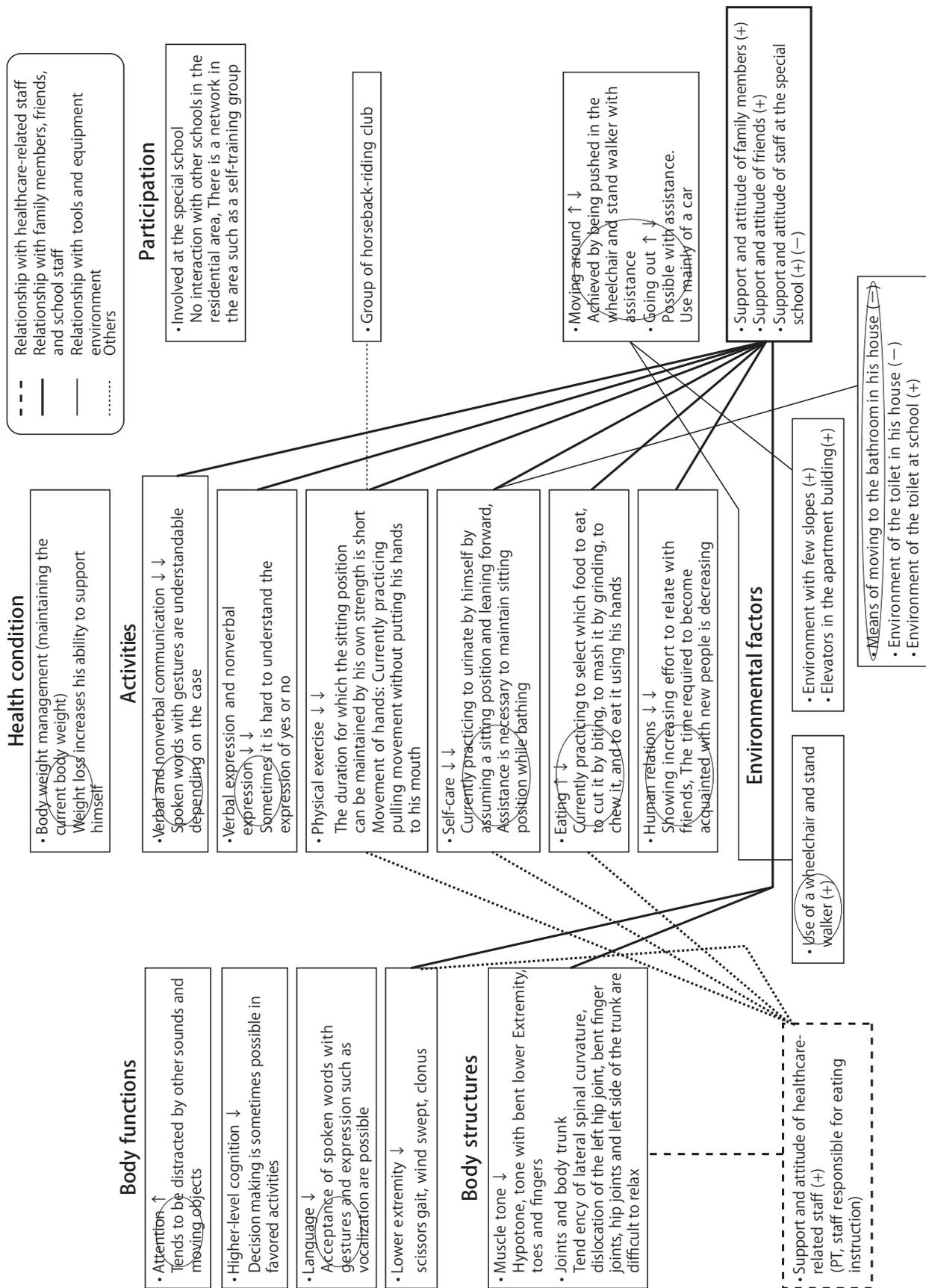


FIGURE 3 Model figure for Boy A

By preparing the model figure, the following was clarified.

#### ① Contents to be included in the model figure

Items to be selected from the checklist are left to the choice of the person who prepares the figure. For example, the “barriers” added to the current model figure by the class teacher are those which may be taken up as tasks and which can be changed to (+) “facilitators” in the future. On the basis of the aims of the preparation of model figures, and in terms of the practical wide-range application of ICF in the future, it is necessary to determine how to evaluate and cope with differences in the choice of contents to be added between creators.

#### ② “Activities” and “participation”

With respect to “activities” and “participation” used in combination in the checklist, the class teacher indicated a difficulty in their differentiation in the figure. In concrete terms, according to “ICF: International Classification of Functioning, Disability, and Health ?Revised Version of International Classification of Impairments, Disabilities, and Handicaps-,” there are four cases of differentiation.<sup>6</sup> However, the class teacher indicated that it was still difficult to understand how to differentiate them.

#### ③ How to present easy-to-understand figures

Because family members, friends, dormitory coaches, and teachers are contained in a single frame within environmental factors, it is impossible to indicate their respective tasks by lines. In contrast, for the overall relationships, as the number of frames increases, the connecting lines become more complex, resulting in greater difficulty in looking at the entire picture. Therefore, it is difficult to show the details of the assignment of tasks in a one-page format. Accordingly, the class teacher indicated that it may be appropriate to make detailed figures by selecting necessary items when requested in addition to the overall picture.

### 4) Discussion between class teacher and other professions

The outcomes obtained and issues to be resolved based on the comments by the class teacher after the discussion using the checklist and model figure are summarized below.

#### ① Clarification of roles

As a result of the discussion, the class teacher’s recognition regarding the roles of the dormitory coaches became clear. In concrete terms, the class teacher could clearly recognize that items such as body-weight management under “health condition” and involvement in eating and human relations under “activity” are significant tasks of the dormitory coaches.

#### ② Promotion of efficiency in discussion

In the discussion, each role could be confirmed within a short time of approximately 10 minutes. As a reason for this, the class teacher indicated that information could

be visually understood easily from the model figure used. Because it is usually not easy to secure sufficient time for discussion, the above finding reveals that the model figure is effective in promoting efficient discussion.

#### ③ Effects of sharing tasks

The class teacher indicated the following: in the discussion with the dormitory staff members, by asking the staff members to write down their responsibilities directly on the model figure, mutual understanding of respective roles was facilitated; in addition, in the discussion with PTs, by asking PTs to write down items that are their areas of specialty, such as body functions and body structures, directly on the model figure, the actual condition and task consciousness from the viewpoint of PTs became more easily understandable. In contrast, documents with too much detail appeared to be difficult for other members to correct or add information.

### (3) Overall evaluation of current case

A series of attempts at utilizing ICF has led to smooth promotion of discussion with dormitory coaches inside the school, showing the efficacy of ICF as a collaboration tool. In addition, the possibility of applying ICF to collaboration among various professionals outside the school in the individualized educational support plan as well as to individualized teaching plans inside the school has been simultaneously suggested. By connecting these plans, the development of more effective guidance is also expected.

## 2. A case of at-home education with close contact between family members and various professionals on a routine basis

In cases of at-home education, class teachers are frequently in contact with family members and various related professionals; accordingly, tasks cannot be achieved smoothly without their collaboration. I investigated the relationship between the class teacher and two occupational therapists belonging to different organizations (hereafter, abbreviated as OTs; one OT belongs to a hospital, and the other OT visits the home for at-home rehabilitation).

### (1) Outline of case

Girl B is in the 3rd grade of elementary department at special school. Because of lissencephaly, she has physical disabilities accompanied with mental retardation. She requires assistance in maintaining a sitting position and in moving around. She loves to be around people and is able to understand simple spoken messages. Because her home is located far from the special school, she is judged as unable to commute because of her low physical strength. Thus, she belongs to the at-home class of the special school. Lessons are carried out twice a week at her home, and she also attends school several times a year. She is involved

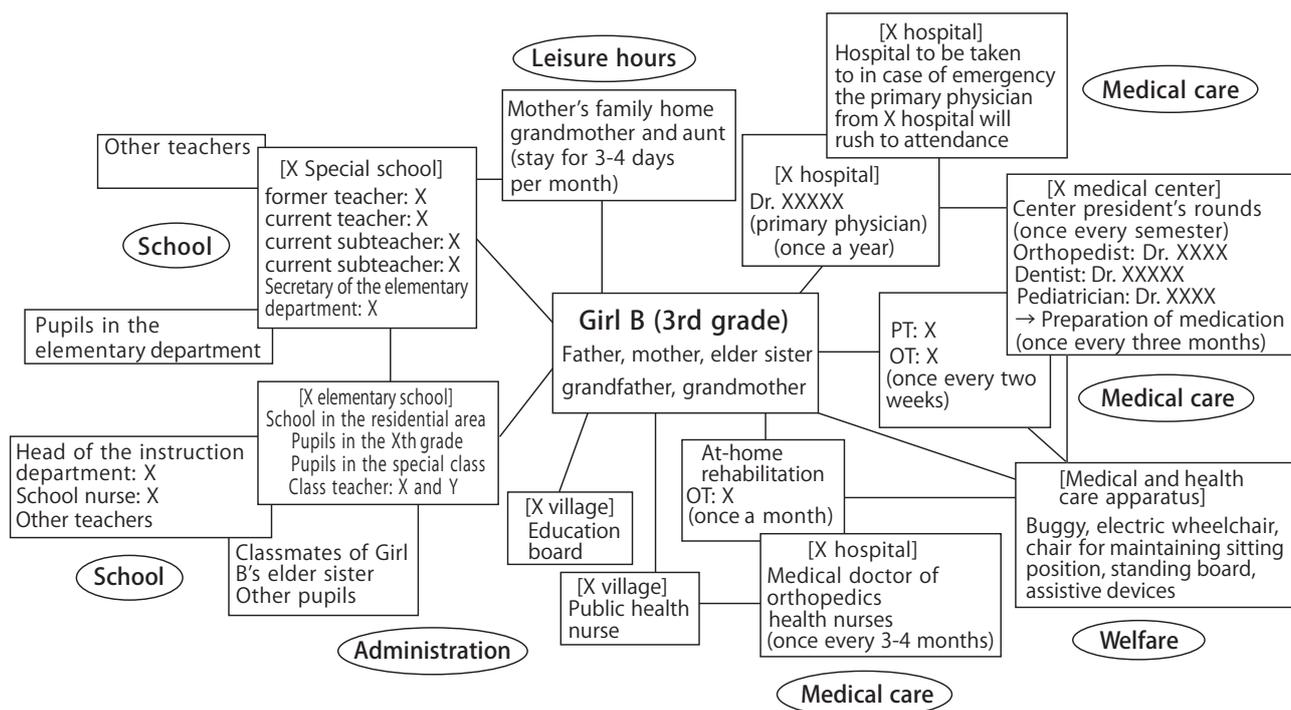


FIGURE 4 Life map for Girl B

with a number of professionals on a routine basis through hospital visits, at-home rehabilitation, and visits with public health nurses at the town office.

(2) Actual tasks

1) Evaluation using checklist

The class teacher performed the evaluation. Because there were some unclear points regarding physical issues, the class teacher asked OTs about these issues and made additions.

2) Preparation of life map

The life map of Girl B prepared by the class teacher is shown in Fig. 4. Because the teacher routinely visits her home, we can see that the teacher is well acquainted with her life. The class teacher realized anew that Girl B interacts with various people, but at the same time felt that further promotion of collaboration was necessary.

On the other hand, Girl B regularly goes to a certain hospital located several tens of kilometers from her home, to which a one-day round trip is impossible; however, the physical distance and the sense of mental burden to Girl B as well as to her family members cannot be expressed on the map. To relate the life map to actual guidance, the status of daily life should be represented realistically in detail; this is a future issue to be resolved.

3) Preparation of model figure

The class teacher prepared a model figure by selecting items which he/she felt to be important for the promotion of

educational activities on the basis of the evaluation scores in the checklist as well as points relating to Girl B written in the remarks space in the evaluation stage (Fig. 5). As concrete contents, the class teacher adopted those related to his/her hope that Girl B will develop greater communication skill because she is receiving at-home education.

This may suggest that the individualized teaching plan, which had already been produced with emphasis put on teaching to improve communication, affects the selection of the items in the model figure.

Symbols in Fig. 5 have the following meanings.

- Arrows connecting constitutive elements represent respective correlations.
- The arrows (e.g., ↑, ↓) inside each item have the same meanings as in case A (Fig. 3).
- While the above rule is essentially applied, these arrows also represent the class teacher's hope that "actual performance would change if more support by people or equipment could be provided." The details of this wish were communicated to related persons during the discussions.
- Because environmental factors are related to many items, it was judged that connecting them all would make the figure too complex; therefore, they were not directly connected. "Environmental factors" are recognized to be the foundation of the life of Girl B according to the class teacher.

The class teacher feels that there is a problem when considering the actual guidance for Girl B given that the connections among the related professionals are not

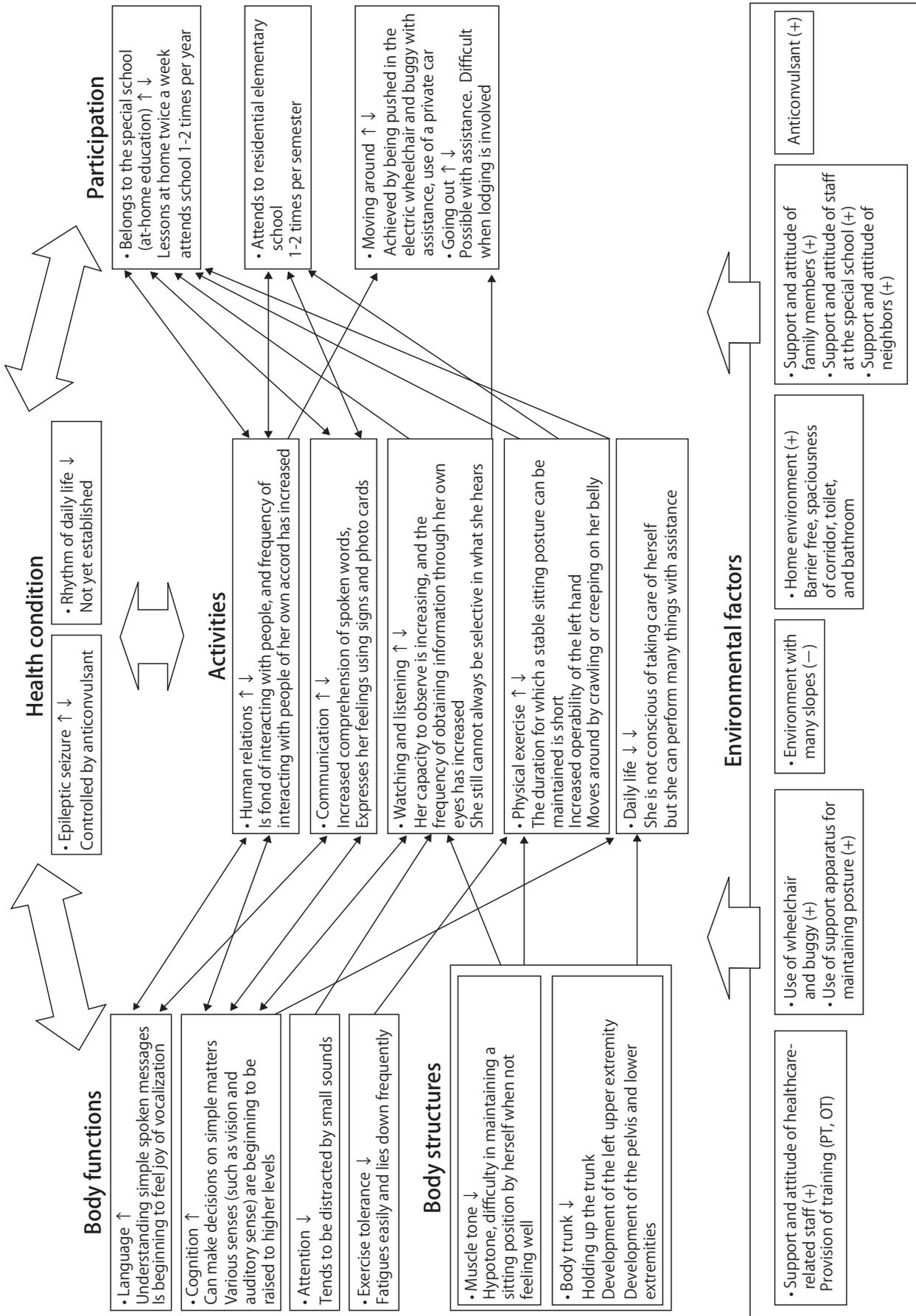


FIGURE 5 Model figure for Girl B

expressed in the model figure. Both the OT from the hospital (hereafter abbreviated as hospital OT) and the OT who visits Girl B's home for at-home rehabilitation (hereafter abbreviated as visiting OT) indicated a difficulty in expressing the actual condition of the child in a single model figure, as well as a concern about the difficulty of understanding a figure containing too much description. In concrete terms, their comments are as follows.

The hospital OT pointed out the relationship among items under "body functions" and "body structures;" however, if all related items are connected by arrows, the figure will become too complex and will be difficult to understand. In addition, the hospital OT indicated a limitation in the expression using  $\uparrow\downarrow$  arrows inside the items and also that "things that Girl B cannot do or cannot do well" and "things that Girl B can do or do well" were haphazard in the model figure, causing confusion. Consequently, the hospital OT pointed out the necessity of a technique of identifying tasks from the former weak points. In contrast, the class teacher expressed a desire to more highly value the things that Girl B was good at in order to develop her educational activity.

Meanwhile, only the visiting OT indicated the merit of representing a rough overall picture of Girl B in a single figure such that the overall picture of Girl B could be confirmed and the division of roles of the related professionals could be considered. The visiting OT said that the figure provided a better understanding of his/her responsibilities within the overall picture and of matters in which he/she should collaborate more with people in other fields. He/she also indicated that to compensate for issues that were not expressed in the figure, it may be desirable for each individual to consider measures for the clarification of the actual conditions and tasks in greater detail.

#### 4) Discussion between class teacher and other professions

The class teacher prepared the model figure (Fig. 5) on the basis of the evaluation using the checklist and held separate discussions with the two OTs, referring to the model figure. The results obtained are summarized below.

##### ① Effects of the model figure

Both OTs expressed fundamental understanding of the technique of collaboration through discussion using the model figure; in particular, the visiting OT positively evaluated the ease of initiating collaboration between different fields using the model figure. Since the visiting OT actually performs occupational therapy at Girl B's home, he/she seemed to realize the importance of environmental factors. He/she also made in-depth comments on the use of the model figure, beyond the class teacher's expectations, so that the class teacher had a very good opportunity to

assess his/her own position within the overall picture.

##### ② Division of roles

The class teacher asked the OTs to fill out the parts where they were involved, and confirmed that the roles of both OTs partly overlapped with the contents of teaching by the class teacher. How to evaluate and deal with these overlapped parts are future issues to be resolved, but gaining an awareness of such parts is the outcome of this study. As a future direction concerning the overlapped parts of guidance given by various professionals, those involved agreed that they would exchange information while continuing their own involvement with Girl B, and they recommended that, in the future, each health-related professional should continue to handle his/her specialization.

##### (3) Evaluation of overall current case

In the case of at-home education where a staff member has many opportunities to meet family members and other professionals, issues such as how and what kinds of professionals are associated with Girl B were confirmed, and discussion among various professionals was realized. As a result, a mutual understanding of each role was established. Thus, the applicability of ICF as a tool for collaboration was again indicated by this case.

### 3. A case of high school department where consideration is given to transition into life after graduation

In a high school department, it is important to instruct students while considering their plans after graduation. To cultivate the skills required for life after graduation, we investigated the collaboration with staff members of facilities that students are expected to frequent after graduation, as well as collaboration with many teachers of different subjects in the high school department.

#### (1) Outline of case

Boy C is a student in the high-school department of the special school. He has been diagnosed as intellectual disabilities. He is able to have daily conversations without any problems, although slowly, and he can associate with friends. Similar to Boy A, Boy C lives in a dormitory 5 days a week. His parents wish him to have a natural and varied life in the local area, so they often take him horseback riding and swimming on holidays.

#### (2) Actual tasks

##### 1) Evaluation using checklist

The class teacher indicated the following as merits of the checklist. With the KJ method that is one of method to classify some information, which is frequently used in the preparation of individualized teaching plans, problems

are clarified by the subjective judgment of the teacher who prepares the plan. In contrast, with the checklist, a wide range of issues concerning overall life are listed and prefixed; therefore, a more objective and systematic arrangement is possible. In the case of Boy C, the use of this checklist evaluation revealed the importance of the existence of individuals as “environmental factors,” which had not been apparent before, according to the class teacher. In addition, the class teacher indicated that the recognition of many unknown issues (which can be identified by asking) and those which are difficult to understand (difficult to interpret) is significant in itself. It is also considered that contact with various professionals is generated from the feeling of “wanting to ask about issues because they are not known well.”

Meanwhile, the following problems with the checklist that must be solved to enable its practical application were indicated.

- Evaluation criteria are not always clear, and therefore, when many individuals perform an evaluation, they may be confused.
- When the evaluation items in the second level alone are used, the range involved in this level may be too broad to enable appropriate evaluation. There are some items that should be evaluated on the third level; however, whether a mixture of items evaluated at different levels can be allowed is a difficult problem.
- For some items, “it is difficult to understand what is being asked.”
- There are items that are considered to be important but which are not listed in the checklist. For example, “e130: Products and technology for education” is an essential item in the school.

To cope with points such as these, it is necessary to examine the creation of a manual regarding the use of checklist. Considering that the checklist is to be used in actual situations, the manual should have a certain degree of flexibility.

## 2) Preparation of life map

In the individualized teaching plans of the school

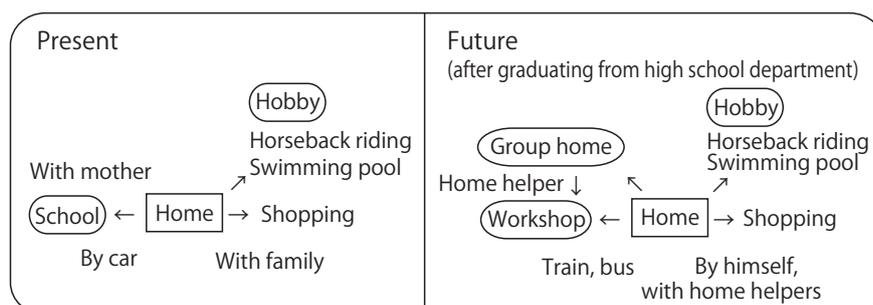


FIGURE 6 Life map for Boy C

where Boy C was involved, the life map has already been prepared. Figure 6 shows an extract from the life map in the teaching plan. Unlike the other cases, detailed descriptions of individuals and professionals are not given in the map; however, the figure characteristically depicts Boy C’s current life and his life after graduation, which is considered to be useful for guidance related to his future.

## 3) Preparation of model figure

To create a model figure that is easier to understand, the class teacher modified some usage of terms; instead of using 2nd-level terms listed in the official Japanese translation of the checklist (each item of the checklist), the teacher used expressions adopted in daily life which were easier to understand and put them in brackets [ ] for each item. In addition, specific conditions of Boy C were marked by the symbol ◇ and listed below the parenthetical terms (Fig. 7).

Here, The following points are listed as other characteristics of Fig. 7.

- The arrows inside the boxes indicate the connection to more detailed lower-level items; below such arrows, details of the contents on the 3<sup>rd</sup> or lower levels are described.
- The thickness of the large arrows that connect each boxed item represents the strength of the relationship between the items.
- Environmental factors are considered to support the overall life of Boy C; accordingly, they are not directly connected with other items.
- “Sucking” and “nail biting,” which were judged by the class teacher as important although they are not listed in the checklist, are described under “Health condition” after uncertainty on where to place them.
- In addition to representing the current condition, contents based on the assumption of the status after graduation are described under “Participation.”

The class teacher gave the following explanation regarding the aims of preparing this model figure.

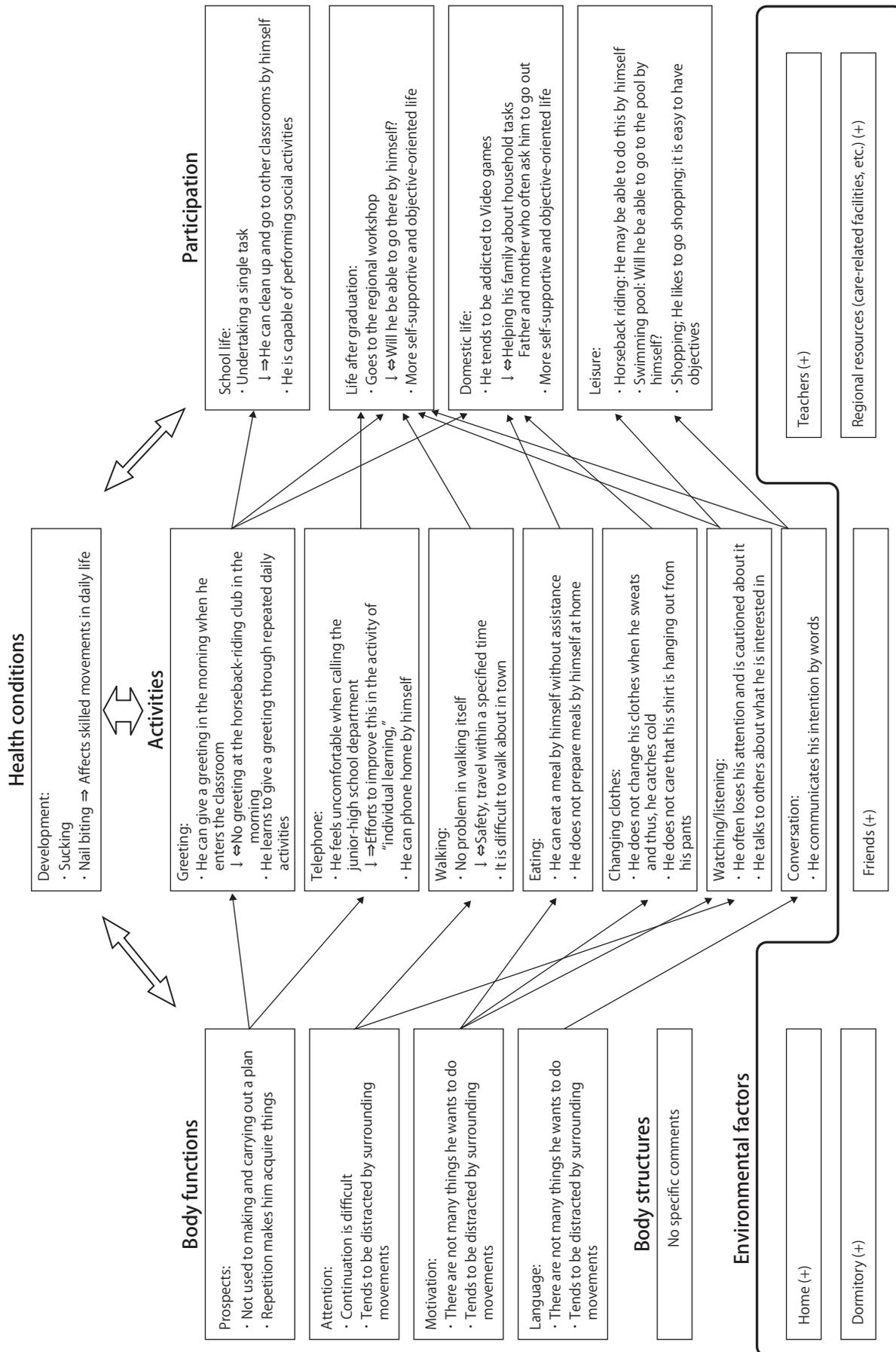


FIGURE 7 Model figure for Boy C

"I consider that the model figure is a collaboration tool; therefore, it is important that the figure be easy to read and understand visually. It was difficult to decide whether to make a single figure or multiple figures for different situations, but I decided to make a single one. This is because, for collaboration among various professionals, the important thing is that by looking at the model figure, the actual conditions and problems in the overall life of the boy can be elucidated, so that we are able to know how the child's overall life is, and where we will be able to play a role. Therefore, I consider it better not to initially draw arrows connecting environmental factors; rather, the arrows should be inserted after discussion with related organizations. In this way, important issues that should not be omitted in the education of Boy C become clear."

With regard to the outcome of creating the model figure, the class teacher reported author the following.

"First, by preparing the model figure, skills that are considered to be connected to the social life (social participation) were clarified. Boy C has no physical-structural problems related to walking, but he is not allowed to walk about by himself in town because he is often distracted by things he sees (problem in maintaining his attention), or because he does not have a strong will to arrive at the destination within a certain time (motivation). After his graduation, he intends to enter the regional workshop; however, if this situation does not change, he needs to be accompanied by a parent to and from the workshop. As a result of creating the model figure, this problem has been structurally represented.

Next, I had a discussion with teachers using the ICF model, and we were able to provide special 3-hour learning sessions for Boy C. As a result, by repetition, he became able to walk to the bus stop, take a bus into town for shopping, and then return to school. To go to the workshop, Boy C is expected to take a train and a bus; he may progress to being able to take a train. In this activity, the task to be achieved by Boy C was obvious and the steps to be taken were apparent; therefore, cooperation among staff members was easily obtained."

Furthermore, the class teacher indicated that there are two styles in the preparation of a model figure. One is that subjects in education became clear during the preparation of the model figure. The other is that the model figure is created on the basis of clear intentions. The class teacher explained that he/she created the model figure from the viewpoint of its use in the individualized teaching plan and indicated the importance of the viewpoint in selecting items from the checklist for the preparation of the model figure. That is, the class teacher selected the latter style.

As the reason behind his/her selection, he/she indicated the following: this research was initiated in the middle of the fiscal year, thus it was conducted during the practical

execution of the individualized teaching plan in which the educational issues were clear; accordingly, this research was clearly affected by being carried out under such circumstances.

While the class teacher indicated a difficulty in distinguishing between "participation" and "activity," he/she also indicated that classification became easy if issues were viewed from the "participation" point of the student. The viewpoint in which importance is placed on "participation" is essential specifically in high school department, where the students are to enter society in the near future.

#### 4) Discussion between class teacher and other professions

##### ① Discussion within high school department

In a high school department and junior high school department, teachers of guidance often differ from the homeroom teacher. Accordingly, the class teacher is often unable to monitor the students during learning activities, or a teacher of guidance is not able to sufficiently understand the attitudes of the students during other learning activities. To compensate for this situation, this class teacher held a discussion with other teachers while referring to the ICF model figure (Fig. 7) and attempted to examine teaching policies and other issues.

Such collaboration between teachers has conventionally been carried out on the basis of an individualized teaching plan. However, because the high school department of this school has a large population of over 60 students, it was necessary to investigate effective means of collaboration within a limited time. Through the use of the model figure, in which tasks in individualized teaching plans were plainly structured, it became easier during discussion to focus on teaching goals, and to predict the educational setting that should be prepared for the student and his/her future image after completing the educational activities.

##### ② Discussion with staff members of the workshop where Boy C expects to work after graduation

The model figure using ICF was favorably evaluated by the staff of the workshop as being easy to read compared with the conventional individualized teaching plan that comprises predominantly a textual description, and "it is easy to understand what kinds of activities are required in accordance with the actual conditions;" therefore, the discussion of activities aimed at supporting daily life after graduation could be effectively carried out. Within the background of criticism from outside the school that the activities being performed in the school are not clear, it is highly significant that, by presenting the model figure, the evaluation that "we now can understand matters on which

importance was placed in school” was obtained.

### (3) Evaluation of overall current case

The use of the ICF model figure resulted in the smooth exchange of opinions among staff members inside the school as well as with various professionals outside the school. In addition, in the discussion with the parents, the usefulness of ICF as a collaboration tool has also been indicated by, for example, the favorable evaluation regarding the presentation of the cause-and-effect relationship by extracting core sections from individualized teaching plans.

## 4. A case in which differences in understanding among various professionals were exposed

When opinions and policies among various professionals involved with a child differ, the child becomes confused and the goals of each professional are difficult to achieve; therefore, collaboration, including coordination among the professionals, is important. On this basis, collaborations mainly between the class teacher and the mother and between the class teacher and the PT are investigated in this case.

### (1) Outline of case

Boy D is in the 1st grade of elementary school department. He was diagnosed as having hypoplasia of the callosal body and West syndrome, as well as severe mental retardation and physical disability. However, when he is greeted or called by name, he sometimes responds through facial expression and gestures. His mother takes him to school by car. In addition, he has been continuously going to multiple medical facilities since before he entered special school.

### (2) Actual tasks

#### 1) Evaluation using checklist

After the evaluation, the class teacher asked Boy D's mother mainly about life-related matters that were difficult to clarify. As a result of the involvement of the mother, the class teacher indicated the following outcome. First, although there were some points which were difficult to understand in the evaluation criteria and contents of the questions, a common understanding with the mother was deepened during the explanation of such evaluation criteria to her. Second, the class teacher was able to obtain not only the requested information, i.e., issues about Boy D that were recognized as being unknown, but also a great amount of completely new information during the conversation with the mother.

Among the checklist items considered to be the field of PTs, the class teacher evaluated “b7: Neuromusculoskeletal

and movement-related functions” under “Body functions” and “s1: Structure of nervous system” and “s7: Structure related to movement” under “Body structures” and then asked the PT to confirm the evaluation; as a result, the following was indicated. First, the evaluation criteria are difficult to follow; further lower-level evaluations are required for more precise judgment, which requires in-depth reading of the “ICF: International Classification of Functioning, Disability and Health ?Revised Version of International Classification of Impairments, Disabilities and Handicaps-.” Second, differences in evaluation scores may be reduced by having multiple evaluators perform the evaluation. In particular, items with large differences in evaluation scores are considered to have ambiguous evaluation criteria; accordingly, the necessity of reexamining the items themselves was indicated. Third, there are items that are insufficient to describe the stages of infants and early development.

Through the above activities, the following unexpected outcome was obtained as a result of differences in the viewpoints of evaluators. Namely, when there are differences in evaluation scores, we tend to see the negative aspect of the presence of errors; however, in this case, the differences in understanding by each professional and in the attitude of the child in different situations were mutually recognized by the various professionals, as evidenced by the differences in evaluation scores.

#### 2) Preparation of life map

Figure 8 shows the life map for Boy D prepared by the class teacher. Boy D has been continuously involved with multiple medical facilities since before he entered special school; the strength of the connection is indicated by the kind of line connecting the items. Similar to the case of Boy B, Boy D as well as all of his family members are shown in the center of the figure. Strictly speaking, this representation should be re-arranged in terms of whether this means support only for Boy D or support for the entire family.

#### 3) Preparation of model figure

After the evaluation using the checklist, the class teacher prepared the model figure shown in Fig. 9 and held discussions; then, using the results of the discussion, the class teacher attempted to modify the model figure so that it could be used more easily.

The following are the characteristics of the original figure in Fig. 9.

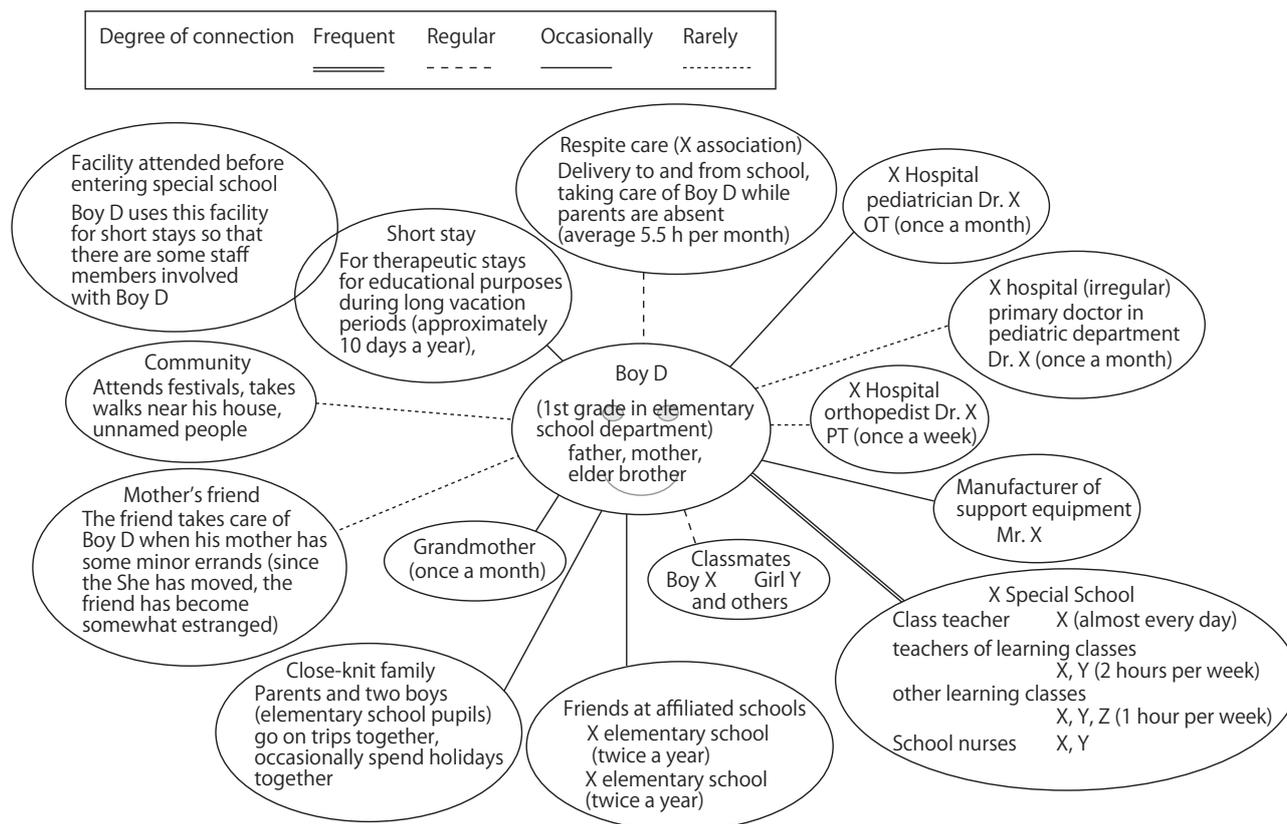


FIGURE 8 Life map for Boy D

- The arrows (↑↓) in the box for each item of the constitutive elements show the capacity and actual performance in this order from the left; the upward arrow ↑ indicates those considered to be positive items for Boy D, and the downward arrow ↓ indicates those considered to be negative items for Boy D.
- In the boxes, specific forms and conditions are also described.
- Lines connecting each of the constitutive elements show the respective relationships.

After the discussion using the original model figure, the class teacher indicated the following.

- Because each item is described briefly in the figure, it is more easily understood than text references, and the overall relationship could be easily explained by following the flow of the figure.
- The figure was created as a tool for discussion; however, understanding the figure may be difficult when the understanding of ICF itself is lacking.
- There are terms such as “undertaking tasks” and “nonverbal messages” whose meanings are difficult to understand; improvement is required.
- Because the individualized teaching plan had already been made, contents that were considered necessary for Boy D were selected from the teaching plan and made into the figure. If an individualized teaching plan had not been

available at the time immediately after entering the school, creating a model figure might have been more difficult.

Points indicated by the mother and the PT regarding the actual conditions of Boy D were then corrected, and lines expressing the relationships between items were changed. Item names were expressed such that they could be easily understood. The modified model figure is shown in Fig. 10. Such modifications were not made for other cases; the modified model figure was a result of seeking ease of understanding and ease of use.

#### 4) Discussion among class teacher, family member and other professions

##### ① Difference in opinion

During the discussion with the mother, the following difference in opinion was clarified. Namely, the class teacher considered the medical care with “differences in policies among health-related professionals” as “barriers.” While the mother agreed with this, she also wished to consider favorably that the same primary physician and the same rehabilitation staff were continuously in attendance and to categorize this state under “facilitators.” From this, the following necessity has been clarified: namely, we should recognize that the total evaluation score for the entire area of medical care should not be set at ±0, but that

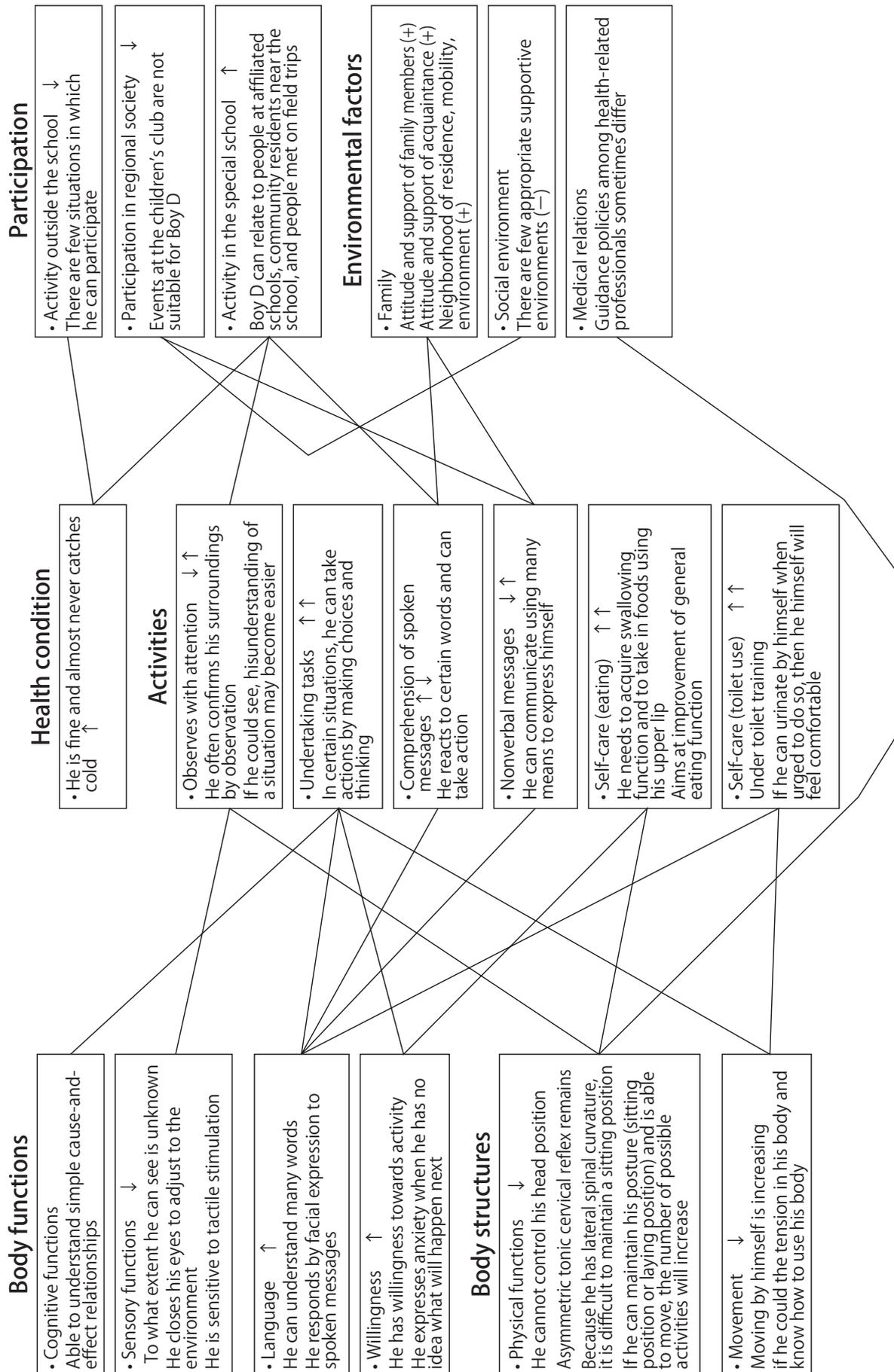


FIGURE 9 Model figure No. 1 for Boy D

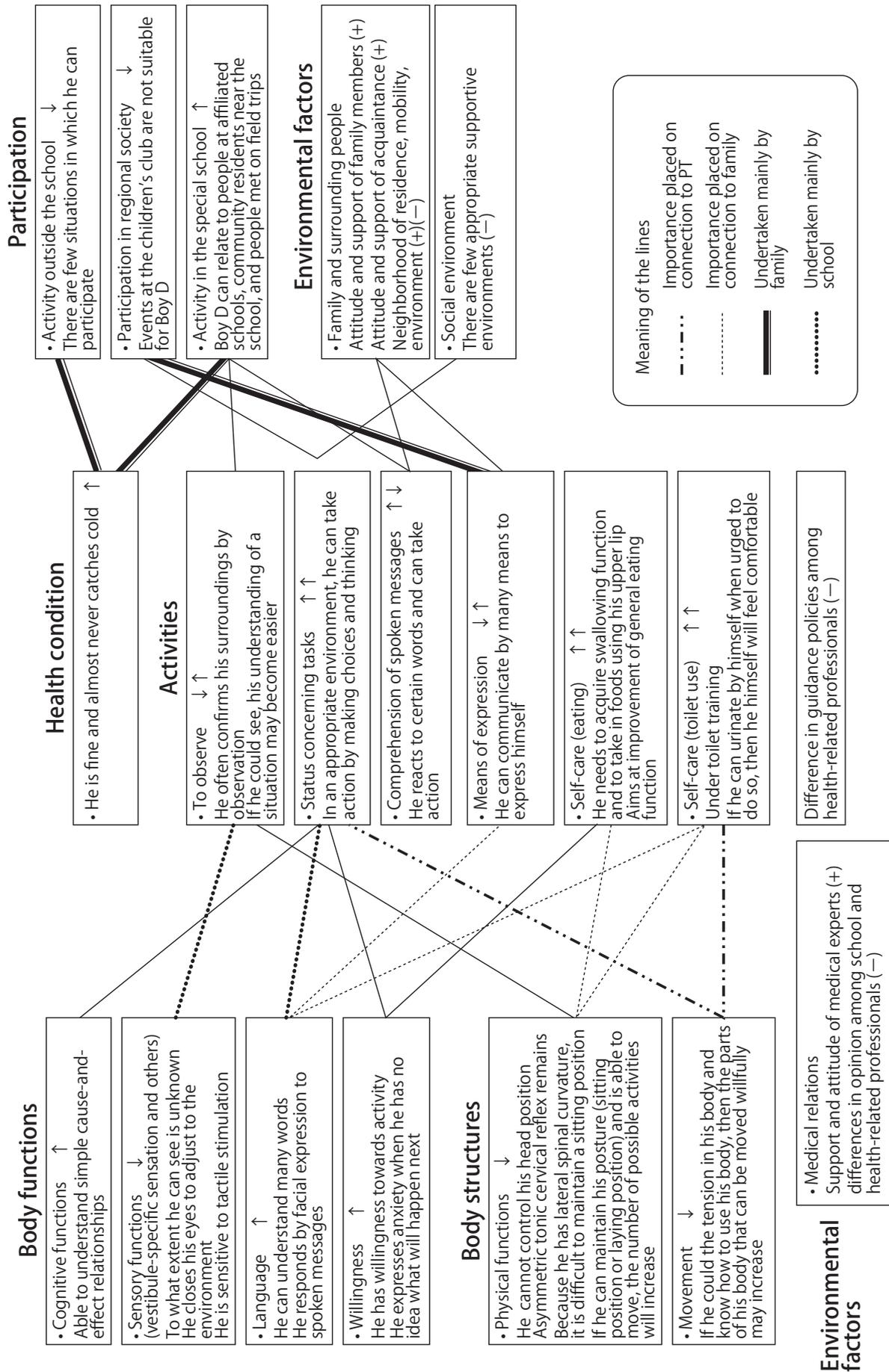


FIGURE 10 Model figure No. 2 for Boy D

“barriers” and “facilitators” are found in combination in the same medical-care area. Furthermore, when a difference in policy is made apparent, there is no place to seek advice, which is considered a “barrier.” This is an important viewpoint and an issue to be examined in the future.

Meanwhile, a difference in the opinion with the PT was also clarified during the discussion. As a concrete example, for the item “Observes with attention,” opinions of the PT and the class teacher are presented below.

PT:

“I consider that it may be difficult for Boy D to observe with attention. Even if he does observe, considering his actual condition, he is probably at the stage of understanding not the meaning of what he sees, but only that there is an object.”

Class teacher:

“I think that Boy D understands an object visually under certain limited conditions. We can see that Boy D moves his eyes to watch the object being presented, and that he confirms the object visually.”

A difference in opinion does not necessarily mean misunderstanding by either party. Similar to adults, children are considered to differ in their facial expressions and actions depending on location, partner, and time. The recognition of such differences by each professional may lead to deeper mutual understanding, which is considered to be linked to more extended teaching and therapy beyond the temporal treatment.

## ② Division of roles

On the basis of the model figure, the overall picture of Boy D was confirmed and roles undertaken by each professional were discussed; the PT also proposed the issue of the roles of rehabilitation, school, and home. I can say that the outcome of the study is that we could share the viewpoint of various professionals undertaking their respective roles.

## (3) Evaluation of overall current case

The point to be noted in this case is the differences in the viewpoints between evaluators. When there is a difference in evaluation scores, we tend to consider the error as a negative aspect. However, here the error leads to a common understanding regarding the differences in the opinions and in the child’s condition depending on the situation.

I also paid attention to differences in the understanding of ICF itself. The current study focuses on the characteristics of ICF as a common language. However, ICF is not everybody’s common language. Health-related professionals in medical care and health and welfare, for

example, have many opportunities to become familiar with ICF or its former International Classification of Impairments, Disabilities, and Handicaps (ICIDH) during their training or in their actual workplaces; accordingly, it is easy for them to gain a common understanding by using ICF. However, the parents’ standpoint is not necessarily the same. Therefore, in actuality, a simple reference that facilitates the understanding of ICF is required. Similar points are indicated in cases A and B as well.

## 5. A case of a facility-affiliated school where collaboration is carried out well on a routine basis

In some special schools affiliated with medical and welfare facilities, communication between the facility and the school is well maintained; however, there are cases in which activities are not mutually known by the facility and the school. In this case, communication among staff members is carried out routinely. I investigated the method of collaboration in this case.

### (1) Outline of case

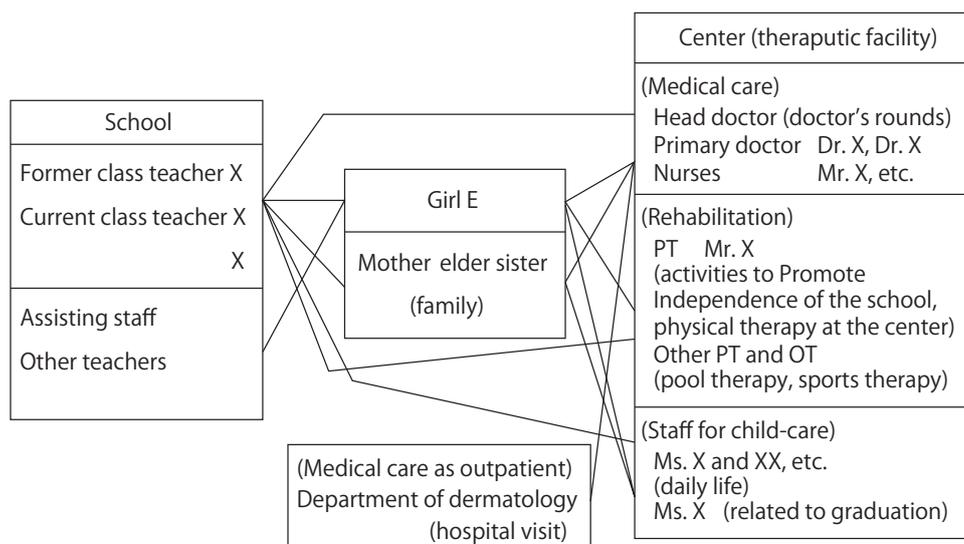
Girl E is in the 6<sup>th</sup> grade in special school. She is physically handicapped and has mental retardation due to cerebral palsy, but she can move around by herself in a wheelchair and communicate in everyday conversation. She stayed in a facility for children with physical/motor disabilities and attends the affiliated special school. She returns home only several times a year, so that the facility and the school are her major place of living. Because the school and the facility in this case were established by the same founder, communication among staff members is frequent; for example, activities to promote independence performed jointly by the facility and the school are included in the curriculum of the school.

### (2) Actual tasks

#### 1) Evaluation using checklist

First, the class teacher performed the evaluation, then the class teacher asked another teacher who was also in charge of Girl E regarding points that were difficult to understand concerning Girl E as well as points to be confirmed, and then finalized the evaluation. The class teacher indicated that this process led to a deepening of mutual understanding. As a result of this evaluation, the class teacher indicated the following.

First, the teacher noted evaluation scores and their later application. In the current evaluation method, items presenting almost no problem or items that are favorites of the child are expressed by the score of 0 (excluding “Environmental factors”). Accordingly, positive aspects of the case are not apparent. Considering the actual subsequent teaching program, contents focusing only on



**FIGURE 11** Life map for Girl E

negative aspects can hardly be said to be good ones. Items which can be made use of as hints in actual teaching are not only the scores, but also information such as that described in concrete terms in the notes, for example, “what kind of difficulties actually exist?” and “in what situation can the child perform the activity?”.

The second point is related to a blind spot hidden behind the fact that a wide variety of items are included. While evaluation using a checklist enables the clarification of a broad view of aspects which had not been previously noted, we should not forget that we are not able to understand everything about the child from these items. In earlier studies concerning the use of ICF, specific difficulties and the wishes of guardians were elucidated for the first time through communication with the guardians and the use of information from other organizations.<sup>9</sup>

**2) Preparation of life map**

Figure 11 shows a life map for Girl E prepared by the class teacher. In this case, as individuals involved with Girl E, mainly staff members of the school and the facility to which she belongs are presented. Because she returns home infrequently, there is no description of her home neighborhood.

**3) Preparation of model figure**

Figure 12 shows the model figure prepared by the class teacher on the basis of the evaluation using the checklist. Compared with the figures in the other cases, this figure is characterized by the connection between each environmental factor and related items, as indicated by the lines.

With respect to the symbols used in Fig. 12, those which differ from other model figures are listed below.

- The arrows (↑↓) in each box indicate that the actual performance is higher than the capability of Girl E.
- The correlation between “environmental factors” and other items is expressed by the arrow →.

The class teacher indicated a difficulty in selecting from the evaluation items in the checklist when preparing the figure. If the number of selected items is too small, many items will be omitted; however, if the number is too large, it will become difficult to read the figure. Similarly, if all the necessary constitutive elements are connected by arrows, the figure will again become too difficult to see. A reduction in the number of items and modification of the type of lines is required to secure ease of reading of the figure. The class teacher suggested making two types of figure: a figure showing the entire picture, and a figure focusing on certain items; he/she also proposed the use of different lengths of the arrows (↑↓) in each item to express the evaluation scores.

**4) Discussion between class teacher and other professions**

Discussion of this case was conducted with the PT who was in charge of training at the facility, the staff member in charge of daily life, and the nurse in charge of medical care. The discussion using the model figure of ICF (Fig. 12) was held in August. In Girl E’s school, staff members involved with the children meet at the beginning of each fiscal year, and they communicate routinely; accordingly, the discussion in August was held with the aim of determining the changes in the actual condition of Girl E after the initial staff meeting and reconfirming the respective roles of the staff members. As a result, the aim was achieved and the

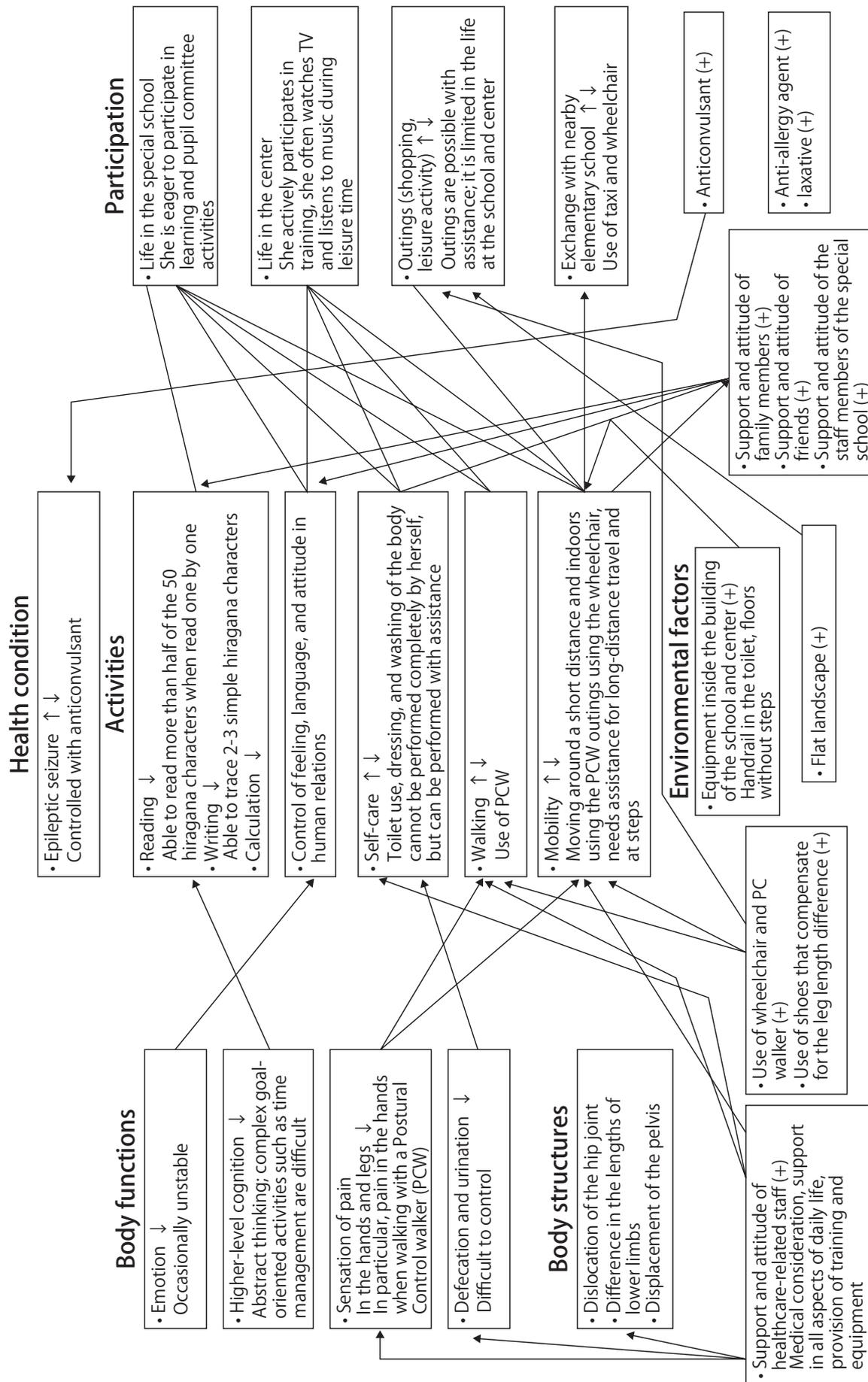


FIGURE 12 Model figure for Girl E

discussion was conducted more effectively, according to the class teacher. The figure was considered to be effective not only in the midyear meeting described, but also in the staff meeting at the beginning of the fiscal year.

### (3) Evaluation of overall current case

As in this case, even when good communication among various professionals is carried out routinely, the series of attempts using ICF had the effect of reconfirming the overall situation of the child and deepening the mutual understanding about their respective roles. To lead cases such as this one in a better direction, in which discussion for collaboration has already been carried out, we must investigate in detail the objectives ICF can achieve in concrete terms in the future. In addition, some of the staff members of the facility became interested in ICF itself through the current discussion. This suggests the possibility of ICF creating new forms of collaboration not only based on proposals from schools, but also based on the school staff working together.

## IV. Comprehensive Discussion

In this section, the results of investigating the five cases and the findings obtained through discussions with research collaborators are combined and organized, and the possibility of and issues in the practical application of ICF as a tool for collaboration among various professionals are considered in relation to individualized educational support plans. In addition, I will state my opinion regarding what collaboration among various professionals is and what it should be.

### 1. Towards practical application

#### (1) ICF checklist

In this study, the “ICF CHECKLIST version 2.1a Clinician Form” was translated with reference to its official Japanese translation, and on the basis of this checklist, class teachers evaluated each case. Through the process of such evaluations, the efficacy of and problems in the ICF checklist as a tool for collaboration among various professionals were clarified.

#### 1) Viewpoint of covering entire daily life

In all instances of cases, positive comments that the items listed in the checklist cover broad regions of the overall daily life were submitted. Among the comments, a frequently noted characteristic was that, compared with the issue-relationship figure of the KJ method, which is frequently used during the preparation of individualized teaching plans and in which the subjectivity of the creator of the figure is often dominant so that some aspects are not completely clarified, the overall daily life is covered by the current checklist.

Meanwhile, because the range of items was so broad, it was also clarified that in all cases, even the class teacher does not know about many of the items. In particular, it seems that many of the “environmental factors” such as “e5: Service, policy” were not known. With respect to these items, positive opinions were stated, such as “it was good to know that there were matters I did not know about,” and “to ask about what I do not know is important;” however, considering the application in actual schools, the possibility of generating the feeling of “being ashamed of not knowing” or “getting things done within what I know” cannot be denied.

The author should also note that knowing everything is not necessarily good. From the standpoint of the children themselves as well as their families, they do not necessarily want teachers and staff to know everything about the children, and data must be collected with special care from the viewpoint of protecting personal information. However, according to the reports of the current five cases, the class teachers indicated that they had a good chance to reconsider issues and tasks from the standpoint of a class teacher or the school through the processes of knowing the total situation of the children to some extent, with the consent of the guardians, while receiving additional information from various professionals; in this regard, the guardians did not express any negative opinions.

From these findings, knowing a broad range of the entire daily life through the use of the checklist is suggested to be effective in promoting collaboration among various professionals.

#### 2) Problems with items: Selection of items

The current ICF checklist has been prepared by selecting major second-level items from among the constitutive elements of ICF; accordingly, not all items of ICF are included, and naturally some are omitted. As an case from this study, in case A, the item “d415: Maintaining posture” was added to “Activity” in the checklist. The addition of items which originally are not in the checklist is allowed with reference to ICF itself when necessary. However, to do this, one is required to know the entirety of ICF, which may be difficult to accomplish with the current checklist alone. To solve this problem, investigation is currently under way in using the “ICF: International Classification of Functioning, Disability and Health ?Revised version of International Classification of Impairments, Disabilities and Handicaps-” as a complement, and using simpler methods including the use of electronic tool.

Meanwhile, the school teacher in case C indicated the necessity of “e130: Product and technology for education,”

and the school teacher in case D indicated the necessity of “b510: Ingestion function.” The lack of these items in ICF differs from the lack of “d415: Maintaining posture.” The former omission means that ICF itself does not sufficiently cover students in their childhood and early developmental stages. To cope with this, a study aiming at the creation of a children’s version of ICF is now under way,<sup>4</sup> and currently the author also is conducting an investigation in the direction of supporting such studies.

### 3) Problems with items: difficulty of evaluation

Here I describe the reasons behind the difficulty in conducting the evaluation in terms of two separate problems: a problem concerning evaluation criteria and a problem concerning the difficulty in evaluating collaboration partners.

One problem with the evaluation criteria is that there are difficult-to-understand terms for both the evaluators themselves and for collaborating partners, such as “d210: Undertaking a single task,” which was pointed out in cases D and E. In addition, in case C, for “Walking,” the following problem was indicated: while its definition presents no problem in the second level of ICF described in the checklist, at the third level, the range of definition is extended so that making a decision on the evaluation became difficult. Finally, an ambiguity in evaluation scores was indicated. For example, regarding the differences in the degree of difficulty of “Activity” and “Participation,” there are the descriptions “mild difficulty” and “moderate difficulty” corresponding to 5-24% and 25-49%, respectively. However, actual judgment is difficult and may depend on subjectivity of evaluators. This problem should be solved promptly to enable the practical application of ICF.

Meanwhile, concerning the difficulty in evaluating collaboration partners, the difficulty exists in numerically evaluating those involved in a case under “Environmental factors.” For example, in “e3: Support and relationship,” it is, in fact, very difficult to categorize the attitudes of collaborative partners and guardians as “barriers.” A research collaborator proposed that the evaluators should fill in the evaluation column not by themselves but together with research collaborators because collaboration is the aim.

### 4) Toward actual teaching

In this checklist, because a scale including negative meanings is used, the condition wherein no difficulties exist is evaluated as a score of 0; therefore, things the child is good at are not readily apparent. Accordingly, guidance to promote those things the child is good at is difficult, and

information related to such guidance is difficult to find. Therefore, in this study, space for notes was provided in the checklist, and we attempted to use the information in this space in actual guidance. Furthermore, in “Activity” and “Participation,” capacity evaluation is divided into the capacity with the support of people and equipment, and the capacity without support, so that differences compared with performance can be clarified and used as hints for guidance.

### (2) Preparation of life maps

In one of the five cases, a life map had already been used in the individualized teaching plan at the school. In the other four cases, similar figures were prepared in the study to confirm collaborating partners. As a result, the class teachers who prepared the figures, as well as collaborators who had discussions with the class teachers, indicated that it was useful to confirm their mutual presence. Meanwhile, because the life map figure basically only shows the names of the individuals and organizations involved, the actual relationships among them, including physical, temporal and psychological distances, cannot be presented.

Here I note the blind point of this map figures as a future issue. When this figure is used in collaboration, there is a risk that support to the child will tend to be considered only within the range of the figure. Essentially, the priority is not individuals and organizations, but that there are issues that require support. Without this recognition, new ideas such as “let’s find new individuals and organizations,” or “let’s exclude these individuals and organizations on the basis of judgments made concerning the issue” may not be generated.

### (3) Preparation of model figures

Because model figures were created with the aim of using them as materials for discussion, they were made to represent the entire situation of the child on the basis of the evaluation items in the checklist. Using the model figure, the actual conditions and issues could be visually understood quickly and future policies could be efficiently discussed; thus, the efficacy of the model figure as a collaboration tool was noted both by the class teachers who prepared them and by the partners who discussed them.

In contrast, all the class teachers who prepared the model figures indicated that it was difficult to determine the items to select from the checklist. The most frequently used viewpoint in such selection was based on the child’s issues noted in his/her individualized teaching plan that had already been prepared. In the future, when considering the practical incorporation of ICF into an individualized educational support plan, it will be necessary to reorganize the correlation between not only the model figure, but also

the series of tasks performed in the current study, and the current individualized teaching plan.

Many comments were also made concerning the presentation of the figures. The most frequently indicated comment was that the incorporation of a large amount of information in a single figure makes the figure difficult to understand, but a reduction of items results in the omission of information. In this regard, because the aim of the model figure in this study was to use it as a tool for discussion, the consensus that a rough, easy-to-understand presentation of the overall situation is sufficient was obtained. There was also the opinion that to compensate for the rough figure, multiple figures of specific situations and objectives could be prepared, such as “a model figure related to the guidance of activities to promote independence.”

In this study, I asked those who prepared the figures to use arrows and symbols as they deemed appropriate and to classify “Activity” and “Participation” as they saw fit; accordingly, various representations were made in each case. To date, although I have not yet obtained any unified representation on the whole, I intend to examine such unification in the future.

#### (4) In discussions

Through the use of model figures, efficient discussions were achieved with various professionals from outside the school and with staff members inside the school. The merit, as noted by one class teacher, may be a result of points such as “this child may have this kind of problem in this situation in daily life” becoming clear from the relationships between items and each professional. Thus, ideas regarding what each professional should target can be easily obtained.

Furthermore, it was also reported that, in addition to the presentation of materials made by the class teacher and asking questions about the actual condition of the child, by sharing tasks such as evaluation using the checklist and the preparation of the model figure during discussion, a more proactive attitude of the partners can be obtained, and the collaboration itself, in addition to the discussion, can be performed more smoothly. In contrast to this, the existence of differences in the understanding of ICF, which should function as a common language, was also indicated; to compensate for this, the document shown in Fig. 13 was made for case A to promote understanding among the collaborators, and it led to smooth discussion, according to the report.

As an issue to be resolved, the scheduling of discussions was noted. In the five cases in this study, each of the class teachers arranged a discussion by his/her effort,

such as visiting the collaborative partners during summer holidays. In the case E, the discussion with the staff of the affiliated facility, which was physically close to the school, was included in the annual plan. In contrast, because of the managerial problem that discussion alone does not warrant any medical or technical service payment, participation by PTs and OTs was difficult. Considering practical applications in the future, systematically ensuring discussion will be a key issue. Furthermore, in the case of residence in a remote area or of a child going to distant facilities, it will be difficult to meet the individuals involved directly. Ways of holding meetings in such cases, or the adoption of other methods, such as the Internet, should be investigated as well.

#### (5) Relationship with individualized educational support plan

To practically apply collaboration with various professionals in the school, I consider that use of the ICF checklist together with an individualized educational support plan is necessary. In this study, in the five cases, various professionals attempted the following tasks: gain a common understanding of the actual condition of the child, and confirm their roles in the future from their respective standpoints. However, how to carry out the actual tasks after understanding and confirmation were achieved was not considered. Therefore, the author proposed that they present their roles and policies in writing as a “support team sheet,” as recommended by Ishikuma and Tamura,<sup>1</sup> and then evaluate them later. However, the class teacher in case E and the OTs in case B indicated that such things were not necessary as a team, and that occasional examinations of the respective plans and evaluations might be sufficient.

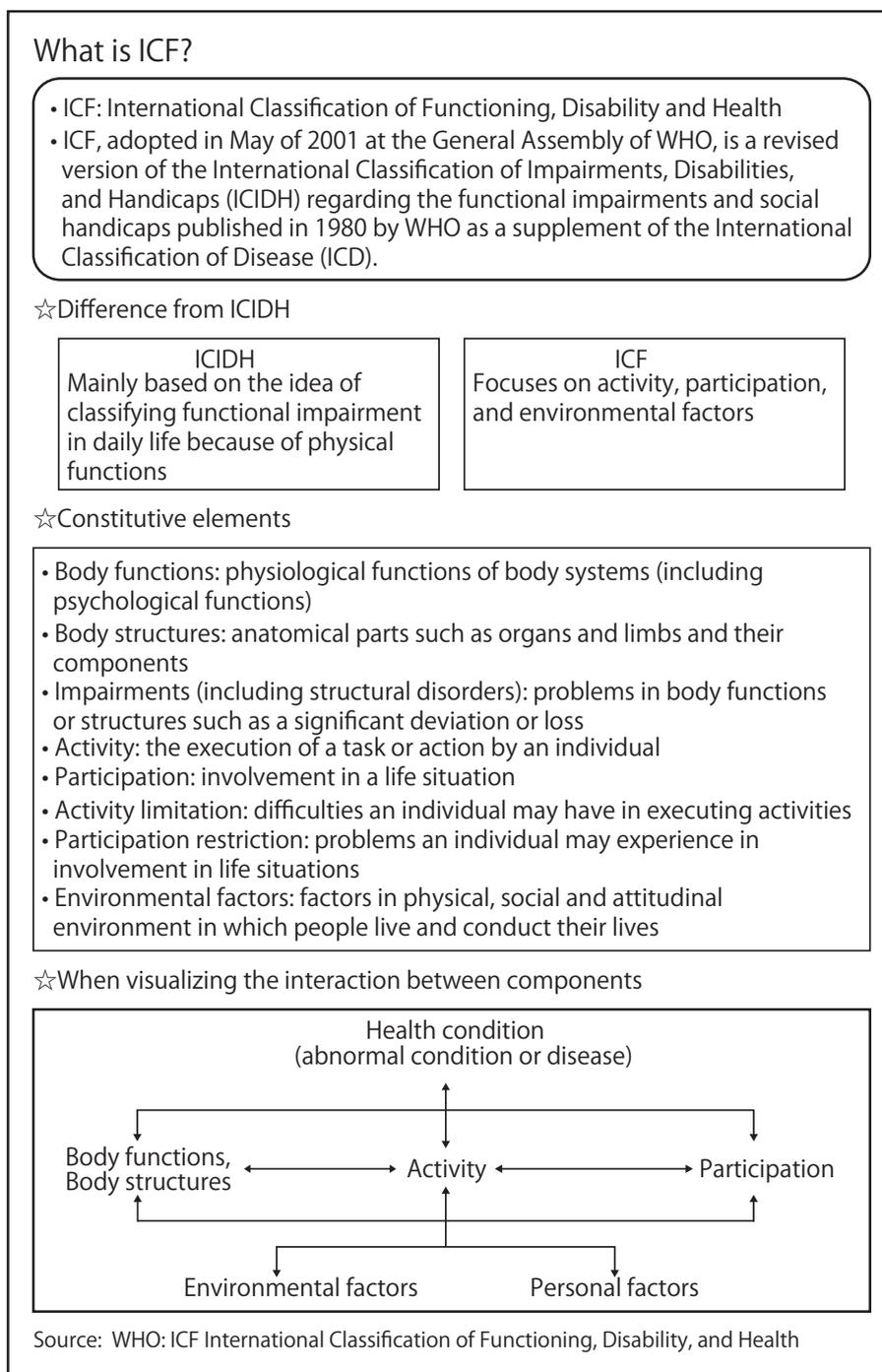
The author nevertheless feels that some kind of written material is necessary for a practical joint application with individualized educational support plans. Under the circumstance that a concrete image of the individualized educational support plan is sought at present, while reorganizing the comments indicated, I will attempt to resolve this issue and address the production of a manual for the entire process.

## 2. Again considering the meaning of “collaboration”

Thus far, I have investigated the methodology of promoting collaboration among various professionals. Here I once again consider “collaboration” itself.

### (1) Is “collaboration” really necessary?

First, I ask if “collaboration” among various professionals is really necessary. In this report, I have stated the necessity of “collaboration” at the point of education of children with disabilities, which recently is noted quite often.



**FIGURE 13** Explanatory chart of ICF

As mentioned in “I. Introduction,” the author has searched for what the collaboration between the teachers at the special school affiliated with a facility and the staff at the affiliated facility should be, and what the efficient division of roles should be.<sup>10, 11, 12, 14</sup> I originally had the idea that many professionals involved with each child should not teach them separately or inefficiently. The research starting from that point has led to efficient and effective teaching that has been well accepted by the staff involved

and by the guardians. However, this is our thought as a service provider, not the thought of individuals involved as major players in collaboration.

In contrast, the starting point of “collaboration” among a variety of professionals, which I previously reported (2003), was the earnest desire of a mother, who requested “lateral collaboration” because of her sense of heavy burden.<sup>9</sup> The mother was solely responsible for managing all the

professionals and organizations involved with her child so that she had to repeat the same explanations over and over again. The various professionals involved to some extent hesitated to share information to protect private information, but after they received the mother's approval to share information, each professional attempted to devise a successful "collaboration." As a result, respective effective approaches were obtained.

Among the current cases, the guardians in case D were reported to be confused by differences in the policies of various professionals, and there was no place for them to ask for advice. To avoid such a situation, collaboration among various professionals is truly required.

The attempt at "collaboration" starting from the viewpoint of service providers and guardians has provided, or is expected to provide, successful outcomes. However, the intentions of the children themselves, who are the main players in this "collaboration," have not yet been sufficiently heard. Their intentions should be respected as much as possible, and the "collaboration" should start from there. On the basis of this thought, I asked the class teacher in case C to investigate a policy in which the child himself can participate maximally. The result has not yet reached a stage to be reported, but I consider this to be an important aspect that should be investigated further.

## (2) What is considered to be "collaboration" and what is the goal?

Although this may be repetitive, the necessity of collaboration among professionals has been much mentioned in the process of special needs education. To date, in a facility-affiliated special school, "collaboration with the facility" has always been noted as the important issue. Where the necessity of collaboration is mentioned as an inevitable factor, the kind of situation that can be referred to as "collaboration" in concrete terms and the state of successful "collaboration" are not at all obvious.

Collaboration itself is not a goal. It is only a means of achieving something, for example, with collaboration, more effective teaching is possible for the children in front of us. In addition, as can be seen from the five cases, the desired "collaboration" varies depending on the case. What is important is to clarify the goals set for each child, what we should ask for in "collaboration" as a means of achieving those goals, and to what extent those goals are expected to be achieved in each case. After clarifying the causes of failure to reach the desired state of "collaboration" and how to resolve them, I plan to continue the investigation on the roles of ICF as an tool of resolving such issues.

\*With respect to the descriptions of the cases in this study, the consent of the guardians and related individuals was obtained through the research collaborators. Consent was also obtained for the content of the text, after the content was reviewed by the research collaborators. In addition, consent was obtained for listing the names and affiliations of the research collaborators in the acknowledgement below.

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## ORIGINAL ARTICLE

# Support for teachers of education for children with multiple disabilities through school consultation

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**Abstract:** An important issue in the education of children with disabilities in contemporary Japan is the enhancement of measures to deal with the severity, pluralization, and diversification of disabilities. This requires an improvement in teachers' expertise at schools for children with disabilities. As part of the effort to support such an improvement in the expertise of teachers, we addressed the issue of school consultation, organized this concept, reported the actual situation in schools for children with disabilities, and assessed the significance of school consultation. Specifically, the following items were assessed and discussed: 1) whether school consultation is a cooperative effort with teachers and teachers' organizations to make the best use of shared expertise in resolving problems; 2) the effectiveness of consultation in specialized training through practical efforts; and 3) the importance of on-site training (training in the classroom) based on school consultation in improving teachers' expertise.

**Key Words:** Multiple disabilities, School consultation, Teacher's expertise, On-site training, Collaboration

## I. Introduction

A transition from conventional "special education" to "special-needs education" has recently begun to be implemented. In this transition, schools for the blind, deaf, and other disabled that have conventionally played a leading role in the education of children with disabilities have been expected to continue their role in accordance not only with the types of disabilities in which they previously specialized, but also in a flexible manner according to local situations and the state of children's disabilities. The severity and pluralization of disabilities in schoolchildren attending these schools have increased. For this reason, the schools should take leading roles in educating schoolchildren with severe and pluralized disabilities with substantial needs for educational support including high-level expert guidance, facilities, and equipment. The schools are also expected to play other supportive roles such as providing consultation and advice regarding education and guidance for schoolchildren as well as for students in regular elementary schools and junior high schools who require special educational support. Particularly in special-needs education, the provision of special educational support according to individual educational needs is advocated. To achieve this, teachers in charge will be

required to have greater expertise.

It has been reported that the expertise of teachers in charge of children with disabilities has been ensured, to a certain degree, by the licensing system. However, the ratio of teachers having special education licenses remains insufficient, and since the types of disabilities covered by the licensing system are specified, it does not accommodate the diversification and pluralization of disabilities. Regarding teachers who provide special educational support in regular elementary schools and junior high schools, the ratio of those who have special education licenses is much lower. Consequently, it can hardly be said that adequate expertise has been ensured.<sup>1,2</sup>

The improvement of teachers' expertise can be achieved through training. National and local government training sessions, original activities planned and held by individual schools, and seminars and workshops held by private research organizations have been provided so far. It has been pointed out, however, that unsatisfactory results have been obtained from such training sessions and workshops. For example, the Third Report (1999) from the Educational Personnel Training Council under the former Ministry of Education acknowledges the inadequacy of training for in-service teachers and the necessity of introducing a training selection system and participatory training. Indeed, many

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training sessions/workshops/seminars have focused on lectures or skill exercises for specific disabilities and specific teaching methods, while there have been few that have directly focused on the resolution of problems faced by individual children. The subject matter of most training has been general and abstract, and concrete application has been left to the individual teachers who attended the courses. In terms of style, the training mainly comprises reports and lectures. Inagaki & Sato (1996)<sup>3</sup> reported that such training should be modified into one based on the "case study" method, in which practical cases are studied. In addition, Inagaki (1998)<sup>4</sup> indicated the need to introduce "training on the basis of teachers' needs and self-initiative" and the "vitalization of practice and exchange by adopting case studies" rather than depending solely on administrative training. For training to become effective, many hurdles, mainly inappropriate methodology and content, must be overcome.

## II. Teachers' Needs and Problems in the Classroom

What teachers need most in the classroom is to resolve individual, specific problems and to deal with the problems of individual students by incorporating an expert's viewpoint. In a nationwide survey on the conditions of deafblind children with multiple disabilities conducted by the author and coworkers (Department of Education for Multiply Disabled, National Institute of Special Education, 2000),<sup>5</sup> teachers in charge of deafblind children in schools for the blind, deaf, and other disabled were asked about the content of training they would like to receive. Many teachers cited items such as "having experts visit the school or facility to consider and deal with educational issues together" and "training in the use of educational materials and supportive devices," more often than items such as "lectures by experts" and "receiving training at a specialized institution." These results showed that training focused on specific subjects was strongly desired. Simply attending a lecture away from the classroom is insufficient for resolving specific individual problems. Rather, it is necessary for training in the classroom to be further developed. What contribution can researchers and experts outside school make? The author believes that one contribution can be their participation in resolving individual and specific issues in cooperation with the school. Outside experts have been intervening in school teaching for quite some time. However, in many cases, only temporary advice was given or objective observation was made for theoretical validation, and few experts have conducted collaborative studies with schools to resolve routine issues in the classroom. However, in an era when school education is facing many difficulties with the changing times and new efforts are required to solve individual and specific problems, it is necessary for external experts and investigators to

participate in educational studies, not as conventional objective observers or researchers, but as problem-solving partners who work in collaboration with the school to solve issues faced by the school. It is necessary to establish a direction toward problem resolution by sharing resources and influences.

To develop this level of collaboration, "school consultation" is considered effective. An outside researcher and expert (consultant) works with the teachers' organization (consultee) at a school that educates and leads schoolchildren with problems (clients) and participates in problem solving in the classroom.

## III. Concept and Characteristics of School Consultation

It is said that Caplan established the consultation method (1970). He stated that "Consultation is a process of interactions between two professional persons, the consultant, who is a specialist and the consultee, who invokes his help in regard to a current work problem with which the latter is having some difficulty, and which he has decided is within the former's area of specialized competence"<sup>1</sup> In other words, consultation and support are provided to the consultee who has a direct relationship with the clients instead of dealing directly with the clients. This is unlike counseling, which is the main method of conventional consultation. Consultations offered at schools are referred to as "school consultation," and in this case, consultees are teachers, assistant principals, principals, and teachers in charge of children with disabilities. Many consultants are researchers and psychologists having educational and psychological expertise. Consultants may also be professionals in the medical, healthcare, or social welfare areas. In general, consultation and support offered by persons with experience to those with less experience is referred to as supervision. In school consultation, many consultants have teaching experience, and hence, school consultation may take on a supervisory nature in some cases. The consultation relationship is basically the relationship among a variety of professionals.

Erchul & Martens (1997) stated, "School consultation is a process for providing psychological and educational services in which a specialist (Consultant) works cooperatively with a staff member (consultee) to improve the learning and adjustment of a student (client) or group of students. During face to face interactions, the consultant helps the consultee through systematic problem solving, social influence, and professional support. In turn, the consultee helps the client(s) through selecting and implementing effective school-based interventions. In all cases, school consultation serves a remedial function and has the potential to serve a preventive function."<sup>2</sup> Consultations are generally classified into four types (Caplan, 1970).<sup>1</sup>

They are listed as follows, incorporating Yamamoto's comments (2000a).<sup>9</sup> 1) Client-focused case consultation: the most common type of consultation, in which a consultee's problem with a client is assessed in order to understand it and to seek a method of resolving it. The consultee is responsible for handling the problem with the client, while the consultant provides support. 2) Consultee-centered case consultation: a consultant works in collaboration with a consultee to objectively analyze, clarify, and solve the consultee's particular problem. The ultimate goal is to correct insufficiencies in the consultee's expertise. 3) Administrative consultation centered on remedial measures: although resembling consultant-centered case consultation, this consultation concerns the measures themselves. A consultant offers specific opinions and expertise with regard to the approach to a new program and organizational functions. 4) Administrative consultation centered on the consultee: consultation aimed at improving the professional role of organizational administrators. School consultation is thought to consist of these four categories. However, Takahashi & Tokunaga (2002)<sup>6</sup> separately classified school consultations into two types according to who requests the consultation. In case-induced consultation, the client and the parents request consultation at the school, and the consultant, as one of the case supporters, has information for clarifying the case and meets with the consultee at the parents' request to provide consultation. In school-driven consultation, school officials, not the client's parents, request consultation. The consultant clarifies the case on the basis of indirect information from the classroom teacher and other sources and provides consultation.

Yamamoto (2000b)<sup>10</sup> cited the following four characteristics of consultation: 1) The consultation relationship is based on mutual free will. 2) Consultants are outsiders, and they are impartial towards consultees. 3) The consultation relationship has a time restriction. The consultant should prevent the consultee from becoming dependent and provide assistance while maintaining a certain distance. 4) The formation of the consultation relationship is centered on the problem to be solved. Consultation is undertaken with the main aim of understanding the case objectively and without touching on the emotions of the consultee regarding the case.

The above four characteristics are also appropriate for school consultation. In a relationship based on mutual free will, however, consultation may, in some cases, begin with a principal's or study leader's request and is thus not always initially based only on free will, although it may take on that nature in the course of development.

#### IV . Special-needs Education and School Consultation

As described earlier, the circumstances of education for children with disabilities are undergoing great changes. In particular, schools for the blind, deaf, and other disabled are expected to serve as local centers, which is predicated on schoolteachers for the blind, the deaf, and people with other disabilities having a certain level of expertise. Therefore, it is important to maintain and develop the knowledge and experience accumulated thus far at schools for the blind, deaf, and other disabled. No previous proposals or reports have presented adequate methods for improving teachers' expertise.

School consultation can lead to an improvement in teachers' expertise in special-needs education. There have not been many studies that deal directly with consultation in this field. This is probably because, although joint studies with outside investigators have already been conducted, no framework incorporating consultation has been established. In 1996, a study aimed at the construction of a "consultation system supporting education for the developmentally disabled" was compiled by a research team from Tokyo Gakugei (Arts and Sciences) University as a specific research project supported by the Ministry of Education. The need for the "construction of a consultation system directly supporting the classroom"<sup>7</sup> was pointed out. More recently, Hamatani (2002),<sup>8</sup> from the Tokyo Research Association of Development Consultation, reported on the practical side of developmental clinical consultation at nursery schools and kindergartens. The report covered various practical issues, including training-type consultation. Symposia on consultation have been held at congresses of special education associations and those of educational psychology during the past few years.

#### V . Actual State of Consultation at Schools Providing Special-needs Education

##### 1. Efforts by schools for the physically disabled

In 2001, it was agreed that our institute would cooperate with the Research Department and Activity for Independent Department of K School for the Physically Disabled by establishing a cooperative research organization, wherein they would report on the details of teaching practices and our institute would support the school in its efforts focused on activities for independent. This cooperative relationship was based on the research project, "Practical study on educational activities under the new education guidelines at schools for the blind, deaf, and other disabled; focusing on self-care activity" and on "Study on expert training support to teachers in education of the multiply disabled through school consultation," supported by a grant-in-aid for Scientific Research, for which the author (H. Sugai) was the study leader. K School is a large school with more

than 1,000 students and around 100 teachers with an annual personnel transfer of more than 10 teachers. This school consists of elementary, junior, and senior high schools, with each school divided into three to four guidance groups depending on the educational curriculum. The subjects of consultation were limited to those of a guidance group (about 30 teachers) based on an educational curriculum consisting chiefly of activities for independent in the elementary division. The author participated as a training consultant concentrating on classroom study at K School to collaboratively substantiate training and to compile a report on the results of the efforts directed at training-based activities for independent. In each training session, a specified person (teacher) from K School served as the intermediary to maintain close contact between the Institute and K School in writing, by telephone, and by e-mail, and the details of the activity were reported to the principal as well as to the entire school staff.

## 2. Consultees' initial problems

During the four years starting from 1998, school building renovation coincided with an increase in the number of students. Because of the limited space, a situation continued in which there was little chance of observing students in other classrooms and grades and in which there was little exchange of information on teaching content and methods. In the target guidance group, in which the teachers served as the consultees, the condition of the children's disabilities had become increasingly severe, pluralized, and diversified as each year passed, and it had become urgently necessary to cope with this situation. In addition, since K School was large, the rate of personnel transfer was high; nearly 10 of the approximately 30 teachers in this group were transferred. Under such circumstances, it was difficult for the consultant and consultees to continue a dialogue.

It was therefore decided, during talks with the consultant, to clarify the problems and difficulties in daily teaching in order to develop a common understanding of these problems among group members, and to set up occasions to discuss problem solving. Specifically, the class study should progress on the basis of the following three points: 1) daily teaching practices with the children should be reflected upon, 2) many opportunities to observe other teachers' teaching practices should be taken, and 3) views on the relationship with the children should be exchanged by many teachers and reflected upon.

Two actual cases were taken up and teachers available to observe the class did so in every class study. The class was videotaped, and all the teachers in the group discussed the presenter's class while watching the videotape.

## 3. Progress of the efforts

### (1) Activities in the first year (2001)

Practices in classes taught by 16 teachers were individually reviewed and discussed using VTRs from May 2001 to February 2002.

The author attended approximately half of these classes and participated directly in group workshops, gave advice at the workshops, and provided consultation for the teachers in charge before and after the workshops. The main topics during the discussions were the teachers' stance in getting involved with the children and how to view children's behavior (Table 1). Discussions were held from the following five central viewpoints in the class study.

- a. Respect children's autonomy in self-determination and initiative (decision making and taking action on their own) and expand involvement starting with children's voluntary activity.
- b. Start with each child's needs and extemporaneously develop activity case by case in line with the child's situation.
- c. Place importance on the creation of mutuality (interactions).
- d. Look at children's needs multilaterally.
- e. Implement class activities from events arising from the flow (context) of children's behavior.

In addition, "communication" was frequently raised as a case study subject. In relation to this subject, since "all children possess their own language and communication mode that they can use," we tried to establish common viewpoints to create an environment in which each child's "language" is sufficiently developed and to ensure a means for each child to communicate what they want to say.

Consultation activities were assessed by asking all teachers who participated in the training to fill out a questionnaire. Comments made by the participants included the following: "Training with the VTR allowed me to understand even the things that were not understandable by only reading documents." "I could learn about the various practices of other teachers." "I could learn from consultation with the consultant concerning the methods of solving various problems." Reflective comments were also expressed: "There were so many teachers in the group that I found it difficult to express my views." At the end of the fiscal year, all teachers in the group filed a case report for each person (or a case report for each class) and compiled a collection of practice reports. The author presented lectures at a local teachers' workshop held at K School. Nearly all the teachers from K School participated in this workshop to learn directly about the author and his views. This contributed to promoting deeper understanding of the efforts of the group.

**TABLE 1** Content of group training, fiscal year 2001

Month	Content of Training (Details that served as the basis of consultations)
Apr.	Discussion of this year's study.
May.	Respect individual children's independent-minded movement and bring out this movement. Pay attention to things together with the children and share thoughts with them. How to view, regard, and interpret the children's behavior.
Jun.	Come into contact with and understand children's interests. Conduct search activities with the children.
Jul.	Sharing the emotion with children and two way communication. Communication methods other than the spoken language.
Sep.	Guide the walking of children who can walk with support. Provision of information understandable to children. The way to pay attention.
Oct.	Link children's words to their movement. Use of object cues. How to handle children's actions or expressions and to respond to them.
Nov.	Develop learning activities based on the spread of children's interest, receiving "Yes" and "No" signs and children's needs.
Dec.	Concept of total communication.
Jan.	How to handle signs from children and to deal with them; limiting and switching activities.
Feb.	Children's positions in which they can act with ease.
Mar.	Reflection on this year's activities and confirmation of the course of activities in the next year.

## (2) Activities in the second year (fiscal year 2002) and the third year (fiscal year 2003)

In the second year, a class study was established as in-school training. In addition, workshops in small groups were proposed by those actively promoting the study at K School. The workshops were aimed at improving the teachers' understanding of the course of guidance and changes in the children by having them give a presentation twice yearly. Specifically, the teachers organized three small groups for every theme they were interested in, separate from the overall workshops in which the author participated. Each small group underwent training, and records of the discussions held for the three groups were compiled with other data prepared by the presenter, kept in a file, and circulated; thus the teachers were able to confirm the details of discussions held by other groups.

The items listed below were selected as the new main points in the second-year training.

- a. "Expansion of exploratory activity" and "Structuration of space:" how children perceive the learning environment, i.e., school and classrooms. "Importance of the environment," that is, how teachers can improve the environment.
- b. "Selection of activity" and "Children's initiative:" what steps should be taken to promote children's initiative, self-selection, and self-determination.
- c. "Children's eyesight (vision)" and "Color of teaching materials:" to insure that children can see the materials clearly; the provision of information and educational material on the basis of children's seeing function.

Aiming at the mutual sharing of feelings with children, the discussions became increasingly focused on devising ways to improve the learning environment and learning steps so that children's initiative could be further promoted. The author continued to observe the classes and to provide consultation by citing specific scenes related to ways of

looking at and understanding children's behavior, and holding discussions on improving teaching materials and tools and the setting of scenes.

In addition, the author organized a conference of the Committee of Institute Project Study at K School. This was helpful for the consultees in that K School's efforts could be viewed relative to the practices at other schools after listening to the reports. The author asked the teacher who served as a K School contact to make a presentation at a nationwide conference. This experience gave K School an occasion to hear the comments and observations of researchers other than this author and of teachers from other schools.

In the third year, the training style employed in the previous fiscal year was continued. The author continued to participate in the class study and assisted K School teachers in visiting and observing class studies held at other schools, provided information, and accepted visitors for educational consultation provided by the author at the Institute.

## 4. Assessment and discussion of consultation at K School

To summarize the overall activities, the teachers involved in this study over the three years were asked to make comments on the class-study-centered training and consultation. The responses are summarized as follows.

### (1) Training using VTR

Few teachers had had any experience of a class study conducted regularly using VTRs every month. In this situation, the following responses were received: "Because the class was being videotaped, I initially assumed a defensive attitude and worried about what scenes should be videotaped." "I had a sense of resistance to presenting my practices and receiving other teachers' comments." With

regard to undergoing the training course, however, many teachers said “It allowed me to review my own involvement objectively” and “Having discussions made me aware of the children’s expressions and representations that I had previously missed and made me recognize the need to further improve my way of relating to them; therefore, the class study was useful for my practice.”

Many positive responses concerning the use of VTRs were received since they contributed to information sharing and expansion of the range of practices: “I could learn about children other than those in my charge and started to share information about the children in my group and to relate to them more carefully.” “Seeing other teachers’ practices allowed me to incorporate their ideas into my practices.” In addition, changes in teachers’ attitude were also reported: “I started to pay attention to even the slightest movement of children, not only in actual contact with them but also when watching the VTRs. In an effort to understand the meaning of the children’s movements, I even asked the group to feature me in a discussion.”

## (2) Changes in the consultees (teachers)

### a. Consultees’ view of children

The teachers who participated in the training exhibited the following changes in their view of the children. Regarding the discussions using VTRs, teachers gave many responses: “I noticed, for the first time, children’s actions and expressions which I had missed or which I had viewed in a narrow sense, and found other ways of interpreting them. This has enabled me to develop my relationship with the children.” “I have come to consider the meaning of even the slightest movement of children and to place importance on each movement.” “I used to read children’s thoughts from their spoken language and facial expressions, but came to realize that their hand, finger, and leg (foot) movements also had meaning. I now relate better to the children because of this realization.”

The discussion results indicated that the teachers in the group were able to confirm that “Every child has his/her words,” “Children’s actions and expressions are always meaningful,” “Interaction with children by carefully watching the slight movements of their hands, fingers, legs (feet), and line of sight is the key to further activating the children’s actions and expressions and developing interactions while encouraging the children’s initiative.”

### b. Teachers’ stance

Some teachers gave the following opinions: “Since we teachers are on the teaching side, I contemplated whether we thought of only “making” the children do things, disregarding their thoughts, under the idea that we must first prepare teaching materials and tools in order to relate to

the children,” and “Perhaps we teachers related to children by giving priority not to the child’s words but to our own spoken words.” Another opinion was also expressed by many teachers, “I came to repeat the interactive process of being attentively receptive to children’s actions and expressions after confirming and interpreting them, and then responding to the children, although not yet adequately, and to interact with the children in consideration of a children-led relationship.” The teachers’ outlook towards the interaction with the children changed to the following: “I would like to aim for interaction with the children in which their initiative is demonstrated,” and “I will make efforts to perform not unidirectional communication from the teacher but interactive communication between the children and the teacher.”

## (3) Consultation and cooperation with the Institute

Teachers’ views on the advantages of consultation included the following:

“Receiving expert advice on routine guidance (interaction with the children) is thought to have been very effective in reviewing the teacher’s guidance based on his/her own ideas. Receiving advice that even the slightest movements of the children, which I had previously missed, has its own meaning provided me with an opportunity to substantially change my views on the children.” “It was good to get an objective view different from that of schoolteachers.” “I learned a lot from the expert advice. It was useful to carry out educational activities with a keen sense of consciousness brought about by the presence of an outsider.” “It was useful to be able to visit an advanced school through the Institute.” “It was helpful that I could directly ask the consultant for advice on teaching and that points raised in discussion could be used immediately in practice.” “It was possible to learn what practice and theories are currently dominant and being developed independent of personal and in-school views. Undertaking training sessions using VTR, which is an orthodox technique but difficult to actually do, on a regular basis, and receiving advice from the Institute staff allowed me to reflect humbly on my practices. The advice was always appropriate, and it was a valuable experience that improved my expertise.”

Problems that must be reviewed upon included the following: “After the confirmation and adjustment of mutual schedules, training was arranged for a busy period of work such as at the end of term, and this added to the teachers’ workload.” “I could not always ask what I wanted to, partly because of the time restriction. I sometimes wanted to ask something after I had received advice, but I couldn’t from time to time.” “In this class study, the teacher who acted as the liaison and took great pains to promote smooth communication among the teachers in the group was a major influence in the group. A teacher who can

take on such a leadership role will probably be necessary in collaborations with specialized facilities in the future.” In summary, it was indicated that there was the possibility that some consultees (teachers) were placed under an excessive burden because of their role as a liaison or a coordinator and because of the timing of meetings. Furthermore, some consultees (teachers) failed to receive sufficient consultation due to time constraints.

## VI . Conclusions and Issues for the Future

### 1. Effectiveness of on-site training

Pursuing continuous reflection on daily interactions with children and considering the steps to take in the future are thought to lead to an improvement in the accuracy of reading the signals sent out by the children and to the development of interactions in which the children’s initiative can be promoted, as demonstrated in the group training at K School. With regard to teachers’ views on the children, the outlook of teachers changed, as indicated by answers to the questionnaire, such as “I should interact with the children by paying attention to even the slightest movement of the children.” The consciousness of this fundamental relationship with the children became apparent in their practices and training activities. The effect of the training that covered practical daily situations is thought to be behind the incorporation of this viewpoint. Merely learning about communication methods of children with multiple disabilities as knowledge does not lead to the development of practices, and knowledge gained in this manner is rarely shared among teachers. When teachers jointly consider specific practical issues, it is thought that such issues will then be used in practice and will contribute to a common understanding among teachers.

As training to improve the teachers’ expertise, not only training such as attending lectures where general information are imparted, but also practical training that allows teachers to tackle assignments on solving problems concerning the children that they actually confront every day is required. The activities at K School provided such training. Problems actually faced at the school every day were directly addressed, and the consultees (teachers) worked on solving them together with an outside expert. Such training that is set in the school deals with issues familiar to the trainees and provides a high incentive to participate fully. I propose to refer to such training as on-site training.

The objective of on-site training is to solve specific, practical problems by a case study approach. The method described in this study, with the involvement of an outside expert in case studies on practical issues, is that of school consultation. The teachers, namely, the consultees,

individually or as a team, make voluntary efforts to solve problems in the course of consultation and can expect to improve their practical ability as a result. School consultation, which functions as on-site training, can lead to the improvement of teachers’ practical skills.

### 2. Education for children with multiple disabilities and on-site training

As described in the introduction, the increased severity and pluralization of disabilities in recent years necessitates competent teachers with greater expertise. Up to now, training to improve the expertise of teachers has failed to have an adequate effect. Some possible reasons are given below.

First, this type of education is targeted at children with a wide variety of disabilities, and therefore requires the exploration of content and methods of education appropriate for individual situations. Since many children with multiple disabilities are not only mentally but also physically disabled, it is impossible to consider their condition in only one way. In many cases, results from not only educational research but also from related sciences are necessary. Measures must be taken to implement the educational content and methods appropriate for the actual individual situation. Adaptability to the conditions of each individual is a unique feature of this education, and it cannot be fulfilled by the coursework-centered teaching program of conventional training or by the training for daily living that has been provided from the viewpoint of helping the children to become socially well adjusted. The pursuit of educational content and methods adapted to the conditions of each individual requires methods different from those in studies of group learning based on a certain level of intellectual and physical development. However, class studies thus far have pursued general methods and skills applicable to any class. Particularly in ordinary schools, class studies are completely group-centered, although case studies are sometimes conducted. Special education also exhibits this tendency. In many cases, coursework and daily-life learning depend on group-based teaching methods, and the key element of such class studies has been groups even if consideration was also given to individuals. There has been a strong connection between class studies and medical treatment, as demonstrated by the use of the expression “treatment and education (rehabilitation)” from the outset. Partly because of this, class studies have been systematized according to disabilities and diagnoses, for example, a teaching program for children with Down’s syndrome and cognitive learning for children with physical disabilities. Here too, methods applicable to the majority of children with a given disability and diagnosis have been pursued. As a matter of fact, the benefits of these methods

and techniques cannot be denied, but what is needed in practical classes is the in-depth practical recognition of “individual and specific events and experiences” that can be established only through regular involvement with individuals. The “reflective practice” of class studies to deepen practical recognition is contraposed to the traditional “technical practice” (Inagaki & Sato, 1996),<sup>3</sup> but it has not yet become established.

Second, up to now, class studies and training have been mainly coursework and unit learning programs. Educational interaction with children with severe multiple disabilities starts with the establishment of a communicative relationship with the educator on the basis of individual differences and the characteristics of the disability. The establishment of such a communicative relationship is often the main issue to be solved. It is necessary to work on initial communication issues including the recognition of subtle signals sent out by a child, distinguishing voluntary behavior, and developing mutuality through responses to the signals. When such a relationship is taken up as an issue, conventional training involving coursework and unit learning is inapplicable, and the promotion of general methods results in difficulties in learning for some children. Neither the application of the existing methods nor the production of teachers’ manuals is feasible. For many teachers who have long been engaged in ordinary education and those who have worked in conventional programs or curriculum development, the concept of education for children with multiple disabilities requires thinking from a fundamentally different angle. Therefore, training focusing on changing the methodological thinking and on adapting educational content and methods to individual cases is needed rather than lectures on established methodologies. Studies in special education have not been without individual case studies. Indeed, many of the studies of children with severe multiple disabilities have been individual case studies. However, the failure of such studies to be applied at schools is attributable to the following reasons: 1) the incomplete detachment from subject-based and program-related ideas; 2) the paucity of long-term efforts because of frequent personnel changes, even though long (several-year) involvement in education for children with multiple disabilities is considered to be necessary before a certain degree of significance in the results becomes apparent; and 3) the fact that a hypothetical system supporting individual studies among practitioners is not sufficiently established.

Under this status of education for children with multiple disabilities, new training in pursuit of the practical recognition of individual cases is considered necessary in addition to conventional training. It is advisable that this

training be focused on studies of class teaching practices at school in view of the need to take up individual cases and to deal with events occurring during routine practice. In other words, training should be on-site.

### 3. Issues for the future

From experience in school consultation with teachers in charge of education for children with multiple disabilities, the author has realized that these teachers feel a need to build relationships with the children they teach and to practically recognize/understand actual events. Now that a large number of students with multiple disabilities is enrolled in schools for the blind, deaf, and other disabled and that teaching with expertise is requested, it has become difficult to meet these demands. The author proposes on-site training as a measure to respond to this problem of teacher training. The use of outside resources for on-site training is effective in enhancing expertise. Cooperation with other institutions has attracted attention in the movement toward the formulation of an “individual educational support plan,” and school consultation is one form of cooperation with external institutions. School consultation in cooperation with local universities, education centers, or other institutes is a promising measure to improve the expertise of teachers.

In addition, on-site training can fulfill the function of consultation. More specifically, a teacher explores his/her own methodology and insight as a subject of research and training, sometimes using outside resources, not through one-sided guidance given from an experienced person to a less experienced person as in the case of general supervision. In schools, the practice of receiving guidance from an invited outside lecturer is already established. Actually, some responses to the questionnaire concerning consultation assessment in this study indicated that some teachers considered the author’s intervention to be supervisory. It will be possible for consultation to focus on joint studies with teachers to develop theories adapted to the classroom, even if guidance intervention cannot be completely eliminated. As this is realized, the issue in the future will be not to apply established theories or techniques, but to analyze and pursue the theories that are already effective in practice to achieve further practical development.

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## ORIGINAL ARTICLE

## A study on teaching schoolchildren with intellectual disability

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**Abstract:** The purpose of studies of classes for schoolchildren with intellectual disability is not only to improve such classes but also to enhance the quality of the children's school life. To explore a new approach to studies of classes for schoolchildren with intellectual disability, first, previous relevant studies were reviewed. Next, the methodology used in the author's study of the class for schoolchildren with intellectual disability that he taught was organized. Of previous related studies, "analytical studies" focused on the quantitative and qualitative assessments of classes by considering classes as a communication process and "Pedagogic studies" focused on the learning process in view of information on the psychology of learning or on the assessment involving the examination of the guidance plan before the class, class observation and a review of the class after class. It was considered difficult for teachers working for the school to conduct class studies by the same approach as those used by researchers. A methodology of class studies that is easy to employ in schools and to achieve improvements in classes was expected to be realized by devising and improving appropriate means of examining the guidance plan before the class and of reviewing the class after class.

**Key Words:** Intellectual disability, Studies of classes, Analytical studies, Pedagogic studies

### I. Need for Studies on Teaching Schoolchildren with Intellectual Disability

Class studies have been defined as follows: "Studies of actual classes for devising contrivances and improvements in conducting classes."<sup>1</sup> If a class study is viewed along a time axis, a progression from the preparation and review of curriculum guidance plan to conduct a class with class observation followed by holding a discussion at a review meeting after the class seems to be the most common pattern. The objective of class studies is to obtain information for class improvement. The information obtained is fed back to each teacher who participated in the class study. This raises the teacher's skill at guidance and ability to understand the schoolchildren and hence leads to lesson improvement.

If classes are considered a purposeful activity conducted as part of the overall school life, however, the essence of class studies for schoolchildren with intellectual disability is not to obtain information for class improvement but to "provide daily classes and school life better suited to the children."<sup>2</sup>

In education for schoolchildren with intellectual disability, it can be said that the principles of guidance are learning through natural and necessary concrete experience with learning focused on practical and specific activities linked to daily life. To put it plainly, providing daily classes and school life better suited to the children suggests a need to validate whether the classes indeed improve the quality of school life and truly nurture life skills by questioning "whether there is practical and specific activity" and "whether the children are learning through natural and necessary concrete experience."

### II. Domestic Studies on Teaching Schoolchildren with Intellectual Disability

Oota<sup>3</sup> indicated that class studies have been conducted in the education of schoolchildren with intellectual disability by many schools but that few research papers have been written by academic and other investigators. The following reasons for this situation were given.

- 1) Investigators lack interest in the classes
- 2) Since the actual status of the children varies, it is difficult to apply knowledge obtained from one class to other classes (class study results lack generality and applicability)

The following presents an overview of the trends

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of studies on teaching schoolchildren with intellectual disability.

### 1. Initiation of studies on teaching schoolchildren with intellectual disability

Komiyama, the former principal of Seichyou School for the Handicapped,<sup>4</sup> commented, "The education guidelines indicate only the contents and teaching objectives appropriate for the education of children with intellectual disability, with little reference to the teaching method," because of the limitations of the original education guidelines, and remonstrated against perfunctory teaching in the name of merely providing life-unit learning. He raised the issue of the importance of analyzing classes and reflecting on analytical results, saying "It is necessary to reflect carefully on what, when, and how schoolchildren acquire experience, have it take root and help themselves, instead of falling back on a general life-unit plan." He reiterated the importance of schoolchildren-centered classes and of studies of the classes themselves, although studies of educational contents and the teaching plan are also necessary. He stated that a class study should pursue "the true profile of children acquiring effective experience" and proposed that the progress of classes should be recorded from the following viewpoints over a long period.

- 1) What could children learn or not learn?
- 2) What changes appeared in their learning following what was done at the beginning of or during the class?
- 3) What was easy or difficult for them to learn?
- 4) How were the lesson contents maintained or how did they take root to exert a useful effect on the children's activities?

Oonishi et al.<sup>5</sup> & Murakami et al.<sup>6</sup> investigated the teaching styles of teachers by class analysis.

### 2. Trends of studies on class studies

Hirose<sup>7</sup> systemized the trends of class studies in the education of schoolchildren with intellectual disability and pointed out the following.

- A. Practical and theoretical studies are necessary, and the pedagogic perspective is important.  
The pedagogic perspective involves the theoretical grounds that are used to clarify the educational direction (relational theory, including educational content theory, methodology, teleology, subject theory, and assessment theory).
- B. In a practical class study at school, one problem is the difficulty for teachers to carry out research activities (difficulty in securing time because of work conditions and lack of motivation toward the study).
- C. A small number of theoretical quantitative (analytical) and pedagogic studies have been reported, but assessments of

the role of and methodology for theoretical studies on the education of schoolchildren with intellectual disability are insufficient.

- D. Very few reports on class studies appear among papers published in the Japanese Journal of Special Education (1980 – 1990).

Studies on teaching schoolchildren with intellectual disability include a study on observation learning,<sup>8</sup> a study focused on the distance between teachers and students,<sup>9</sup> and a class analysis study in which the utterances and behaviors of teachers and children were analyzed categorically.<sup>10</sup>

- E. At the Congress of the Japanese Association of Special Education, only the intellectual disability sector and the delicate health and weakness sector have made presentations on class studies.

He also pointed out the following issues that need to be resolved.

- A. It should be understood that there is naturally a limit to the benefit of class analysis by means of quantifying teaching in which too much importance is placed on technical aspects.
- B. Emphasis should be placed on lesson creation.
- C. The subject principle and linguistic principle of merely having students recite answers should be improved.
- D. The joy of learning together should be valued highly.  
The meaning of tutorial counseling should be confirmed, and incautious tutorial counseling should be avoided.
- E. The pedagogic perspective should be given more consideration in class studies.

Oota<sup>11</sup> reviewed prior reports on class studies of schoolchildren with intellectual disability and provided the following summary. Class studies by class analysis were started in the mid-1960s; teaching styles have been assessed; and studies using communication analysis began to be conducted in the 1980s. He pointed out the importance of studies on teaching performance.

### 3. Analytical studies

Studies have been carried out in which analytical systems involving the classification and quantification of students' utterances and behaviors during class according to categories devised from a specific point of view were deliberated.

Nakayama<sup>10</sup> modified Flanders's<sup>12</sup> mutual analytical categories to prepare class analysis categories and conducted class analyses of schools and special classes for schoolchildren with intellectual disability using the class analysis categories. He reported that teacher-centered

classes were often the norm, where the number of teachers' utterances was much higher than the very few voluntary utterances of the children. Another study of class analysis using similar class analysis categories was reported by Yanagimoto and Tsuzuki.<sup>13</sup> These reports indicate that not only quantitative analysis but also qualitative analysis is necessary.

In a study aimed at qualitative analysis, Tsuge et al.<sup>14</sup> developed an analytical system for analyzing not the frequency of categorized behaviors but the relationship between the progress of the class and the exchanges between teachers and students to clarify their interaction.

Musashi et al.<sup>15</sup> conducted a continuous analysis of classes over two terms at a school for schoolchildren with intellectual disability using the analytical system described by Tsuge. They reported that there were patterns of interactions between teachers and students and indicated that the development of a new system to facilitate the monitoring of teaching activities and its use in subsequent classes should be addressed.

Nagoya<sup>16,17</sup> reported practical methods and recommended their application. To qualitatively analyze a life-unit-learning class, it is necessary to consider and form categories based on the class view of the unit; in the life unit, in which the teacher performs activities with students, the individual relationships between the teacher and the students must be clarified. Regarding the analysis of a life-unit-learning class, Fujine<sup>18</sup> has reported a study on communication analysis.

Hirayama et al.<sup>19</sup> have recently reported that a class study using an ethnographic method developed in anthropology is effective for qualitative study, although no report of the application of this method to a class study of children with intellectual disability has been published.

#### 4. Pedagogic studies

Studies have been carried out in which the theoretical grounds for clarifying the educational direction (relational theory, including educational content theory, methodology, teleology, subject theory, and assessment theory) of a class have been assessed. For instance, Miyamoto<sup>20-22</sup> stated that the following were included in a class study: "Children's activities, the teacher's role, teaching materials and aids to be used, and assessment from the point of view of what should be targeted, what should be expected, and what the children should have learned in a lesson."

Taguchi<sup>23</sup> assessed learning motivation in special classes for schoolchildren with intellectual disability by creating

assessment items and reported that three types of classes exist, as listed in Table 1.

**TABLE 1** Types of classes in special classes for schoolchildren with intellectual disability

Teacher-centered type	The teacher plays a major role in driving the class. The teacher provides a goal and plan which children follow. The teacher indicates children's failures or provides assistance when requested. This type provides the least spontaneous motivation to the children.
Child-centered type	The teacher helps the children to recall their past experiences so that the children will learn actively. The teacher indirectly encourages the children to find a challenge and to make a plan for overcoming it. The teacher prompts the children to become aware of their failures and, when assistance is requested, does not immediately provide it. There is little competition, praise, or scolding. Although this type of class is considered to satisfy spontaneous motivation, the children learn little, since the teacher does not expect much of the children.
Discrepancy type without single teaching style	The teacher proceeds with class in a manner similar to the teacher-centered type, but the teacher encourages the children to take the initiative in learning. The teacher prepares a detailed plan before conducting the class. The teacher expects children to set fairly difficult goals and plans for themselves. The teacher favors a child-centered class, but, since the class falls into confusion, he/she is compelled to lead the class and cannot proceed with the class using a single teaching style.

Taguchi<sup>24</sup> examined the possibility of providing discovery-based classes for schoolchildren with intellectual disability, which he compared with explanation-based classes, as summarized in Table 2. He reported that little difference was observed in the effect of teaching between these two types despite differences in the teachers' utterances during the classes, and that there were more voluntary utterances by the children in the discovery-based classes.

**TABLE 2** Process of discovery-based and explanation-based classes

	Discovery-based class	Explanation-based class
First stage	Observation Provide conflicting information	Observation Provide consistent information
Second stage	Prediction Form tentative theories and plan	Set a good example Teach the basic ideas
Third stage	Verification Discover the basic ideas	Confirmation Confirm the basic ideas
Fourth stage	Use in life Adopt in one's own life	Use in life Adopt in one's own life

Studies have been carried out regarding “guidance by combining a scope and subject,” which is often developed in classes for schoolchildren with intellectual disability. Tanno<sup>25</sup> aimed to improve life-unit learning classes and identified eight points to consider when guiding schoolchildren that should lead to lesson improvement by analyzing classes through the repeated viewing of VTRs. Other studies on improving life-unit-learning classes include those by Shinozaki and coworkers.<sup>26, 27</sup> In recent years, Sato et al.<sup>28</sup> reported that class studies in learning through tasks were characterized by guidance plan reviews and class observation, both of which were centered on the concept of the “creation of a class situation in which schoolchildren can successfully complete tasks,” which is an inherent idea favored by teachers, and that these studies were effective.

In other class studies, attention has been focused on class observation and discussion at class study meetings, which are thought to occupy a major part of class studies in a school. Oota<sup>29</sup> pointed out that in many studies the items considered in class observation include educational material and teaching aids, children's activities, and the goal of education, and that less experienced teachers often conducted class observation with little regard to the relationship between these items. Oota<sup>30</sup> assessed the effect of the review of a class in a class study at a school for children with disability and found that a constructive discussion of things to be improved, of which the teacher was previously unaware, on the basis of the class observation led to an improvement of subsequent lessons. Ootani<sup>31</sup> also evaluated class reviews in a senior high school for schoolchildren with intellectual disability from the viewpoint of a social adequacy assessment by reviewers.

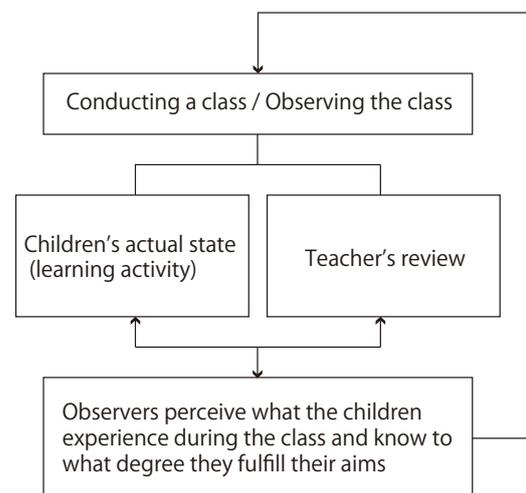
## 5. Trends of special features of class studies in “Developmental Retardation and Education” (formerly Japanese Journal of Children with intellectual disability)

Document 1 lists the special features and articles on class studies and lesson creation published in “Developmental Retardation and Education,” the Journal of the Japanese Association for the Study of Special Support Education. This document was prepared from the listing posted on the web page of the Japanese Association for the Study of Education for the Developmentally Disabled.<sup>32</sup>

Fewer than 10 of more than 560 issues of this journal appeared to feature class studies and lesson creation. The study on teaching schoolchildren with intellectual disability appears to be proceeding slowly, although it is true that many articles other than those in the special feature issues also touched on topics related to class creation.

Articles regarding class studies written by Oota (2002) and Ishizuka (2003) have been published recently. They are summarized below.

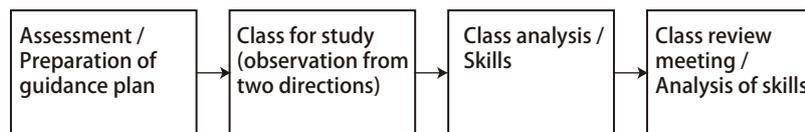
Oota<sup>33</sup> stated that teachers' *raison d'être* lay in the class and that class studies are necessary to improve the lesson, to enhance the teachers' skills, and to improve the skills of the teachers participating in class study meetings. He proposed that class studies should be used as active research, putting emphasis on communications between the teacher and the observers, as shown in Figure 1.



**FIGURE 1** Flow of class study as active research  
Prepared by the author on the basis of Oota's description

In addition, Oota<sup>33</sup> proposed two types of casual class study approach as described below:

### A. Class study attaching importance to teaching skill improvement



#### (1) Five-connected-viewpoint approach taken by a teacher by him/herself

The teacher reviews the lesson from the following five points of view and the relationships between them.

- A. Was the goal of the lesson clear?
- B. How was the teaching carried out?
- C. Were the educational materials and teaching aids suitable for the children?
- D. Was the children's actual state observed by the teacher?
- E. Was learning activity designed to achieve the goal of the class?

#### (2) ROMAN process approach taken by a group of teachers

The group progresses through the following five stages by incorporating the above five-connected-viewpoint approach:

- A. Reading the guidance plan (**R**eading)
- B. Observing the class (**O**bservation)
- C. Making memos (**M**emorandum)
- D. Conducting an analysis (**A**nalysis)
- E. Speaking (**N**arration)

It was explained that this approach makes it easy to focus on the main points of the discussion at a study meeting, since participants can read the guidance plan together and consider the observation points while they observe the class.

Ishizuka<sup>2</sup> suggested that importance should be attached to a preliminary examination of a class and a review of the validity of the aim and goal of the lesson by analysis of the basis of the following six specific steps.

- 1) Selection of activity
- 2) Plan of activity flow
- 3) Provision of a playing field where schoolchildren can engage in full activity with minimum constraint
- 4) Preparation of suitable tools (easy-to-use tools, trend toward realism)
- 5) Selection of companions in activities (taking mutual relationships into account)
- 6) Teacher's direct involvement in the activity (acting together with the children)

### III. Class Studies Experienced by the Author

The class studies experienced by the author as a teacher

of an elementary school class of schoolchildren with intellectual disability are described according to the style of the class study.

#### A. Class study attaching importance to teaching skill improvement

This class study was conducted for transferred and newly appointed teachers, as described below.

It had been decided beforehand to consider the following skills for the next lesson.

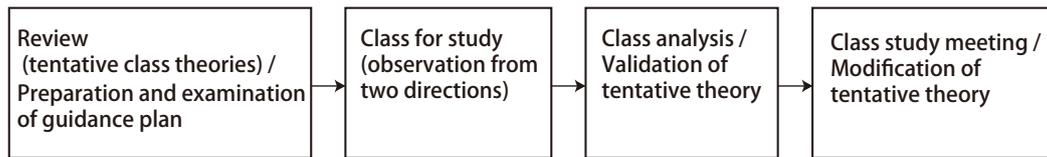
- 1) How to write the guidance plan (how to describe the philosophy towards teaching, the subject matter, views on lesson units, views of the children, the goal of the lesson, the learning process, and points to remember)
- 2) The ideal learning process (activity development)
- 3) Questioning plan (teacher's voice and wording when asking questions and giving instructions, the teacher's position and responses)
- 4) Plan for using the blackboard (use of colored chalk, cards, and strip blackboards)
- 5) Use of educational materials and teaching aids (arrangement of data presentation and its effective use)
- 6) Classroom management (group formation, improvement of classroom environment, for example by posting bulletins)

It seems that the class study conducted for transferred and newly appointed teachers was designed to familiarize them with the school's style of writing the guidance plan and to initiate them into the group of teachers.

Before the class review meeting, groups of about five teachers submitted summarized analytical data for each item. At the meeting, required improvements were enumerated in detail, for example, the position of the blackboard and the content of the teacher's utterances to the children.

The author himself became keenly aware of his poor overall skills in the classroom and felt, from the remarks at the meeting, that the participants were mutually trying to improve their skills. A senior teacher of an age that suggested him to be a veteran and another teacher who had been transferred to this school the previous year talked to

### B. Class study based on tentative class theories (class design)



Content of lesson: Language, News report about sleighing

me casually after the class review meeting, and from their words, I could sense their confidence and pride in being teachers.

#### B. Class study based on tentative class theories (class design)

This class study was conducted as described below.

A study of tentative class theories was first carried out by a teaching group (in this case, a group for teachers for classes for handicapped children). The teaching group examined the tentative class theories, prepared a guidance plan based on those theories, made proposals and discussed them at a class study meeting, and modified the guidance plan. For the class analysis, the teachers were divided into groups of about five members. Each group examined the lesson on the basis of the tentative theories and prepared for data presentation at the class study meeting.

The lesson was a language class. A news report about sledding was used as material related to the theme of the life unit, "Let's go sledding." The day after going on a bus trip to go sledding, the schoolchildren wrote a story in the form of a news report on the basis of their memories of the event.

The following three tentative class theories were considered for each group.

- 1) Proper verbalization at the field trip site will make it easy to recreate the field trip later in class. Various clues, such as certain items, movement, pictures, and VTR, will help prompt the children to speak in class.
- 2) If a hand puppet appears and asks questions with the teacher, the children will repeat other children's utterances in an attempt to describe the field trip in detail.
- 3) The children will be able to experience the joy of writing something and communicating to others by immediately presenting their writing in the form of a news report.

The following opinions on the tentative theories were given at a meeting after the class.

Tentative theory 1: The order of presentation to the children - watching a video → movement → pictures- led smoothly to their recalling the event and writing the news report. The pictures provided clues to the children.

Tentative theory 2: The children expressed an interest in the puppet, and the puppet participated in the communication as a new companion. It was suggested that the puppet might become a model for the children.

Tentative theory 3: So much time was spent on remembering and writing that the children were unable to present their news reports. The common-experience activity was extended so much that each child had difficulty in summarizing it in writing. Moreover, the preparation of writing aids, such as examples that could be copied, was insufficient.

In response to the above comments, the time allocation was changed so that the children could focus on writing by recalling, and paper with a grid was prepared to facilitate copying.

The author realized that the consideration of the tentative theories contributed to focusing on lesson creation and the sharing of the viewpoints of class observation.

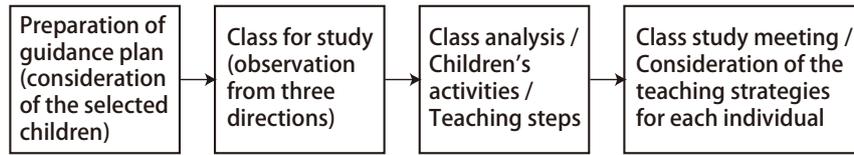
#### C. Class study aimed at guidance that emphasizes the individual

Before this class study, a schoolwide study was undertaken with the theme of an ideal lesson that draws out each individual through group guidance. When a guidance plan was prepared, selected children were considered (the children for whom teachers had prepared special teaching strategies), and these strategies were also specified in the guidance plan.

The class comprised eight children with intellectual disability, all of whom were enrolled in the study. The guidance plan was examined before the start of the lesson, and the development of learning activities and teaching strategies were discussed, similarly to class study style B.

In the class observation, teachers were organized into

**C. Class study aimed at guidance that emphasizes the individual**



Content of lesson: Arithmetic, Game scores

groups of five or six members. Each group individually recorded the selected children’s activities, held a discussion after the class, and prepared data for a class study meeting

The class was an arithmetic class. The life unit was “Let’s hold a festival,” and it dealt with the tabulation and addition of scores for games such as bowling and pinball. In teaching the class of eight senior children, the children worked in pairs to perform a number of activities (arranging the bowling pins on the marks on the floor, counting from 1 to 5 and from 1 to 10, and adding up scores, including consolidation operation, adding with counting, and the formulation of mathematical formulas) in accordance with the children’s challenges, during which the relationships between the children were observed by the teacher.

Target behavior	Assessment	Child’s utterances and behavior
The child in charge of time informs the player of the start and the end of the game using an hourglass.	○	Counted the number of A balls (7 balls), B balls (3 balls), and C balls (7 balls) verbally and drew the corresponding number of circles.
The child counts the balls up to ten using a counting slide	○	First, the child drew four circles for B balls but corrected it to three on his/her own.
And circles the corresponding number in a table.	○	Counted the number of D balls (12 balls) up to 12 verbally but drew 10 circles.

In the class analysis, the children’s activities and achievement were described and analyzed on the basis of each individual’s target behavior. An example for a pinball game is shown below.

Matrices were made to illustrate the relationship between the paired children (and their relationships with the other children). Some children were unable to get responses from their partner even though they actively tried to get their attention. It became clear that it was necessary to devise measures to allow the children to communicate, such as the teacher acting as a go-between.

Identifying each individual’s target (target behavior) and considering of the steps in the assessment of the

guidance plan contributed to clarifying the assessment of the individuals. Recording the relationships among the children and between the children and the teacher using the matrixes revealed relationship issues of which we had been previously unaware.

**D. Class study pursuing educational goals**

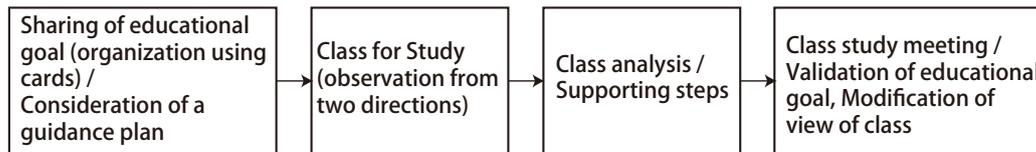
Before this class study, schoolwide research on the theme “sensitivity cultivation” was carried out. In deciding this theme, all the school personnel deliberated the concrete educational goal that should be sought, and this became the starting point of the class study.

All the school personnel were divided into groups of about five members, and the “Educational goal sought” was discussed in a brainstorming session held for two days during the summer holiday. Keywords were written on cards, which were organized into various classifications.

The class study dealt with expression in physical education. A circular process was assumed: “Noticing something” → “Feeling it” → “Expressing it” → “Satisfying it” → “Noticing something” → ---. The learning process was envisioned as follows: noticing and feeling a sound, expressing what was felt as a movement, the imitation of one child’s expression by the surrounding children to experience the feeling together, and noticing something new from the surrounding children’s expressions. A guidance plan was considered according to the above process. After the class, the school staff separated into groups according to the classification of the keyword cards, and they reviewed the educational goal and discussed the ideal lesson structure (view of class). The results were discussed at a class study meeting.

Sharing the process of exploring the research themes in terms of the children’s actual state and putting these themes in order brought the staff closer to the research theme and enabled the integration of the research theme “sensitivity cultivation” and the goal of educational research and development.

#### D. Class study pursuing educational goal (the embodiment of education goals)



Content of lesson: Physical Education, "Let's play Transformation."

The class study dealt not only with the achievement of the teaching goal and the consideration of the teaching strategies but also allowed teachers to discuss ideal educational research and development to be targeted. As a consequence, I realized that the promotion of class studies leads to the qualitative improvement of educational research and development.

#### IV. Conclusions – Effective Class Studies for Schoolchildren with Intellectual Disability

Education for children with intellectual disability should place emphasis on the following: "Learning through natural and necessary concrete experience with learning activities focused on practical and specific activities linked to the children's daily life."

Classes are conducted purposefully in overall school life. Class studies for schoolchildren with intellectual disability therefore must improve the quality of their school life and verify whether the classes foster the children's vitality.

Some previous class studies for schoolchildren with intellectual disability were analytical ones based on the development and application of a system for a quantitative or qualitative analysis by considering classes to be a communication process among schoolchildren or between schoolchildren and a teacher. Class studies, such as pedagogic studies emphasizing lesson improvement based on the lesson structure using knowledge of the psychology of learning, the examination of guidance plans beforehand leading the teacher to review their view of the lesson, and the observation and review of classes have also been carried out.

Both analytical and pedagogic studies are expected to provide insights into class improvement, but what is common to both is that the use of study methods employed by researchers that will entail extreme difficulty when applied in schools. Even if a class study is conducted in accordance with an annual plan, a study method that requires much time and labor to collect and process data for analysis will not gain support from teachers.

In one of the class studies experienced previously by the author, tentative theories (policy and strategies of

lesson design) were considered in the process of drafting a guidance plan, and, in class observation, these tentative theories served as points of observation for collecting data. In data collection, children's activities based on target behaviors and the relationships among the children and between the children and the teacher were described. At the meeting after the class, analytical data were presented and suggestions for improvements to lessons were made by some groups. Furthermore, the staff discussed and shared educational goals on the basis of the reality of the children that was observed by each teacher, to seek the ideal education in class, and to promote effective educational practices.

In studies of classes for schoolchildren with intellectual disability, making improvements in the class study system, such as devising an appropriate way of examining the guidance plan before the class and an appropriate way of reviewing the class, is considered to reveal an effective approach to practical class studies, as pointed out by Oota<sup>30</sup> and Sato<sup>28</sup>.

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**DOCUMENT 1** List of features and published papers regarding class studies in "Developmental Retardation and Education"

Issue Number	Date of Issue	Feature Title	Paper Title	Author
143	Aug 1970	Practical study methods	Class analysis	Fujishima, G.
			Case study methods	Kogo, T.
			Schoolchildren observation methods	Amou, H.
			Guidance records	Kosugi, C.
			How to logically connect the class study methodology and school system establishment internally	Kato, S.
			How to take and compile guidance records	Ooishi, M.
			What appears in pictures drawn by mentally retarded children	Shoji, T.
201	Jun 1975	Class studies	Inner observation through compositions	Seichi, T.
			Conditions of a good class for the mentally retarded	Hitomi, K., et al.
			Life-unit learning class, "Athletic meeting"	Shiono, K.
			Life unit of "Spring field trip"	Watanabe, Y., et al.
			Class creation, "Enjoyable school"	Kawaguchi, K., et al.
224	May 1977		Recent trends of class studies	Nagano, S.
			Class study and class plan	Miyamoto, S.
227	Aug 1977		Class study and class plan	Miyamoto, S.
228	Sep 1977		Problems of teachers in class study	Miyamoto, S.
350	May 1987	Drawing out children's individuality in class and conditions for personality development	Focusing on personality and uniqueness	Yunoki, F.
			Providing every child with a situation which he/she can handle	Nakatsubo, K.
			Children should not be restricted by an existing program	Akiyama, K.
		Steps taken to draw out each child's personality in this class	Class enabling every child to carry out life planning	Ishikawa, M.
			Ensuring individuals can do what they are able to	Hokkaido Takasu Junior High School for Handicapped Children
			Tailoring work activities, tools, work methods, etc., to individuals	Kurosawa, K.
		Activities, play equipment and tools devised for this child in this class	Providing a place where individuals can be active	Takao, S.
			Incorporating children's wishes in learning activities	Iida, S., Tsuki, M.
			Making use of pairs of good friends	Kato, C.
			Emphasizing motivation and stepwise guidance	Matsubara, M.
			Creation of a situation in which every child can work	Hizawa, T., Hachiya, M.
			Tailoring the contents of learning to individuals and connecting them to their daily life	Tsunetomo, T.
426	Jul 1993	Class progress	My view of class and my recommended class / Becoming involved, enjoying, and creating / Classes: Starting from home visit education based on the individual child	Nomura, S.
			Creation together with children on the basis of their actual situation: Practicing home visit education	Watanabe, M.
			Class with a rigorous view of "learning (alteration)"	Ito, Y.
			Total communication guidance for autistic children who give very limited signals	Shiino, M.
			Development of class designed to achieve vocational independence	Taguchi, N.
			Work learning "Making a miniature"	Senda, K.
			View of class appropriate for this education	Kuwahara, K.
			Pursuit of a situation which the student can handle	Kukita, H.
			Class in which any child enthusiastically takes the initiative	Nakatsubo, K.
			Class progress of life unit "Let's make an animal square in the courtyard": Respecting children's voluntary activity	Tadokoro, A.

(Continued)

## DOCUMENT 1 Continued

Issue Number	Date of Issue	Feature Title	Paper Title	Author
			Special contribution "What is a class understandable to everyone?"	Muto, T.
			Expectation and proposals for class: "Why don't you try it this way?"	Kondo, G.
			Aiming to live a better life	Takamatsu, T.
			Finding what each child needs	Higashiyama, H.
			Creating a situation where children move exuberantly	Fujishima, T.
			Do what you have to do discretely	Matsunaga, M.
481	Sep 1997	Class creation	Why class creation is necessary now / class theories for current education for handicapped children	Hirose, N.
			Importance of discussions among leaders	Kato, M.
			Symphony of various individual characteristics: Progress of a handbell-based life unit (From practice in FY 1996)	Miyazawa, M.
			Through the unit, "Newspaper reporters"	Tachibana, T.
			Search for a better class: Consideration of the use of aids and sharing of roles	Sato, S.
			Is a guidance plan necessary for work learning?	Yoshikawa, K.
			Have kind eyes that watch what can be done	Ikeura, M.
			Guidance plan with thorough support	Nakazawa, K.
			Points in preparing a guidance plan	Miki, A.
			My thoughts about class	Ooshiro, M.
			Assessment of guidance plans	Sato, S.
492	Aug 1998	Recommendation of practical studies	Practical studies which improve today's and tomorrow's practice	Koide, S.
			For a better class study	Ozaki, Y.
			How to hold a class study meeting	Ishizuka, K.
			Continuing class study meetings: Class study in department units	Kogo, A.
			Class study returning to children: A class study of a class for the handicapped	Wakamatsu, T.
			Wanted advice and unwanted advice	Ozaki, Y.
			Wanted guidance plan and unwanted guidance plan Class study: Points to be valued	Ishizuka, K., Yoshizato, N., Saito, K., Ogiwara, N., Mitobe, T.
			For a better curriculum	Oominami, H.
			How can the whole school advance the study	Yusa, H.
			Making a child-centered school life: Search for a better way of support: A curriculum study	Yamada, S.
			Plans which succeed easily and those which succeed with difficulty	Endo, Y.
			Systems which succeed easily and those which succeed with difficulty	Oominami, H.
			Points of study carried out by the whole school	Tomonari, H., Watanabe, S., Misawa, J., Saeki, H.
			Points of holding a study reporting meeting	Imura, Y.
			Points in report and bulletin preparation	Ueoka, K.
			Practical study, and assessment and testing	Ueoka, K.
			How to write and how to take up a "case"	Imura, Y.
			Practical study memo – part 3: Well-regarded workshop and ill-regarded workshop	Murase, M.
			Practical study memo – part 3: Points in compiling a study report	Ikegami, S., Watabe, T., Tsuji, Y., Endo, M.
495	Nov 1998	Class creation for handicapped children	Class creation for handicapped children	Oominami, H.

(Continued)

## DOCUMENT 1 Continued

Issue Number	Date of Issue	Feature Title	Paper Title	Author
			Medical arrangement at educational sites Guidance for child M's dressing and undressing taught by relating it to nursing and training guidance	Suzuki, Y., Sawai, H.
			Selected nursing and training guidance for unstable child A	Isobe, Y., Chijiwa, Y., Ishikawa, T.
			Work learning of a mentally and visually impaired child: Inoue-san working on reeling thread	Nagoya, T.
			Aiming for connection with each class: Development and use of a tutorial plan	Murano, K.
			Visiting as a life-supporting lifestyle: From practical home-visit (at-home) education	Sugawara, M.
			Experienced teachers: Practical side of home-visit education and schooling	Takahashi, S., Yamashita, M.
			Pursuit of better hospital life for Child H	Sugimori, Y.
			Attempt to guide children without expressive language in collaboration with an institution	Iida, K.
			Specialized nature of multiply handicapped children	Gokami, T.
			Only home-visit education will do	Hayashi, I.
539	Jul 2002	Recommendation of a class study	Recommendation of class study	Ota, M.
			Class study meeting conducted by local teachers in charge of classes for the handicapped	Koga, Y.
			Valuing daily effort	Toya, M.
			Consideration of class by utilizing VTR	Watanabe, S.
			Use of IT in self-care activity	Kaji, M.
			Crisis of class studies	Hirose, N.
			What I think about class studies	Fukuda, T.
			Class improvement through scrutiny of "assessment"	Yoneda, H.
			Work and learning guidance plan for junior high school	Koga, Y.
			Life-unit learning guidance plan for elementary schools for the handicapped	Kono, T.
555	Nov 2003	Class studies	Improving one's ability to execute practical skills: The importance and a specific method of contemporary class study	Ishizuka, K.
			Whole school effort to create a situation that supports child-oriented classes	Ogura, K.
			Class study making use of reading through curriculum guidance plans	Kaguchi, K.
			Class study by teachers of local special classes for the handicapped with mutual support	Kosugi, S., Tsubokawa, S., Yamamoto, H.
			Class study conducted with the teacher of a class for handicapped children	Sakurai, Y.
			From on-demand educational consultation to class study	Hamada, T.
			Case study and class creation in collaboration with a clinical psychotherapist	Ota, M.
			Class creation using a videoconference system	Sakuta, M.
			Improving the class	Shiga, C.
			"Tutorial plan" and "Class" activated by motivation	Kaburagi, O.
			Effective class study for curriculum and guidance plan	Nagoya, T.



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## INVESTIGATIVE REPORT

# Approach to teaching adventitiously blinded persons with difficulty in reading braille: Comparison of the degree of ease in reading between braille characters of two sizes

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**Abstract:** Many of those who become visually impaired after learning normal characters (hereafter, adventitiously blinded persons) can write Braille characters with comparative ease, but have difficulty in reading Braille by touch. The purpose of this study is to clarify the effect of the size of Braille characters on learning during the initial training of Braille reading for adventitiously blinded persons. In the first study, using two types of Braille character with different cell spacings (intervals between Braille characters), we compared the reading speed, the number of misreadings, and the readability between sighted persons inexperienced in Braille reading and Braille users proficient in reading, to examine the effect of cell spacing on Braille reading. In the second study, sighted persons inexperienced in Braille reading were divided into two groups, and Braille characters of different sizes, including dot size (hereafter, normal size and large size), were presented in a different reading order, to compare their reading speed, number of misreadings, and readability. Thus, the effect of providing training materials with large Braille characters on reading training was examined. The results of these two studies revealed that the use of Braille with wide cell spacing and large Braille characters is an effective method for the initial training of Braille reading for adventitiously blinded persons with difficulty in reading.

**Key Words:** Adventitiously blinded persons, Initial training of Braille reading, Braille size, Braille reading

## I. Background

### 1. Current status of Braille reading for adventitiously blinded persons

Braille, which is an alphabet of characters that people with visual impairments can read and write by themselves, is still insufficiently used, but certainly spreading in our society. For example, the following are available: Braille ballots for elections, bar, civil-service, and university entrance examinations in Braille, and Braille instructions on ticket-vending machines in stations, automatic teller machines at banks and post offices, the handrails of stairs, and in elevators. Thus, Braille is frequently seen in our society. Because we are now living in an information society where obtaining information is becoming a necessity, Braille is an important means of obtaining information for people with visual impairments.

On the basis of the “survey on actual conditions of disabled children and persons” (2001)<sup>3</sup> conducted by the Department of Health and Welfare for Persons with Disabilities, the Social Welfare and War Victims’ Relief

Bureau of the Ministry of Health, Labor and Welfare, the number of people with visual impairments aged 18 years or older is estimated to be 301,000, and the number of such people under 18 is estimated to be 4,800. Focusing on the level of impairment, out of the total 305,800 people with visual impairments, 107,200 people are diagnosed as having the severest first-grade level of impairment, and approximately 30,000 of these people use Braille for reading and writing in their daily lives. Moreover, the statistics on the causes of impairments and the ages of onset of impairment reveal that many visual impairments are due to adventitious causes.

For those who have relied on vision to obtain information, it is very difficult to replace vision with touch as the main sense. Kan (1988) conducted an 8-year study on the state of Braille reading for 197 adventitiously blinded persons learning massage, acupuncture, and moxibustion at rehabilitation and relief centers.<sup>1</sup> In his study, the relationship between the number of characters a person can read in one minute and the years of using Braille was as

follows. People in their twenties can read 100 characters by touch per minute, and people in their thirties, 85 characters per minute, after learning Braille reading for two and a half years. However, it takes four and a half years for people in their forties to acquire the ability to read 85 characters in one minute. For people in their fifties, it takes three and a half years to acquire the ability to read 60 characters per minute. Thus, the older people become, the longer it takes them to acquire the ability to read Braille. Moreover, in a comparison of the reading ability of adventitiously blinded persons with that of nonsighted children, the reading speed of the former in their twenties was equivalent to that of the latter in fourth grade. Although these results are natural considering functional decline with age, it may cause intense frustration to adventitiously blinded persons who had relied mainly on vision to collect information.

Even in schools for the blind, few adventitiously blinded students have already acquired the Braille literacy required for school lessons before enrolling in physiotherapy or other classes. Because coursework starts immediately after enrolling in the school for the blind, a certain level of Braille literacy is required. However, no sufficient time is spared for Braille training, leaving no other choice but to carry out Braille training in parallel with the coursework. We are currently struggling with this situation.

If adventitiously blinded persons feel reading Braille by touch is difficult, their motivation concerning coursework and the active gathering of information will decline. Moreover, in association with the nonacceptance of impairment, some people may develop a strong aversion to Braille. It is necessary to develop training programs and materials that can increase their motivation towards learning Braille reading or enable the effective acquisition of the Braille reading ability while maintaining high motivation.

## 2. Training methods and materials

Braille training for adventitiously blinded persons, and particularly the training method for improving reading by touch efficiency, differ depending on the school for the blind or the rehabilitation center and Braille library where the Braille training is carried out. In addition, there are few training materials. Braille training is still on the level of trial and error.

Nakamura (1993) reported that the Braille written using the Perkins Brailler (Fig. 1) is more effective for the initial training of Braille reading than that written using Braille kits because of the wide dot spacing (1-4 dot spacing) and wide cell spacing (4-1 dot spacing).<sup>6</sup> Figure 2 shows the structure of Braille characters, including the dot spacing and cell spacing.



FIGURE 1 Perkins Brailler

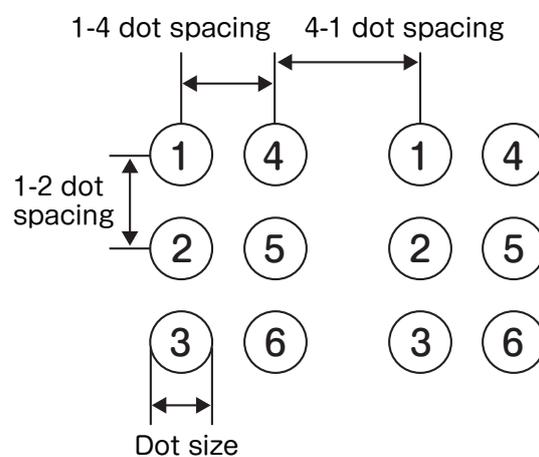


FIGURE 2 Structure of Braille

Furthermore, Kan (1988) proposed the use of a text in which a blank cell is inserted between characters during initial training.<sup>1</sup> In the “Manual for Braille Learning” (1995) by the Ministry of Education (from 2001, Ministry of Education, Culture, Sports, Science and Technology), the following statements are made. “For blind children and students experiencing difficulty in reading Braille, it is effective to make a Braille text with a slightly widened cell spacing to practice Braille. Then, the cell spacing should be gradually narrowed so that they can gradually become accustomed to normal Braille.”<sup>5</sup> Kuroda et al. (1995) considered that the readability of Braille characters by those who have not acquired proficient Braille literacy and those who have a limited tactile function can be improved by changing character size, cell spacing, and line spacing.<sup>4</sup> They examined the effect of cell spacing and line spacing on the reading efficiency of subjects with different degrees of Braille literacy. Subjects who had not acquired a proficient Braille reading ability said that Braille with a wider cell spacing and a wider line spacing was more



individuals to discriminate two adjacent dots, the ratio of cell spacing to dot spacing, “reading experience,” and the relationship between size and reading speed. For example, Braille with too wide a cell spacing is difficult to read. When a character is expressed using two cells, such as syllables with a voiced consonant and contracted sounds, which is a characteristic of the representation of a Japanese character in Braille, a cell followed by too wide a spacing makes it difficult to detect the second cell and practicality is lost. In addition, even if optimal Braille sizes could be specified for the conditions of individual adventitiously blinded persons, the technology of the current Braille printers is limited in terms of providing adaptable printers for easy production of training materials of optimal Braille sizes at each educational site.

Under these circumstances, to examine the teaching approach, it is considered significant to clarify the effect of the difference in Braille size (dot size, dot spacing, and cell spacing) on the training of Braille reading for adventitiously blinded persons, within the range of Braille size that can be produced in texts at practical educational sites. We hope that such clarification will lead to the provision of easy-to-read texts and new ideas for developing an effective training method.

## II. Objective

The purpose of this study is to clarify the dependence of learning effectiveness on the difference in Braille size during the initial training of Braille reading for adventitiously blinded persons.

This study consists of two parts: Study 1 and Study 2. In Study 1, the effect of the difference in cell spacing on reading was examined. In Study 2, the readability of Braille characters of different sizes (hereafter, normal size and large size), including dot size, was compared between groups to examine the effect of using text with large-sized characters on reading. The realization of the objective of this research was approached from these two studies.

## III. Experimental Methods

### Study 1

Sighted persons who are beginner Braille touch readers and totally blind persons who are expert Braille touch readers (Braille users) were tested on reading two types of Braille with greatly different cell spacings to compare their reading speed, the number of misreadings, and the readability.

### (1) Subject

The subjects consisted of 32 sighted males and females (average age, 43 years) and 10 male and female Braille

users (average age, 39 years; average time using Braille, 25 years). The age range for both groups is from 23 to 58.

### (2) Experimental reading material

Using six Braille characters “⠠ (na), ⠠ (ni), ⠠ (i), ⠠ (re), ⠠ (me), and ⠠ (fu),” which are comparatively easy to read by touch, a series of meaningless units of two or three characters are combined with a blank cell to make four patterns of 19-character strings on a line (Fig. 3). Two string patterns were embossed in the international size and the Californian size using the Braille printer “ET” (Enabling Technologies, U. S. A.). Here, the international and Californian sizes are the size names used by the manufacturer of this printer. At the head of all lines, the Braille character “⠠ (me)” was printed to indicate the starting point of reading.

Table 1 shows the size specifications of international- and Californian-sized Braille. Both Braille characters have the same dot size of 1.4 mm but differ greatly in cell spacing (4-1 dot spacing).

**TABLE 1** Comparison of Braille size

Type of Braille	Dot size (mm)	1-4 dot spacing (mm)	4-1 dot spacing (mm)	1-2 dot spacing (mm)
International size	1.4	2.38	4.17	2.34
Californian size	1.4	2.65	5.13	2.65

### (3) Reading test

The decision of which hand and which fingers to use for reading and the reading method was left to the subject. The subjects (in the case of sighted persons, their eyes were covered) were given one minute to read aloud each of two strings of Braille characters of different sizes to examine their reading speed and number of misreadings. After reading two patterns, they rated which of the first or second Braille string was easier to read on a scale of five (First string, Probably first string, No difference, Probably second string, Second string).

### Study 2

The sighted persons, who are beginner Braille touch readers, were divided into two groups to whom the Braille characters of different sizes were presented in a different order. By examining their reading speed, the occurrence of misreading, and the readability of Braille characters, the effect of the size of the Braille characters on reading efficiency and that of the presentation order were compared between the two groups.

(1) Subjects

As subjects, 28 male and female sighted persons aged 24 to 69 were divided into two groups (A and B). The number of subjects in each group and the average age are shown in Table 2.

TABLE 2 Number and average age of subjects

Group	N	Average age (years old)
A	13	41.3
B	15	41.5

(2) Experimental reading material

Using eight Braille characters “•• (u), •• (re), ••• (me), •• (fu), • (a), • (i), •• (ni), and •• (na),” which are comparatively easy to read by touch, four patterns - of 20-character strings consisting of meaningless units of two characters and four characters were prepared (Fig. 4). Two-character units were combined such that each character was used at least once as the first character and the last character of a unit in one string. Four-character units were combined such that each character was used at least once as the first character, a middle (second or third) character, and the last character of a unit in one string. This was carried out for the following reasons. As shown in Table 3, among the eight characters in these reading samples, the characters “• (a),” “• (i),” “•• (ni),” and “•• (na),” consist of dots only on the left side of the cell; therefore, the spacing between one of these characters and the subsequent character will be wide, which may cause difficulty in detecting the actual cell spacing and hence affect reading efficiency.

TABLE 3 Eight characters used as reading samples

u	re	me	fu	a	i	ni	na
••	••	•••	••	•	•	••	••

Four string patterns of two-character units and of four-character units were prepared using the two character sizes shown in Table 4, and each pattern was embossed on a card. Normal- and large-sized characters were embossed using the Braille printer “ESA721” (JTR company) and “ESA2000/L” (JTR company), respectively. At the head of all lines, the Braille character “••• (me)” was printed to indicate the starting point of reading.

TABLE 4 Comparison of Braille sizes

Type of Braille	Dot size (mm)	1-4 dot spacing (mm)	4-1 dot spacing (mm)	1-2 dot spacing (mm)
Normal size	1.4	2.0	3.2	2.25
Large size	1.9	2.4	3.84	2.7

(3) Reading test

The subjects in group A read the strings of normal-

sized two-character units, large-sized two-character units, normal-sized four-character units, and large-sized four-character units in that order, whereas the subjects in group B read the strings of large-sized two-character units, normal-sized two-character units, large-sized four-character units, and normal-sized four-character units in that order. This sequence was used because the order of reading of Braille of a different size may affect reading efficiency. The decision of which hand and which fingers to use for reading and the reading method was left to the subject. The sighted subjects, whose eyes were covered, were given one minute to read aloud each string of Braille characters of a different size to examine their reading speed and the characters that were misread in each of four trials. They compared the readability of normal-sized Braille with that of large-sized Braille in two- and four-character units on a scale of five (First card, Probably first card, No difference, Probably second card, Second card).

IV. Results and Discussion

Study 1

For the 32 sighted persons who are beginner Braille touch readers, the speed of reading one character of international size and that of Californian size were compared, as shown in Fig. 5. The positive direction on the Y-axis indicates a higher speed of reading (in seconds) one Californian-sized Braille character than reading one international-sized Braille character.

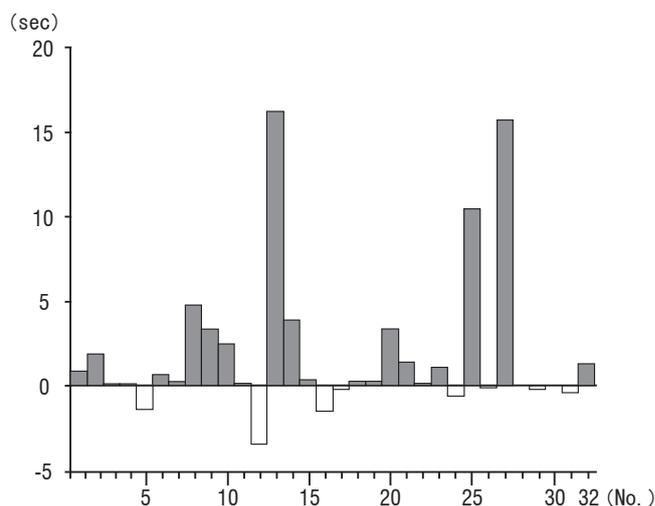


FIGURE 5 Comparison of reading speed per character

Next, 20 sighted persons who read all 19 characters within one minute in either the international size or Californian size and 10 Braille users were classified in terms of the size of the character read faster, the readability of Braille characters, and the occurrence of misreadings. The results are shown in Tables 5-1 to 7-2.

No.1

Let's read various Braille characters.

Reader	Hand used		Age
	Right	Left Both	

Four Braille cards will now be distributed one by one. The Braille characters on each card are of slightly different sizes. The lines are composed of a series of meaningless units consisting of two or four characters. Eight characters, ⠠(u), ⠠(re), ⠠(me), ⠠(fu), ⠠(a), ⠠(i), ⠠(ni), and ⠠(na), are used.

If the subject reads a character correctly, circle the character. If the character is misread, record how the character was misread. The time limit is 1 minute per card. Everyone starts simultaneously. When the subject finishes reading, he/she should raise his/her hand. The time taken will be announced, and the recorder should record it.

After the subject finishes reading the first two cards, ask the subject about the difference in the sense of touch of the Braille characters between the two cards, and ask the same question in a similar fashion after the fourth card is read.

Card 1

⠠(me), ⠠(ui), ⠠(funa), ⠠(ni), ⠠(afu), ⠠(meni),  
 ⠠(nau), ⠠(rea), ⠠(ire), ⠠(name), ⠠(ure)

Card 2

⠠(me), ⠠(nare), ⠠(nime), ⠠(iu), ⠠(ana), ⠠(funi),  
 ⠠(ua), ⠠(rei), ⠠(mefu), ⠠(nia), ⠠(rena)

Question: Which Braille string was easier to read?  
 First card, Probably first card, No difference, Probably second card, Second card

Card 3

⠠(me), ⠠(unareni), ⠠(meifua), ⠠(nafuare)  
 ⠠(inume), ⠠(fui)

Card 4

⠠(me), ⠠(reanina), ⠠(meufui), ⠠(fuiame)  
 ⠠(inaure), ⠠(uninaa)

Question: Which Braille characters were easier to read?  
 First card, Probably first card, No difference, Probably second card, Second card

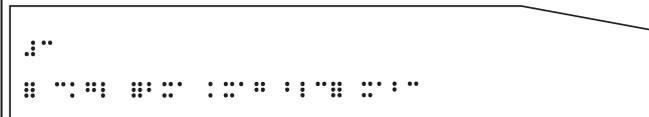
Card 1: Normal size



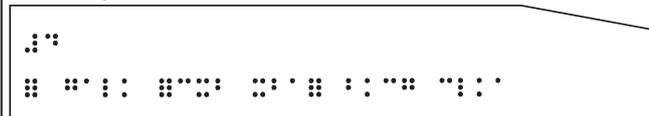
Card 2: Large size



Card 3: Normal size



Card 4: Large size



No.2

Let's read various Braille characters.

Reader	Hand used		Age
	Right	Left Both	

Four Braille cards will now be distributed one by one. The Braille characters on each card are of slightly different sizes. The lines are composed of a series of meaningless units consisting of two or four characters. Eight characters, ⠠(u), ⠠(re), ⠠(me), ⠠(fu), ⠠(a), ⠠(i), ⠠(ni), and ⠠(na), are used.

If the subject reads a character correctly, circle the character. If the character is misread, record how the character was misread. The time limit is 1 minute per card. Everyone starts simultaneously. When the subject finishes reading, he/she should raise his/her hand. The time taken will be announced, and the recorder should record it.

After the subject finishes reading the first two cards, ask the subject about the difference in the sense of touch of the Braille characters between the two cards, and ask the same question in a similar fashion after the fourth card is read.

Card 5

⠠(me), ⠠(fua), ⠠(ina), ⠠(reu), ⠠(nime), ⠠(uni),  
 ⠠(mere), ⠠(nafu), ⠠(ai), ⠠(niu), ⠠(are)

Card 6

⠠(me), ⠠(una), ⠠(reni), ⠠(mei), ⠠(fua), ⠠(au),  
 ⠠(ire), ⠠(nime), ⠠(nafu), ⠠(ani), ⠠(fume)

Question: Which Braille string was easier to read?  
 First card, Probably first card, No difference, Probably second card, Second card

Card 7

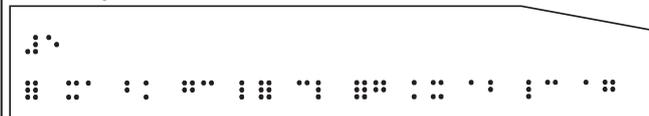
⠠(me), ⠠(afuime), ⠠(naureni), ⠠(nimeaf),  
 ⠠(reinau), ⠠(inifuna)

Card 8

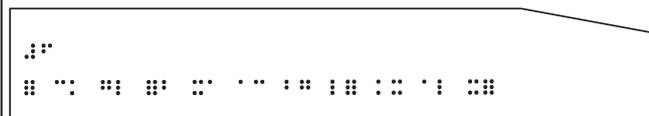
⠠(me), ⠠(niremei), ⠠(nafuau), ⠠(uanime),  
 ⠠(inarefu), ⠠(aniui)

Question: Which Braille string was easier to read?  
 First card, Probably first card, No difference, Probably second card, Second card

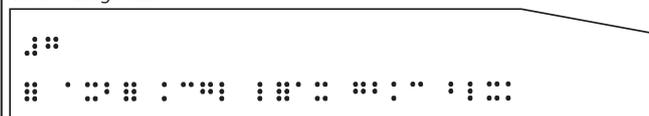
Card 5: Large size



Card 6: Normal size



Card 7: Large size



Card 8: Normal size

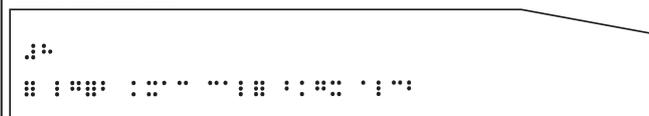


FIGURE 4 Data forms and Braille cards (Study 2)

**TABLE 5-1** Size of characters read faster and readability

Sighted persons ( <i>n</i> =20)	Size of characters read faster		
	Californian size	No difference	International size
Readability			
Californian size, <i>n</i> (%)	11 (55)	0 (0)	3 (15)
No difference, <i>n</i> (%)	1 (5)	0 (0)	0 (0)
International size, <i>n</i> (%)	0 (0)	0 (0)	5 (25)
Total, <i>n</i> (%)	12 (60)	0 (0)	8 (40)

**TABLE 5-2** Size of characters read faster and readability

Braille users ( <i>n</i> =10)	Size of characters read faster		
	Californian size	No difference	International size
Readability			
Californian size, <i>n</i> (%)	1 (10)	0 (0)	1 (10)
No difference, <i>n</i> (%)	1 (10)	0 (0)	0 (0)
International size, <i>n</i> (%)	0 (0)	2 (20)	5 (50)
Total, <i>n</i> (%)	2 (20)	2 (20)	6 (60)

**TABLE 6-1** Size of characters read faster and errors

Sighted persons ( <i>n</i> =20)	Size of characters read faster			Total
	Californian size	No difference	International size	
Errors, <i>n</i> (%)				14 (70)
Both sizes, <i>n</i> (%)	3 (15)	0 (0)	2 (10)	
Californian size, <i>n</i> (%)	1 (5)	0 (0)	4 (20)	
International size, <i>n</i> (%)	3 (15)	0 (0)	1 (5)	
No error, <i>n</i> (%)	5 (25)	0 (0)	1 (5)	6 (30)

**TABLE 6-2** Size of characters read faster and errors

Braille users ( <i>n</i> =10)	Size of characters read faster			Total
	Californian size	No difference	International size	
Errors, <i>n</i> (%)				1 (10)
Both sizes, <i>n</i> (%)	0 (0)	0 (0)	1 (10)	
Californian size, <i>n</i> (%)	0 (0)	0 (0)	0 (0)	
International size, <i>n</i> (%)	0 (0)	0 (0)	0 (0)	
No error, <i>n</i> (%)	2 (20)	2 (20)	5 (50)	9 (90)

**TABLE 7-1** Readability and errors

Sighted persons ( <i>n</i> =20)	Size of characters read faster			Total
	Californian size	No difference	International size	
Errors, <i>n</i> (%)				14 (70)
Both sizes, <i>n</i> (%)	5 (25)	0 (0)	0 (0)	
Californian size, <i>n</i> (%)	2 (10)	0 (0)	3 (15)	
International size, <i>n</i> (%)	3 (15)	0 (0)	1 (5)	
No error, <i>n</i> (%)	4 (20)	1 (5)	1 (5)	6 (30)

**TABLE 7-2** Readability and errors

Braille users ( <i>n</i> =10)	Size of characters read faster			Total
	Californian size	No difference	International size	
Errors, <i>n</i> (%)				1 (10)
Both sizes, <i>n</i> (%)	1 (10)	0 (0)	0 (0)	
Californian size, <i>n</i> (%)	0 (0)	0 (0)	0 (0)	
International size, <i>n</i> (%)	0 (0)	0 (0)	0 (0)	
No error, <i>n</i> (%)	1 (10)	1 (10)	7 (50)	9 (90)

Figure 5 shows that 22 out of 32 sighted persons who are not accustomed to Braille reading can read the Californian-sized Braille, which has wider cell spacing, faster than the international-sized Braille.

Tables 5-1 and 5-2 show the relationships between the size of the character read faster and readability for sighted persons (Table 5-1) and Braille users (Table 5-2).

For 12 (60%) out of 20 sighted persons, the speed of reading Californian-sized Braille was higher than that of international-sized Braille, and all subjects answered that the Californian-sized Braille was more readable, except for one person answering that there was no difference in readability. Although eight sighted persons (40%) had a higher speed of reading international-sized Braille, some answered that international-sized Braille was more readable and others answered that Californian-sized Braille was more readable.

For six (60%) out of ten Braille users, the speed of reading international-sized Braille was higher than that of Californian-sized Braille, and they answered that the international-sized Braille was more readable, except for one person who answered that Californian-sized Braille was more readable. The two Braille users who read both types of Braille at the same speed answered that the international-sized Braille was more readable. Of the two Braille users whose speed of reading Californian-sized Braille was higher, one answered that the Californian-sized Braille was more readable and the other answered that there was no difference.

Tables 6-1 and 6-2 show the classifications of subjects in terms of the size of the Braille read faster and the occurrence of misreadings. Fourteen (70%) out of 20 sighted persons misread characters. Five out of the six sighted persons who did not misread any characters read the Californian-sized Braille faster.

In the case of Braille users, misreading was observed for only one subject. However, there was no significant difference in the occurrence of misreadings between Braille sizes for subjects who use Braille daily.

Tables 7-1 and 7-2 show the classifications of subjects in terms of the readability and the occurrence of misreadings. In the case of sighted persons, four out of six subjects who did not misread any characters answered that the Californian-sized Braille was more readable, one answered that there was no difference, and the other answered that the international-sized Braille was more readable. Among the 14 sighted persons who misread characters, 10 answered that the Californian-sized Braille was more readable.

In the case of Braille users, seven out of nine subjects who did not misread any characters answered that the international-sized Braille was more readable, and the remaining subjects answered that there was no difference or that the Californian-sized Braille was more readable.

From the above results, it was found that the international-sized Braille is more readable and is read with fewer misreadings by Braille users who are accustomed to Braille reading, whereas the Californian-sized Braille, which has a wider cell spacing, is more readable and is read with fewer misreadings by sighted persons who are inexperienced in Braille reading. Therefore, it was demonstrated that the adoption of Braille with a wide cell spacing is effective for training adventitiously blinded persons in Braille reading at the initial stage.

## Study 2

Tables 8-1 to 9-2-b show the results on the size of the Braille character efficiently read (the size of the Braille character read faster), the size of the Braille character correctly read, and the readability of two- and four-character units for groups A and B.

**TABLE 8-1** Comparison of strings of two-character units (Group A)

Subject number	Size of characters efficiently read	Size of characters correctly read	Readability
1	L	L	L
2	L	L	L
3	L	L	Probably L
4	L	L	L
5	L	Same	L
6	L	Same	Probably L
7	L	L	L
8	L	Same	No difference
9	L	L	Probably L
10	L	L	L
11	L	L	L
12	L	L	Probably L
13	L	L	L

**TABLE 8-1-a** Comparison and summary for strings of two-character units (Group A) ( $N = 13$ )

Size of characters efficiently read $n$ (%)		Size of characters correctly read $n$ (%)		Readability $n$ (%)	
L	13 (100)	L	10 (77)	L	8 (62)
Same	0 (0)	Same	3 (23)	Probably L	4 (30)
Normal	0 (0)	Normal	0 (0)	No difference	1 (8)
				Probably normal	0 (0)
				Normal	0 (0)

**TABLE 8-2** Comparison of strings of four-character units (Group A)

Subject number	Size of characters efficiently read	Size of characters correctly read	Readability
1	L	L	L
2	L	L	L
3	L	L	L
4	L	L	L
5	L	Same	L
6	L	Same	Normal
7	L	L	L
8	L	L	Probably L
9	L	L	Probably L
10	L	L	L
11	L	L	Probably L
12	L	L	L
13	L	L	L

**TABLE 8-2-a** Comparison and summary for strings of four-character units (Group A) ( $N = 13$ )

Size of characters efficiently read $n$ (%)		Size of characters correctly read $n$ (%)		Readability $n$ (%)	
L	13 (100)	L	11 (85)	L	9 (69)
Same	0 (0)	Same	2 (15)	Probably L	3 (23)
Normal	0 (0)	Normal	0 (0)	No difference	0 (0)
				Probably normal	0 (0)
				Normal	1 (8)

**TABLE 9-1** Comparison of strings of two-character units (Group B)

Subject number	Size of characters efficiently read	Size of characters correctly read	Readability
1	L	L	L
2	Normal	Normal	Probably normal
3	Normal	L	Normal
4	Normal	Normal	Probably normal
5	L	Same	L
6	L	L	L
7	L	L	L
8	Normal	Normal	No difference
9	L	L	Probably L
10	Normal	Normal	L
11	L	L	Probably L
12	L	L	L
13	Normal	Normal	No difference
14	L	L	Probably L
15	L	L	Probably L

**TABLE 9-1-b** Comparison and summary for strings of two-character units (Group B) (*N* = 15)

Size of characters efficiently read		Size of characters correctly read		Readability	
<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)	
L	8 (53)	L	7 (47)	L	6 (40)
Same	1 (7)	Same	3 (20)	Probably L	4 (27)
Normal	6 (40)	Normal	5 (33)	No difference	2 (13)
				Probably normal	2 (13)
				Normal	1 (7)

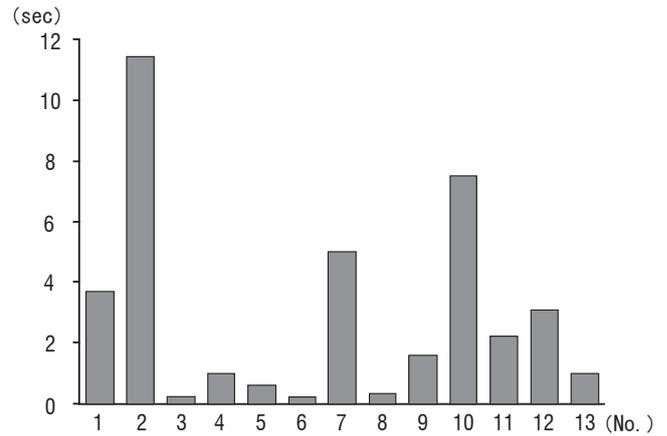
**TABLE 9-2** Comparison of strings of four-character units (Group B)

Subject number	Size of characters efficiently read	Size of characters correctly read	Readability
1	Normal	Normal	L
2	L	L	L
3	Normal	Normal	Probably normal
4	L	L	No difference
5	Same	Same	L
6	Same	Same	L
7	Same	Same	Probably L
8	L	Same	L
9	Normal	Normal	L
10	L	Same	L
11	L	Same	L
12	L	L	L
13	Normal	Same	No difference
14	L	L	L
15	L	Same	Probably L

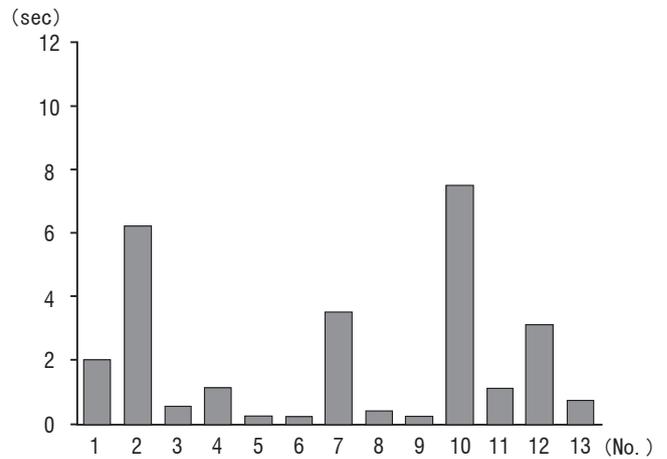
**TABLE 9-2-b** Comparison and summary for strings of two-character units (Group B) (*N* = 15)

Size of characters efficiently read		Size of characters correctly read		Readability	
<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)	
L	8 (53)	L	4 (27)	L	10 (67)
Same	3 (20)	Same	8 (53)	Probably L	2 (13)
Normal	4 (27)	Normal	3 (20)	No difference	2 (13)
				Probably normal	1 (7)
				Normal	0 (0)

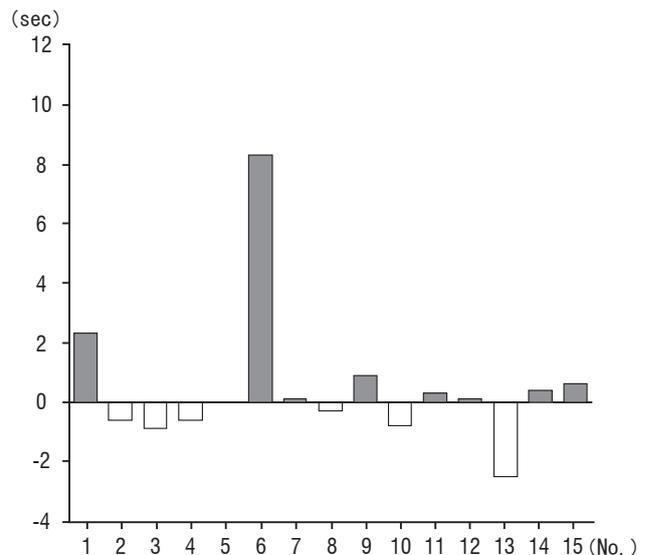
Figures 6-1 to 7-2 show the differences in reading speed between the normal-sized Braille and the large-sized Braille for each group. The positive direction on the Y-axis indicates a higher speed of reading (in seconds) one large-sized Braille than reading one normal-sized Braille.



**FIGURE 6-1** Comparison of speeds of reading strings of two-character units (Group A)



**FIGURE 6-2** Comparison of speeds of reading strings of four-character units (Group A)



**FIGURE 7-1** Comparison of speeds of reading strings of two-character units (Group B)

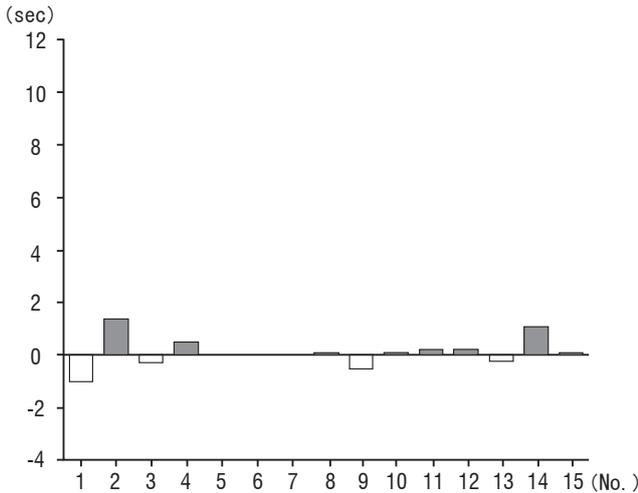


FIGURE 7-2 Comparison of speeds of reading strings of four-character units (Group B)

Next, examples of misreading two- and four-character units in both normal and large sizes are shown in Tables 10-1 to 11-2 for group A (Tables 10-1 and 10-2) and group B (Tables 11-1 and 11-2).

TABLE 10-1 Examples of misreadings of strings of two-character units (Group A)

Normal size	Number of errors	Large size	Number of errors
⠠ (i) → ⠠ (ni)	4	⠠ (re) → ⠠ (me)	2
⠠ (fu) → ⠠ (na)	1	⠠ (i) → ⠠ (ni)	1
⠠ (re) → ⠠ (a)	1	⠠ (na) → ⠠ (fu)	1
⠠ (na) → ⠠ (a)	1		
⠠ (me) → ⠠ (re)	1		
⠠ (u) → ⠠ (a)	1		
⠠ (na) → ⠠ (fu)	1		

TABLE 10-2 Examples of misreadings of strings of four-character units (Group A)

Normal size	Number of errors	Large size	Number of errors
⠠ (fu) → ⠠ (na)	2	⠠ (i) → ⠠ (ni)	1
⠠ (i) → ⠠ (a)	2	⠠ (na) → ⠠ (fu)	1
⠠ (ni) → ⠠ (i)	2	⠠ (re) → ⠠ (me)	1
⠠ (na) → ⠠ (ni)	2		
⠠ (a) → ⠠ (na)	1		
⠠ (u) → ⠠ (ka)	1		

TABLE 11-1 Examples of misreadings of strings of two-character units (Group B)

Normal size	Number of errors	Large size	Number of errors
⠠ (i) → ⠠ (ni)	3	⠠ (fu) → ⠠ (na)	3
⠠ (fu) → ⠠ (na)	2	⠠ (me) → ⠠ (re)	2
⠠ (a) → ⠠ (u)	2	⠠ (ni) → ⠠ (i)	2
⠠ (me) → ⠠ (fu)	1	⠠ (i) → ⠠ (a)	2
⠠ (fu) → ⠠ (u)	1	⠠ (a) → ⠠ (u)	2
⠠ (re) → ⠠ (me)	1	⠠ (u) → ⠠ (a)	1
⠠ (ni) → ⠠ (na)	1	⠠ (u) → ⠠ (na)	1
⠠ (me) → ⠠ (re)	1	⠠ (fu) → ⠠ (ni)	1
⠠ (u) → ⠠ (a)	1	⠠ (u) → ⠠ (me)	1
⠠ (na) → ⠠ (ni)	1	⠠ (i) → ⠠ (re)	1

TABLE 11-2 Examples of misreadings of strings of four-character units (Group B)

Normal size	Number of errors	Large size	Number of errors
⠠ (na) → ⠠ (ni)	3	⠠ (u) → ⠠ (a)	3
⠠ (ni) → ⠠ (na)	3	⠠ (i) → ⠠ (ni)	2
⠠ (i) → ⠠ (na)	3	⠠ (a) → ⠠ (u)	2
⠠ (u) → ⠠ (a)	2	⠠ (i) → ⠠ (a)	2
⠠ (ni) → ⠠ (fu)	1	⠠ (u) → ⠠ (i)	1
⠠ (u) → ⠠ (i)	1	⠠ (a) → ⠠ (i)	1
⠠ (na) → ⠠ (a)	1	⠠ (me) → ⠠ (fu)	1
⠠ (fu) → ⠠ (na)	1	⠠ (ni) → ⠠ (i)	1
⠠ (me) → ⠠ (re)	1	⠠ (i) → ⠠ (na)	1
		⠠ (me) → ⠠ (i)	1
		⠠ (fu) → ⠠ (a)	1
		⠠ (ni) → ⠠ (na)	1

Table 12 shows all cases of misreading depending on group and Braille size.

**TABLE 12** Misreadings according to group and size

Example of error	Normal size		Large size		Total
	Group A	Group B	Group A	Group B	
⠠(i) → ⠠(ni)	4	3	2	2	11
⠠(ni) → ⠠(i)	2			3	5
⠠(fu) → ⠠(na)	3	3		3	9
⠠(na) → ⠠(fu)	1		2		3
⠠(me) → ⠠(re)	1	2		2	5
⠠(re) → ⠠(me)		1	3		4
⠠(u) → ⠠(a)	1	3		4	8
⠠(a) → ⠠(u)				4	4
⠠(na) → ⠠(ni)	2	4			6
⠠(ni) → ⠠(na)		4		1	5
⠠(na) → ⠠(a)	1	1			2
⠠(a) → ⠠(na)	1				1
⠠(i) → ⠠(a)	2			4	6
⠠(a) → ⠠(i)				1	1
⠠(i) → ⠠(na)		3		1	4
⠠(fu) → ⠠(a)				1	1
⠠(a) → ⠠(fu)		2			2
⠠(me) → ⠠(fu)		1		1	2
⠠(u) → ⠠(i)		1			1
⠠(i) → ⠠(u)				1	1
⠠(re) → ⠠(a)	1				1
⠠(u) → ⠠(na)				1	1
⠠(fu) → ⠠(ni)				1	1
⠠(ni) → ⠠(fu)		1			1
⠠(u) → ⠠(me)				1	1
⠠(i) → ⠠(re)				1	1
⠠(fu) → ⠠(u)		1			1
⠠(me) → ⠠(i)				1	1
⠠(u) → ⠠(ka)	1				1

As shown in Tables 8-1 to 8-2-a and Figs. 6-1 and 6-2, for all subjects in group A, in which the test started with the reading of the normal-sized Braille, the efficiency of reading large-sized Braille was higher than that of reading normal-sized Braille for both two- and four-character units. The large-sized Braille was more frequently read correctly, in the case of two-character units, by 77% of the subjects, and there was no difference in the number of characters correctly read between Braille sizes for 23% of the subjects. In the case of four-character units, the large-sized Braille was more correctly read by 85%, and there was no difference in the number of characters correctly read for 15% of the subjects. Twelve subjects (92%) answered that “large size” or “probably large size” was more readable for both two- and four-character units, whereas the remaining 8% of subjects answered “no difference” for the two-character units and “normal size” for the four-character units. However, for all subjects who answered “no difference” or “normal size,” the large-sized Braille was actually read more efficiently.

Next, in group B, for which the test started with the reading of the large-sized Braille, as shown in Tables 9-1 to 9-2-b and Figs. 7-1 and 7-2, 53% of the subjects read the large-sized Braille more efficiently than the normal-sized Braille for both two- and four-character units. In the case of two-character units, 40% of the subjects read the normal-sized Braille more efficiently than the large-sized Braille, and 7% of the subjects read both types of Braille at the same efficiency. In the case of four-character units, 27% of the subjects read the normal-sized Braille more efficiently and 20% of the subjects read both at the same efficiency. In the case of two-character units, 47% of the subjects correctly read large-sized Braille more frequently, 33% of the subjects correctly read normal-sized Braille more frequently, and the remaining 20% of the subjects correctly read both Braille at the same rate. In the case of four-character units, 27% of the subjects correctly read large-sized Braille more frequently, 20% of the subjects correctly read normal-sized Braille more frequently, and the remaining 53% of the subjects correctly read both Braille at the same rate. Regarding readability, in the case of two-character units, 10 subjects (67%) answered that units of “large size” or “probably large size” were more readable, and eight out of the 10 subjects actually read the large-sized Braille more efficiently than the normal-sized Braille. Two out of seven subjects who read the normal-sized Braille more efficiently or read both at the same efficiency answered that the large-sized Braille was more readable. Three subjects (20%) who answered that characters of “normal size” or “probably normal size” were more readable actually did read the normal-sized Braille more efficiently. The subjects who answered “no difference” (13%) actually read the normal-

sized Braille more efficiently. Furthermore, in the case of four-character units, 12 subjects (80%) answered that characters of “large size” or “probably large size” were more readable, but seven out of these 12 subjects actually read the large-sized Braille more efficiently. Seven percent of the subjects answered that those of “probably normal size” were more readable, but they actually did read the normal-sized Braille more efficiently. The subjects who answered “no difference” in readability accounted for 13%, and the sizes of the characters efficiently read by them in actuality included both normal and large sizes.

Focusing on the misreading examples for each Braille size shown in Tables 10-1 to 11-2, the number of misreadings of large-sized Braille was smaller than that of normal-sized Braille for both two- and four-character units in group A. In group B, there was no difference in the number of misreadings between the normal- and large-sized Braille. As shown in Table 12, the number of misreadings between ⠠ (i) and ⠠ (ni), (i.e., read ⠠ (i) instead of ⠠ (ni) and vice versa) is as many as 16, followed by 12 misreadings between ⠠ (fu) and ⠠ (na) and between ⠠ (u) and ⠠ (a), 11 misreadings between ⠠ (na) and ⠠ (ni), 9 misreadings between ⠠ (me) and ⠠ (re), and 7 misreadings between ⠠ (i) and ⠠ (a). This may occur because the cell spacings and the cells themselves were not detected by the fingertips. Between ⠠ (na) and ⠠ (ni), misreadings were less frequent for the large-sized Braille. This may occur because the dot at position 2, which is difficult to detect in the case of the normal-sized Braille, is more detectable in the large-sized Braille.

From these results, it was found that training materials with large-sized Braille are effective in the initial training of Braille reading for adventitiously blinded persons who have difficulty acquiring the ability to read normal-sized Braille.

## V. Conclusions and Remaining Issues

From the results of Studies 1 and 2, it was found that Braille with wide cell spacing or large-sized Braille is effective for adventitiously blinded persons who have difficulty in reading normal-sized Braille by touch. As stated in “Background,” it is not effective to simply increase Braille size or cell spacing without limit, because there are various related factors. Moreover, there is a limitation in printers that can support several Braille sizes. Kizuka (1999) commented on Braille size as follows. “When it comes to problems of Braille size, not only the absolute size but also the ratio of the spacing between dots in a cell to the spacing between cells become problems. In addition, the ratio of dot spacing to dot diameter cannot be overlooked.”<sup>2</sup> Kizuka compared the ratio of cell spacing to dot spacing among Braille systems of various countries. In comparative

experiments in his study of reading Braille written with foam ink, his subjects commented that Braille with the ratio of 1.41 is the most readable and that Braille with the ratio of 1.65 has too wide a cell spacing. Considering these comments, Kizuka stated that Braille with ratios ranging from 1.4 to 1.8 is readable by ordinary users. What then are the ratios for the Braille examined in our study, namely, international-, Californian-, normal-, and large-sized Braille? The ratios for the Braille examined in our study are shown in Table 13 together with Kizuka's ratios for comparison.

**TABLE 13** Ratios of cell spacing (4-1 dot spacing) to dot spacing (1-4 dot spacing)

Type of Braille	Dot spacing (4 • 1) ÷ (1 • 4) = Ratio
Soviet Union	3.93 ÷ 3.17 = 1.24
Czech Republic	3.97 ÷ 3.00 = 1.32
Brazil	3.53 ÷ 2.60 = 1.36
Taiwan	3.13 ÷ 2.27 = 1.38
Nakamura-made	2.98 ÷ 2.10 = 1.42
Korea	3.17 ÷ 2.17 = 1.46
Japan	3.27 ÷ 2.13 = 1.54
China	3.97 ÷ 2.53 = 1.57
France	3.80 ÷ 2.30 = 1.65
Braille Everyday	3.80 ÷ 2.30 = 1.65
America	4.05 ÷ 2.35 = 1.72
Perkins	4.00 ÷ 2.30 = 1.74
Giant	6.70 ÷ 3.10 = 2.16
International size	4.17 ÷ 2.38 = 1.75
Californian size	5.13 ÷ 2.65 = 1.94
Normal size	3.20 ÷ 2.00 = 1.60
Large size	3.84 ÷ 2.40 = 1.60

Cited from the study by Kizuka (1999).<sup>4</sup> Four Braille sizes are additionally listed.

Except for the Californian size, the ratios at which Braille is readable by ordinary users are from 1.4 to 1.8, and are close to the upper limit of the range. The ratio for the Californian-sized Braille is higher than the upper limit but lower than that for the giant-dot Braille, which is used for adventitiously blinded persons in Europe and the United States. Because the range of ratios reported by Kizuka was not obtained from data on adventitiously blinded persons, this ratio range cannot be simply compared with our ratio range. However, this ratio will be very helpful when considering the gradual reduction of Braille size during the stepwise training of Braille reading for adventitiously blinded persons.

Sighted persons who adventitiously lose their vision are also severely traumatized psychologically. Even some period after losing their vision, they may still be emotionally unstable. In addition, many people experience declining sensory function of their fingertips due to aging, and many people who adventitiously lose their vision due to diabetic retinopathy, which is recently becoming

a particularly common cause of loss of vision, also have disorders of peripheral nerves. Therefore, the sensitivity of their fingertips is dulled, causing difficulty in identifying an aggregation of points. This most likely decreases their motivation to learn Braille. Therefore, the initial training stage is very important, and it is necessary to arrange the educational environment such that adventitiously blinded persons can gain confidence and motivation through concrete learning achievements, such as success in reading. In the future, we will provide training materials with Braille having a wide cell spacing or large-sized Braille, the effectiveness of which was clarified in this study, in the initial training of Braille reading for adventitiously blinded persons having difficulty in learning Braille, and we will demonstrate the effectiveness of this Braille learning system in practice. In addition, we hope to develop such training materials as instruction manuals, taking into consideration the transition to normal-sized Braille.

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## NOTE

# History of and perspective on education for children with speech and speech-language disorders in Japan

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**Abstract:** Education for children with speech and language disorders in Japan began in the form of remedial education for children with learning difficulties in reading and the correction of dialects in the speech-language arts class in the postwar period. The influence of the introduction of speech pathology from the US improved this type of education. It has become specialized to cater to the educational needs of children with speech-language disorders, and the content and methods of such education have been established. This kind of training originally began ‘after-hours,’ that is, after the school day finished. Subsequently, part-time special classes under the special class system were soon adopted, and at present, it is based on “*tsukyu sidou*,” which is a system of “resource-room training” that has been practiced for more than 30 years. Education for children with speech-language disorders in Japan has accumulated a history of research and movement in aspects of both the “development of content and methods” and the “development of the system.” Recently, the issues of such education related to the development of the system of resource-room training and the certification of speech therapists have been highlighted. In this paper, following the history of this education, we discuss management issues and the specialization of education and teachers in relation to current trends of society and education.

**Key Words:** Education for children with speech-language disorders, *Tsukyu sidou* (resource-room training), Speech-language training class, Speech therapy class

## I. Introduction

Education for children with speech-language disorders<sup>(1)</sup> in Japan began as remedial education for children with learning difficulties in reading<sup>(2)</sup> and the correction of dialects<sup>3</sup> in the speech-language training class or speech-language therapy class in the postwar period. The influence of the introduction of speech pathology from the US improved this type of education. It has become specialized to cater to the educational needs of children with speech-language disorders, and the content and methods of such education have been established. This kind of training originally began ‘after-hours,’ that is, after the school day had finished. Subsequently, part-time special classes<sup>(4)</sup> under the special class system was soon adopted, and at present it is based on “*tsukyu sidou*,” which is a system of “resource-room training” that has been practiced for more than 30 years.

Education for children with speech-language disorders in Japan has accumulated a history of research and movement in aspects of both the “development of content and methods” and the “development of the system.”

Recently, the issues of such education related to the development of a system of resource-room training and the certification of speech therapists<sup>(5)</sup> have been highlighted.

- (1) What kinds of children are the students in the “speech-language training class<sup>(6)?”</sup>
- (2) What are the content and the methods of education for children with speech-language disorders?
- (3) What qualifications are required for the teachers involved in the education of children with speech-language disorders<sup>(7)?</sup>

These questions can be categorized into issues concerning the role of the “speech-language training class” (management issues), the content and methods of education for children with speech-language disorders (specialization of education), and the qualifications of the teachers (expertise of teachers).

In this paper, the various issues mentioned are discussed after the history of this type of education in relation to the current status of society and education.

## II. History of Education of Children with Speech-language Disorders

The education of children with speech-language disorders in Japan germinated from the practical work of Rakuseki-sya established by Shuji Izawa in the Meiji era (1868-1912). Rakuseki-sya developed mainly around training to remedy stuttering, and divisions, branch offices, and local offices were established during the Taisho era (1912-1926). Rakuseki-sya accomplished achievements as a private business in the Meiji and Taisho eras.

In school, classes for children who stuttered were established in elementary schools of Tokyo City in the Taisho era. Records indicate that such classes were established in the Yanagawa Elementary School in Fukagawa Ward and two schools in Shiba and Kanda in 1926. However, these practices were terminated by the onset of the Pacific War.

The current education of children with speech-language disorders is based on the educational theory of Kenji Hamasaki, adopted at the Sendai City Toricho Elementary School in Miyagi Prefecture, and that of Kiyomatsu Okuma, adopted at Ichikawa City Mama Elementary School in Chiba Prefecture with the start of the new education postwar.

### 1. Beginning as remedial education

Kenji Hamasaki began efforts in the education of children with speech-language disorders after his research on “correction of Tohoku accents using Roman letters” and “training adapted to individual differences,” and he established the “speech-language training class” for children with speech-language disorders in his school in 1953. This class was mainly held as an extracurricular activity after the end of the school day.

Kiyomatsu Okuma began efforts in remedial training of Japanese reading after his research on “group training catering to ability and individual differences,” and he established a “Japanese remedial class” based on the resource-room system in 1953.

On the basis of this work, special classes for children with speech-language disorders were established in the Sendai City Toricho Elementary School in 1958 and in the Chiba City Innai Elementary School in 1959. Thus, the education of children with speech-language disorders began in public education in both name and reality.

#### (1) Work of Kenji Hamasaki

The training pioneered by Kenji Hamasaki was called the Sendai method or Toricho method, and it had the following

features.

- ① The method is structured on the basis of research on Japanese phonetics.
- ② Detailed step-by-step teaching of articulation is prepared.
- ③ Sufficient pathological research is conducted for each type of speech-language disorder.
- ④ Teachers are in close contact and coordination with medical institutions.
- ⑤ The training method is constructed with emphasis on functional training.
- ⑥ A solid record is prepared, training record sheets, photographs, and audio and video recordings.

Hamasaki categorized the training of children as speech and speech-language therapy.<sup>(8)</sup> He indicated the necessity of avoiding games or hearing exercises in which the intention of the teacher was unclear, and that the appropriate and necessary training should be carried out step by step, that the reason for the training should be clear, and that the results of training should be evaluated objectively.

Hamasaki contended that speech-language disorders are remediable and called the class for remedying such disorders a “speech-language training class.” He also held to the principle of disclosing the therapy to the parents. Furthermore, his remedial training for speech-language disorders was not only conducted as individual training but also often conducted in small groups with the intention of not only pursuing training efficiency but also nurturing the children’s sociability, cooperativeness, and communication skills (Hamasaki, 1988).<sup>1</sup>

#### (2) Work of Kiyomatsu Okuma

The work of Kiyomatsu Okuma was based on the research and practice of remedial training for children having difficulty in reading. Subsequently, it progressed to the “training of speaking” on the idea that the basis of reading is in hearing and speaking.

Because the children who received remedial speech training had disabilities such as articulation disorders, stuttering, developmental delay of language, and mutism, Okuma proposed that an organization in charge of the planning and implementation of remedial training be established (cooperation with medical institutions and the management of the class and school).

Moreover, Okuma focused on the relationship between speech-language disorders and poor learning performance and paid attention to understanding the actual condition of the children, including poor learning performance, and determining the criteria for admittance into the special class.

In the actual training, he took care of psychological aspects and communication by creating a pleasant atmosphere, promoting willingness to speak, stabilizing the emotional conditions of children, giving them confidence, and helping them make friends. The training materials were also well designed by taking into consideration the interests and concerns of children, as well as incorporating games in the training (Okuma & Yamagishi, 1997)<sup>7</sup>.

### (3) Development as remedial education

The practice of the remedial class<sup>(9)</sup> for children with difficulties in language and delay in learning Japanese was carried out throughout the country. The “Japanese Association of Remedial Education” was established, and the research and practice of remedial education were expanded to include arithmetic. (Later, the Study Group of Speech and Language Disorders became independent of the Japanese Association of Remedial Education and developed into the present “Japanese Association of Education for Children with Speech and Language Disorders.”) According to the list of remedial classes established across the country created by the Japanese Association of Remedial Education in 1954, remedial classes (the subjects of which were Japanese, arithmetic, and speech-language disorders) were established in 19 elementary schools in the country. The Mama Elementary School where Okuma carried out his training and the Toricho Elementary School where Hamasaki conducted his training are on the list. The practices of Okuma and Hamasaki started as remedial education and then became the foundations of the development of education for children with speech-language disorders.

## 2. Development of special class for children with speech-language disorders

The establishment of special classes for children with speech-language disorders in Sendai City Toricho Elementary School in 1958 and in Chiba City Innai Elementary School in 1959 led to the development of such special classes as the setting of remedial education for children with speech-language disorders.

### (1) Expansion of special classes for speech-language disorders

On the basis of the activities of the parents’ associations in Toricho Elementary School in Sendai City and Innai Elementary School in Chiba City, the “National Council of the Association of Parents of Children with Speech and Speech-language Disorders” was established in 1964, and a nationwide movement to establish special classes for children with speech-language disorders and the fostering and certification system of teachers began.

The “NHK Special Speech-language Training Class (Sendai Broadcasting Station)” and “NHK Remedial Speech-language Class (nationwide network),” which were based on the practices of Hamasaki and Okuma, were also aired to serve an illuminating role. Moreover, the teaching curriculum for education of children with speech-language disorders was established in teacher-training colleges across the country. Such developments led to the rapid nationwide establishment of special classes for children with speech-language disorders as sites of therapy for such children.

### (2) Training system in special class for children with speech-language disorders

Considering the system of special classes for children with speech-language disorders, it is necessary for the children in the special class to stay and to be trained mainly in that class. However, from the beginning of the adoption of the special class, *tuukyu* system, which is a resource-room system in which most of the training concerning academic subjects and fields is given in regular classes and the special training concerning speech-language disorders is given in the special class, has been adopted for the following reasons.

In Toricho Elementary School, in the first year of the special class, academic subjects were taught to a combined class consisting of three children in the third grade and four children in the fourth grade. The speech and language therapy was conducted in a class including children from other elementary schools after school hours. It was pointed out that the system was burdensome for the teacher of the class and children, as well as being inefficient. The “resource-room method” (called the “*tsukyu* method” by Hamasaki) was adopted in the following year, 1959 (Hamasaki, 1988)<sup>1</sup>.

In Mama Elementary School, the resource-room system (called the *tsukyu* system in Mama Elementary School) was adopted from the beginning of the “speech-language therapy class.” The general reasons were as follows. ① It was proved that the target children could derive educational benefits from training for one to four hours per week. ② Because the number of target children was large, the content of the training must be narrowed in order for one teacher to take charge. ③ The system was modeled after that in the US. ④ It was necessary to clarify the difference between the speech-language therapy class and the fixed special classes, most of which targeted mentally retarded children (Okuma & Yamagishi, 1997)<sup>7</sup>.

The special class for children with speech-language disorders was established as a fixed class in the institutional framework; however, the training was actually conducted

by the resource-room method until “resource-room training” was legislated in 1993.

Various problems arose, such as those related to school registration and the curriculum, because of the gap between the system and the actual training method.

### (3) Institutional characteristics of special class system for children with speech-language disorders and its practice

#### Problems in school registration and curriculum

While most of the training was conducted in regular classes, the children had to be treated as belonging to the special class for speech-language disorders in the official records such as the attendance book, school registration (curriculum guidance records), and health examination reports. As for class enrollment, because it was necessary that children who were enrolled and trained in a regular class be transferred to the special class for speech-language disorders, parental consent was required. In practice, sometimes the enrollment was not changed and the special training was given as part of educational counseling. In either case, there was a problem with the positioning of the training of children within the educational curriculum.

#### Flexible operation of system

While there were various problems in the practice under the special class system for children with speech-language disorders, it was also pointed out that the system had some beneficial characteristics.

The advantage was that a relatively flexible management of the special class for children with speech-language disorders was allowed. On the basis of the approval to establish the class and obtaining a training space (classrooms) and teachers, training and support were given to children other than those enrolled in the special class. In a relatively relaxed management environment, the special class functioned as an educational resource that could respond to the numerous needs of various children.

The ages of the children who received the training and support also varied. There were reports that training and support were given to infants, high-school students, and adults in some cases. Another advantage pointed out was that support, adapted to the individual needs of the children, was provided regardless of the status of the class in which they were enrolled; for example, speech-language training could be given to children who were enrolled in the special class for mental retardation.

### 3. Training in special class for children with speech-language disorders

The special class for children with speech-language disorders, which was called the “speech-language training class” in Toricho Elementary School in Sendai City and the “speech-language therapy class” in Innai Elementary School in Chiba City, was developed as the space for setting remedial education for children with speech-language disorders.

Behind the names chosen for the special class for children with speech-language disorders, namely, “speech-language training class” and “speech-language therapy class,” there seemed to be an intent to show that the special class for children with speech-language disorders was different from the special classes for children with other disorders and that the setting of remedial speech-language training was in the resource-room system (resource-room method).

While the special class for children with speech-language disorders was established as the setting of speech-language therapy, the target, content, methods, and views on training were developed differently within practices in individual areas.

#### (1) Change in target children

After the special classes for children with speech-language disorders were begun in Toricho Elementary School in Sendai City in 1958 and in Innai Elementary School in Chiba City in 1959, such classes became established across the country.

The number of classes increased rapidly in the late 1970s and in the early 1980s (Table 1). Changes in the status of the disorders of the target children were also observed (Table 2).

**TABLE 1** Change in number of established special class for children with speech-language disorders and in number of children enrolled

Fiscal year	Number of class (n)	Number of children (n)
1965	17	163
1970	277	2,075
1975	847	5,590
1980	1,198	7,177
1985	1,416	7,658
1990	1,429	6,614

Total number in elementary and junior high schools surveyed by the Ministry of Education, Culture, Sports, Science and Technology

**TABLE 2** Change in status of disorders of target children

	1973	1979	1985	1991
Articulation disorder (%)	27.4	25.4	31.7	36.1
Cleft palate (%)	11.2	7.1	4.9	3.5
Stuttering (%)	22.9	13.8	10.8	8.3
Hearing impairment (%)	17.7	16.9	15.8	13.4
Language development (%)	20.8	32.6	33.4	30.4
Others (%)		4.2	3.4	8.3

National survey on actual condition of special classes for children with hearing impairment and speech-language disorders (National Institute of Special Education)

In actual status, the proportion of children with disorders classified as language delay rapidly increased during the period between the survey in 1973 and 1979. (The classification “language delay” was treated as the general term for children showing a delay in language development. In the survey in 1985, this term was further divided into “main problem in language,” “main problem in emotion,” and “main problem in intellectual faculties” on the basis of the characteristics of the delay. In the survey in 1991, language delay was replaced by the term “delayed language development” to emphasize that this term was not a diagnostic term. The term “others” has been used since 1979. As for the condition of the children classified under this term, autism, mutism, delayed mental development, cerebral paralysis, learning disorders, and children returning from abroad were listed in the survey in 1991. While the classification term “language delay” has changed to the terms “delayed language development” and “others,” the number of children classified into these terms has increased, suggesting that the conditions of the children have diversified.)

These changes caused the training in the special class for children with speech-language disorders to shift from the conventional concept of remedial education (Kawashita, 1987)<sup>2</sup>. Along with this shift, the special class for children with speech-language disorders, once called “speech-language therapy class,” has gradually come to be called “speech-language training class” in many cases.

## (2) Change in concept of education observed at national convention

From the list of national conventions held by the National Public School Association of Education for Hearing and Speech-language Disorders<sup>(10)</sup> every year, we can see that “issues of system and management” was the theme from the 1st Convention (Tokyo 1972) to the 11th Convention (Fukushima 1982). This indicates that the issues in the system and management were of concern at that time (Table 3).

**TABLE 3** Titles of 1st–11th national conventions

Year, Host prefecture, Title of convention
1972, 1st, Tokyo Desirable classes for children with hearing and speech-language disorders in public school
1973, 2nd, Kanagawa Desirable classes for children with hearing and speech-language disorders in public school: Immediate issues and measures for them
1974, 3rd, Fukuoka Desirable classes for children with hearing and speech-language disorders in public school: Immediate issues and measures for them
1975, 4th, Niigata Desirable classes for children with hearing and speech-language disorders in public school: Pursuing effective training
1976, 5th, Hyogo Desirable classes for children with hearing and speech-language disorders in public school: Aiming at consistent training from early childhood
1977, 6th, Tokyo Desirable classes for children with hearing and speech-language disorders in public school: Aiming at enhancing consistent training from early childhood
1978, 7th, Yamaguchi Desirable education for children with hearing and speech-language disorders: Pursuing the role and the position of the classroom (class)
1979, 8th, Iwate Desirable classes for children with hearing and speech-language disorders in public school: Looking at the coming ten years on the basis of the current situation
1980, 9th, Miyazaki More desirable education for children with hearing and speech-language disorders: Aiming at specific management and training in the future on the basis of current situation
1981, 10th, Saitama More desirable education for children with hearing and speech-language disorders: Pursuing early detection of disorders and enrichment of consistent training system
1982, 11th, Fukushima More desirable education for children with hearing and speech-language disorders: Pursuing class management and training responding to actual status on the basis of the current situation

After the 12th Convention (1983), the themes started to vary, such as “rich in mind and language,” “rich in humanity,” and “looking for education with a new viewpoint.”

At the 12th Convention (Aichi 1983), Osamu Miyawaki (the principal of Naka-Daiichi Elementary School in Kakamigahara City in Gifu Prefecture at that time), in his panel discussion entitled “Considering the desirable future education of children with hearing and speech-language disorders from a broad viewpoint-the standpoint of school management-,” referred to the language relation diagram suggested by Johnson. Focusing on the y and z axes, he indicated that speech-language disorders were problems in the society surrounding the children rather than problems of the children themselves, and that educators should pay attention to this background. For this reason, he pointed out the significance of school and class management (Miyawaki, 1983)<sup>6</sup>.

At the 17th convention (Miyagi 1988), Kazuaki Kawashita (a teacher at Higashi-nibancho Elementary School in Sendai City and the head of the Research Division of the Miyagi Association of Hearing and Speech-language Disorders at that time) commented on the subtitle “looking for education with a new viewpoint” following the title of the convention, saying, “The training methods are highly diversified depending on the characteristics, process, and degree of language problems, and the acceptance of this diversity is the significance of the existence of the ‘language training class.’ However, through its 30-year history, the training methods have become fixed as if they were established depending on the type of disorder. Namely, the training procedure is predefined and it is applied to every child. -snip- Two major problems seem to relate to such training. One is that the speech-language training class and the teachers lose touch with the children’s actual school life and learning activities, which reduces the meaning of the speech-language training classes in schools. Essentially, the training in a speech-language training class must be organized flexibly in accordance with the problems or characteristics of the children. However, it seems that the more specialized the training becomes, the less flexible it becomes in terms of its adaptability to the real status of the children” (Kawashita, 1988)<sup>3</sup>.

While the conventional education for speech-language disorders aimed at alleviating the specific disorder of the child (x axis), Miyawaki showed the necessity of focusing on the surroundings of the children.

From the new viewpoint of education for children with speech-language disorders, Kawashita shifted the basic concept from the conventional one of remedial education to the consideration of the child’s overall school life. He also tried to confirm the significance of the existence of “speech-language training class” in schools. He is determined to review the concept of remedial education which has been

**TABLE 4** Titles of 12th–22nd national conventions

Year, Host prefecture, Title of convention
1983, 12th, Aichi Pursuing desirable education for children with hearing and speech-language disorders in the future: Aiming at the development of students rich in mind and language
1984, 13th, Aomori Pursuing a concept of education for children with hearing, speech-language, and emotional disorders in the future: Concept of class management and training for nurturing the mind and language
1985, 14th, Tokyo Pursuing desirable education for children with hearing and speech-language disorders in the future: Training with the aim of nurturing rich humanity
1986, 15th, Ibaraki Pursuing a concept of education for children with hearing and speech-language disorders in the future: Training with the aim of nurturing rich humanity
1987, 16th, Nagano Desirable education for children with hearing and speech-language disorders in the future: Pursuing a concept of training and class management aimed at nurturing rich humanity
1988, 17th, Miyagi More desirable education for children with hearing and speech-language disorders: Pursuing training with new viewpoints
1989, 18th, Tokyo More desirable education for children with hearing and speech-language disorders: Pursuing class management and training with a new viewpoint
1990, 19th, Akita Future direction of education for children with hearing and speech-language disorders: Ideal class management and training responding to requests from children
1991, 20th, Ehime Promotion of education facing and nurturing each individual child: Effective training method responding to disorders of each child
1992, 21st, Okayama More desirable education for children with hearing, speech-language, and emotional disorders: Aiming at nurturing communication ability
1993, 22nd, Hokkaido Ideal training on the basis of educational diagnoses of children with speech-language disorders

continuously sustained in the education of children with speech-language disorders and to look for new viewpoints.

After the 12th convention (Aichi 1983), the subjects

were “rich in mind,” “mind and language” and “rich in humanity,” which indicate a continuous focus on mind and humanity. The subject was “training with new viewpoints” at the 17th convention (Miyagi 1988) and “class management and training with new viewpoints” at the 18th convention (Tokyo 1989), reflecting the continuous promotion of the transformation of education for children with speech-language disorders. Moreover, the viewpoint of understanding speech-language disorders as a problem of communication was suggested at the 21st convention (Okayama 1992) (Table 4).

Behind these changes was the growing understanding of disorders promoted by the International Year of Disabled Persons in 1981 and the publication of the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) by WHO in 1980.

With the comprehensive idea of dividing disorders into three levels, namely, impairments, disabilities, and handicaps, as shown by ICIDH, speech-language disorders were also perceived from a new perspective. While conventional speech and language therapy was mainly based on the idea of understanding speech-language disorders as impairments and disabilities, when speech-language disorders were understood from the aspect of handicaps, the viewpoint arose of approaching them as problems in communication using language and in communication of relationships. This viewpoint became the basis of the subsequent transformation of the training concept.

#### 4. Establishing “resource-room training”

Since the establishment of the special classes for children with speech-language disorders in Toricho Elementary School in Sendai City in 1958 and in Innai Elementary School in Chiba City in 1959, it has taken more than 35 years for training under the resource-room system to be legislated as an educational system.

While the education of children with speech-language disorders has been developed under the system of special classes and has long been practiced in the form of training under the resource-room method (resource-room system), the realization of a system corresponding to the actual status of training has been required from the beginning of such education. Various efforts and approaches were constantly made by related organizations such as the National Public School Association of Education for Hearing and Speech-language Disorders and the National Association of Parents with Children with Speech and Speech-language Disorders.

In a circular (No. 380) entitled “Education for children needing special treatment under the partial revision of the School Education Law and its enforcement regulations”

from the head of the Elementary and Secondary Education Bureau of the Ministry of Education in October 1962, it is stated that “children with speech-language disorders should be educated in their own special class in accordance with the characteristics and degree of their disorders, or they should be trained in a regular class with consideration of their disorders.” This was the first time that the education of children with speech-language disorders was clearly specified.

In 1978, in the report “Ideal school education for children with mild mental-physical disorders” by a research and investigation committee for special education, it was suggested that “children with speech-language disorders should be trained in a special class for such children, in a resource room or by a visiting expert teacher, or in a regular class with consideration of their disorders in accordance with the characteristics and degree of the disorders.” However, such a system has not yet been realized.

In 1987, “The third report on educational reform” was published by the Ad Hoc Council of Education. It suggested that, “considering the actual status of disorders, further efforts should be made in the development and enrichment of the special classes in elementary and junior high schools, including the training system in resource-room classes.” The enrichment of “resource-room training” was also mentioned in the report by the Curriculum Council in 1988.

As an outcome of the above activities, the summary of the discussion of the Council of Researchers and Associates for Resource Room Class, entitled “Measures for enrichment of training in the resource room,” was published in 1992. In the next year, 1993, training in the resource-room method was clearly established as “resource-room training” in the partial revision of the enforcement regulations of the School Education Law.

#### 5. Development of “resource-room training”

##### (1) Issues related to transformation

The following issues have arisen in association with the transformation from special classes for children with speech-language disorders to the system of “resource-room training” (National Public School Association of Education for Hearing and Speech-language Disorders, 1994)<sup>9</sup>.

##### ① Placement of teachers

Because one teacher per about 10 children was set as the standard, a difficulty arose in establishing special classes in sparsely populated areas such as rural districts because of an insufficient number of children. This problem also became a factor that promoted the diversification of the status of disorders in order to secure subject children.

##### ② Subject children

Because the children in other special classes could

not be trained in the resource room in the new system, it became necessary to devise ways of providing care for such children, such as educational counseling.

### ③ Number of subject children

Resource-room classes are widely known to be the training field for children enrolled in regular classes. The advantage that children can be trained while they are enrolled in regular classes is recognized. As a result, the need for the education of children with speech-language disorders grew and the number of subject children increased, which led to the need to assign multiple teachers to one class.

### ④ Content of education and time of training

Because the content and time of training were specified and it became difficult to secure time for studying academic subjects, a necessity arose to be selective of the content of training and to adapt the training method.

## (2) Development of resource-room training

Even with the issues associated with the transformation from the system of special classes for children with speech-language disorders, “resource-room training” spread rapidly (Table 5). “Special class training” was gradually replaced by “resource-room training,” and the total number of subjects increased.

**TABLE 5** Change in number of children receiving “resource-room training” and “special class training” (for speech-language disorders)

Year	Resource-room training	Special class	Total
1993	9,645	5,285	14,930
1994	11,183	4,162	15,345
1995	13,486	3,380	16,866
1996	16,638	2,639	19,277
1997	19,217	1,821	21,038
1998	20,461	1,513	21,974
1999	21,944	1,298	23,242
2000	23,290	1,193	24,483
2001	24,850	1,211	26,061
2002	26,453	1,166	27,619

Ministry of Education, Culture, Sports, Science, and Technology, materials on special education

## III. Changes after Establishment of “Resource-room training” System

### 1. Change in status of children

Regarding the changes after the establishment of the “resource-room training” system, the rate of articulation disorders among the subject children increased as a whole. The improved usability of the resource-room system is identified as the reason behind this trend.

language development (delay in language development)

and other disorders also still occur at high rates. The reason may be the actual status of the resource-room system as a site for tutorial training of children with mild developmental disorders who are enrolled in regular classes (National Institute of Special Education, 1993, 1998 & 2003)<sup>5</sup> (Table 6).

**TABLE 6** Changes in disorders of target children

	1991	1996	2001
Articulation disorder (%)	36.1	49.2	43.3
Cleft palate (%)	3.5	3.0	2.0
Stuttering (%)	8.3	8.3	8.4
Hearing impairment (%)	13.4	2.5	8.6
Language development (%)	30.4	30.7	29.9
Others (%)	8.3	6.4	7.7

National survey on actual condition of special class for hearing impairment and speech-language disorders (National Institute of Special Education)

The “resource-room training” system is a system for treating children with mild disorders who are enrolled in regular classes. Teachers should be assigned and the site of training should be specified and managed as the “resource-room-training class” for each disorder type.

Considering “resource-room training” in terms of the type of disorders, speech-language disorders occur at a high rate (Table 7).

Because the number of resource-room-training classes for hearing impairments and emotional disorders is small, children with hearing impairments and those with autism receive training in the resource-room-training class for speech-language disorders in many places where a resource-room-training class for these disorders has not been established. This is also a reason for the diversification of subject disorders (Table 7).

## 2. Change in training

### (1) Responding to individual needs

The diversification of the status of children has changed the perception of the content and method of training.

The themes of national conventions of the National Public School Association of Education for Hearing and Speech-language Disorders include “responding to characteristics of individual disorders” for the 23rd convention (Tochigi, 1994) and “responding to requests (needs) from children” for the 24th (Chiba, 1995) and 26th (Oita, 1997) conventions.

The promotion of training that responds to the needs of individual children has become increasingly required. The titles of recent conventions indicate that it has become

**TABLE 7** Rates of disorders of children and students receiving “resource-room training”

Fiscal year	Speech-language disorder (%)	Hearing impairment (%)	Emotional disorder (%)	Amblyopia (%)
1993	78.8	9.3	10.9	0.9
1994	79.5	8.1	11.5	0.8
1995	80.8	7.2	11.1	0.8
1996	83.2	6.4	9.7	0.7
1997	84.0	6.0	9.0	1.0
1998	84.0	6.0	10.0	1.0
1999	85.0	5.2	9.0	1.0
2000	84.5	5.0	9.7	0.5
2001	84.1	5.0	10.4	0.5
2002	83.3	5.1	11.1	0.5

The number of children with physical disabilities and health impairments was 0.2% or lower. (Data on Special Education provided by the Ministry of Education, Culture, Sports, Science, and Technology)

difficult to deal with children by merely typifying the status of their disorders and categorizing them into predetermined cases (Table 8).

At the time of those conventions, educational trends were shifting from the conventional standardized education to education that respects individuality and caters to individual differences. Following discussions of the Ad Hoc Council of Education (from 1984 to 1987), the viewpoints of respecting individuality and education catering to individual differences were presented in the discussion on “desirable education in Japan looking toward the 21st century” at the 15th and 16th Central Education Council meetings (from 1995 to 1997). These discussions are also part of the reasons for the change in content and method of training.

Because education for students with speech-language disorders had mainly been practiced as tutorial training, research and development on the planning and implementation of the “tutorial training program” were conducted in some areas after the “resource-room training” system was institutionalized.

In particular, “resource-room training” was considered complementary training to the education in schools and was aimed at responding to the individual needs of children, their parents, and schools. The ideas of accountability and informed consent, namely, explanation of and gaining consent for the training content from the subject children, their parents, and schools (classes), were introduced in the determination of the training content. These may also be part of the reason for the change in the content and method of training (Metropolitan Board of Education, 1997)<sup>8</sup>.

**TABLE 8** Titles of 23rd–32nd national conventions

Year, Host prefecture, Title of convention
1994, 23rd, Tochigi Desirable education for children with hearing and speech-language disorders in accordance with the characteristics of individual disorders: Aiming at accurate educational diagnosis and its better practice
1995, 24th, Chiba Better education for hearing and speech-language disorders: Class management responding to needs of children
1996, 25th, Nara Better education for children with hearing and speech-language disorders: Pursuing educational practice from a long-term perspective
1997, 26th, Oita Better education for children with hearing and speech-language disorders: Aiming at classroom and class management and training that responds to needs of children and the local area
1998, 27th, Shizuoka Better education for children with hearing and speech-language disorders: Seeking desirable support towards individual self-realization on the basis of the role of education for children with hearing and speech-language disorders
1999, 28th, Tokyo Better education for children with hearing and speech-language disorders: Desirable education with respect for individual children
2000, 29th, Yamagata Pursuing desirable education on listening and speaking to enhance sound development of children: Seeking ways to understand and train children
2001, 30th, Shimane Desired support for children to live their own lives
2002, 31st, Hokkaido Desirable training based on educational diagnosis of children with speech-language disorders
2003, 32nd, Gunma Desirable education on language and listening to support rich communication: What is revealed by various forms of collaboration

## (2) Enrichment of life and establishment of self-identity

“Desirable support for children to live their own lives” was featured in the title of the 30th national convention of the National Public School Association of Education for Hearing and Speech-language Disorders (Shimane 2001).

In the keynote proposal of the convention, Yoji Matsubara (a teacher at Matsubara Elementary School in Hamada

City, Shimane Prefecture, at the time) proposed that, while conventional training is aimed at the improvement and overcoming the disorder status of the children, it should focus on the life of the children and devise “support for children to live their own lives.” He brought up the necessity of accepting the present status of the children, not attributing difficulties in life to the children’s disability, and providing support for the enrichment of the children’s lives through relationships with the people around them (Matsubara, 2001)<sup>5</sup>.

In other words, instead of the viewpoint emphasizing the overcoming of disorders and improvement of children’s ability, education focusing on individual initiative and the lives of children with disorders was suggested.

In the Plan for People with Disabilities -- Seven-Years Normalization Strategy, which was drawn up in 1995, “aiming at improving the quality of life (QOL)” was considered as one of the seven aims for promoting measures on the basis of rehabilitation and normalization. “The necessity of improving the social life, including not only activities of daily living (ADL) but also the cultural activity and family life of disabled people” was also indicated. Such changes in the concept of measures for disabled people has also stimulated changes in the concept of education for children with speech-language disorders.

#### IV . Tentative discussion of issues in education for speech-language disorders

Thus far, we have been following the course of education for children with speech-language disorders from the viewpoints of the “education system” and the “ideas and content of education” considering the correlation between these viewpoints.

Here, the changes are reexamined and a tentative discussion on the various issues is proposed on the basis of the answers to the following questions. (1) What kind of children are the subjects of the “speech-language training class?” (2) What are the content and the methods of education for children with speech-language disorders? (3) What qualifications are required of teachers providing education for children with speech-language disorders?

##### 1. What kind of children are the subjects of the “speech-language training class?”

The “speech-language training class” is established as a forum of education responding to speech-language disorders from an institutional viewpoint.

At the beginning, the “speech-language training class” was established as a forum for speech-language therapy. Since then, its function has been extended to respond to the various educational needs of children. This change, namely,

the issue of the diversification of disorders, has continued since the late 1970s when the number of “speech-language training classes” rapidly increased. The issue at the time was predominantly dealing with children with delayed language development. Currently, the issue has shifted to dealing with children who, in regular classes, have difficulties in learning and in life as part of a group.

This change can be understood as an expansion of the content and function by shifting the focus from the aspect of speech to that of language and from the formal aspect of speech-language (speech-language training) to the functional aspect (communication) in the framework of education for children with speech-language disorders.

These issues have also been presented as issues of “speech-language training class” management. There has been discussion among those who regard the “speech-language training class” as a site of speech-language therapy for children with speech difficulties and those who regard it as a site for providing support to children who are enrolled in regular classes but have other needs. By analogy to the education system in the US, whether the “speech-language training class” should be a “speech clinic” or a “resource room” was also discussed.

There was divergence in the viewpoints of the parties participating in the discussion in many cases; some emphasized desirable education for speech-language disorders and its specialization while others focused on the desirable function of the “speech-language training class.”

What we know from this discussion is that, in practice, the “speech-language training class” has been managed from both the viewpoints of speech-language therapy and support for children with various needs. Both viewpoints have been emphasized and put into practice with regard to local circumstances, the history of the establishment, and the perspective of the parties concerned at the time.

##### 2. What are the content and methods of education for children with speech-language disorders?

Education for children with speech-language disorders started as speech-language therapy. At first, on the basis of knowledge of speech pathology, the purpose of the education was mostly understood as improvement of language skills of children with speech-language difficulties through an educational method. It was often said that, “Speech-language disorders are curable disorders that can be treated just as tooth decay is treated, and going to the speech-language training class is similar to going to a dental clinic.”

However, along with the diversification of the subject children, the aspect of support for their development was emphasized. The emphasis on the content and method of training shifted from the aspect of teaching to that of promoting speech-language activities of the children in which the teacher is part of the environment, and the training has the function of developing the environment surrounding the children and encouraging and supporting those nurturing the children.

Recently, on the basis of knowledge obtained from research on communication disorders, training and support focusing on the relationship between two persons, namely, a child and a person who is part of the child's environment, are being carried out with the view that speech-language disorders are not problems specific to the child but are communication disorders.

Educational support that emphasizes the enrichment of the child's life, not on the difficulty or delay in language or the improvement of the child's ability, is also being attempted. Such support is provided from the standpoint of focusing on respecting the individual initiative of the child and on the improvement of the quality of the child's life.

These old and new viewpoints can also be understood in terms of the difference in the two standpoints concerning the education of children with speech-language disorders.

One standpoint is that the education of children with speech-language disorders involves "activities for alleviating the speech-language disorders of children by an educational (not medical) approach," and the second one is that education comprises "activities for understanding all aspects of the children with speech-language disorders and for supporting the enrichment of their lives, self-establishment, and self-realization."

Content and methods of training have been proposed and practiced from each standpoint, which considers the characteristic differences.

What we should understand here is that education for children with speech-language disorders has both aspects described above, i.e., improving the disorders and supporting children to enrich their lives. Each aspect has been emphasized and put into practice at different times depending on the actual status of the individual children, the education and culture of the local area, and the view concerning speech-language and education of the teacher in charge.

### 3. What qualifications are required of the teachers involved in educating children with speech-language disorders?

Efforts to improve the qualification of teachers involved in educating children with speech-language disorders have been made for a long time within the framework of the issue of fostering and training teachers.

To date, the teaching curriculum for fostering teachers involved in educating children with speech-language disorders has been followed in teacher-training colleges across the country. The national government, local governments, and some research organizations have also offered training. The qualification system for these teachers has also been a concern. The development of a licensing system to ensure the expertise of teachers has been suggested (Council of Researchers and Associates on Improvement and Enrichment of Special Needs Education-the 1st and 2nd reports-1998 and 1999).

Under these circumstances, discussion on the expertise of teachers involved in educating children with speech-language disorders was triggered in 1998 by the legislation of the licensing system for speech therapists, which is a national certification. Various questions were raised in the discussion: should teachers involved in educating children with speech-language disorders obtain this qualification; what is the difference between specialists (such as speech therapists) and the teachers; what is lacking in the expertise of these teachers compared with that of specialists (such as speech therapists); and what is the expertise of teachers involved in educating children with speech-language disorders<sup>11</sup>?

The key to answering these questions is discussed below.

If teachers involved in educating children with speech-language disorders have the same expertise and role as specialists (speech therapists), they would be replaced by the specialists (speech therapists).

Teachers for the education of children with speech-language disorders are expected to have qualifications in both "specialized content concerning speech-language disorders" and "specialized content concerning education."

The education of children with speech-language disorders involves helping such children find their individuality, choose their own way of life, and achieve self-realization. The teachers involved in such education must have confidence in and be able to explain not only their knowledge of speech-language disorders but also their overall knowledge of the mind and development of children, the life of the children at school, at home and in

the local community, the academic subjects and fields, and the method of supporting children.

## V . Conclusion

The education of children with speech-language disorders has passed through a history of conscientious study and efforts by people in the aspects of both the “development of content and methods of education” and the “development of the system.” Moreover, its educational resources have been enriched as well as modified according to current thought.

The education of children with speech-language disorders began with the emphasis on the “individual” and, along with the system of resource- room training, has accumulated more than 40 years of history in its practice and achievements.

In June 1997, the Central Education Council suggested the “necessity of education that responds to individual ability and aptitude” in a report on “desirable education in Japan looking toward the 21st century.” Their concept was described as follows: “Education is the activity of supporting the ‘self-searching journey.’ Through education, children acquire the foundations and basis to live in society as well as find their individual characteristics and choose a suitable way of life for themselves. During these successive procedures, children gain various experiences through the process of trial and error and seek their self-realization. Appropriate support for such children is the most important mission of education.” “Considering the nature of education, respecting individual characteristics as something irreplaceable and trying to develop them should be the basic concept behind educational reform.”

In March 2003, the Council of Researchers and Associates on Desirable Special Needs Education in the Future, in their report “Desirable Special Needs Education in the Future (final report),” suggested a “transformation to ‘special support education’ that provides appropriate educational support in response to the educational needs of individual children with disorders,” reflecting a transformation from mass education to education for individual needs.

The trend in education is directed to the viewpoint of the “individual.”

The viewpoint of education is being shifted from “looking at individuals from the eyes of society” to “looking at society from the eyes of individuals.”

The viewpoint of education for children with speech-language disorders is also being shifted from “support

for individuals to participate in society” to “support for individuals to live a rich life.”

More than 40 years ago, our predecessors made efforts to establish education for children with language disorders, focusing on individuals; now, education is again being directed towards the “individual” with new meaning.

The aspects of “individuals” and “society” are always at opposing ends, and the viewpoint of education wavers between them. Someday the viewpoint of education may again shift in another direction. Education for children with speech-language disorders should also change accordingly.

We believe that, even if the system of education for children with disorders changes in the future, the educational resources and culture developed through the education of children with speech-language disorders will continue and be further enriched and developed in line with the trends and ideals of the coming age.

## Notes

### (1) Education of children with speech-language disorders

The education of children with speech-language disorders is literally understood as the education of children with speech-language disorders. However, it has a different meaning from the education of children with disorders in other aspects in terms of system and content.

First, because speech-language disorders also occur in association with other disorders, the training concerning speech-language disorders associated with other disorders is given in the context of education for the major disorder. Therefore, the education of children with speech-language disorders is the education of children whose major problem is speech-language disorder.

Second, because children with speech-language disorders can learn academic subjects in a regular class, training in the education of children with speech-language disorders mainly consists of dealing with the speech-language disorder.

Because of these institutional features, the education of children with speech-language disorders is characterized by the training concept emphasizing the “removal and reduction of the disorder.”

### (2) Remedial training

Remedial training is conducted for children with difficulties in learning subjects. Occasions and opportunities for tutorial training are designated separately from regular

classes. It is also conducted as special training with the content and methods devised in response to the difficulties of individual children.

### (3) Remedial education

In this paper, this term is used to denote the investigation of the cause of poor school performance and the proper teaching of children showing poor school performance provided by specialist teachers. It does not indicate any direct medical treatment.

### (4) Resource-room system

Kiyomatsu Okuma started using this term in the field of education for children with speech-language disorders. It is a form of training in which most of the education concerning the teaching of academic subjects is given in regular classes and the special training concerning speech-language disorders is given at a special site (such as in a speech-language therapy class).

Until the legal establishment of the system of "resource-room training," the form of resource-room training was called the "resource-room system" or "resource-room method" and was one type of training in special classes. Kiyomatsu Okuma was the first to use the term "resource-room system," and Kenji Hamasaki, the term "resource-room method."

### (5) Speech therapist

The national certification system for speech therapists (Speech Therapists Law) was legislated in 1997. It is mainly designed as the certification of specialists who are engaged in medical and welfare support for people with speech-language and hearing disorders. As a transition measure within five years after legislation, teachers who had engaged in training for speech-language and hearing disorders in the schools were also qualified for the national exam for speech therapists if they met certain conditions.

### (6) Speech-language training class

The site for "resource room training (for speech-language disorders)" is commonly called the "speech-language training class." Conventionally, this term had been used as an alternative to the "special class for children with speech-language disorders." The site for resource-room training is also called the "resource-room-training class for children with speech-language disorders" in many cases. However, there is no official provision on how to describe the site of "resource-room training." Considering the current status in which the system of the special class for children with speech-language disorders coexists with the resource-room system, we used the term "speech-language training class," which has been widely used for a long time.

### (7) Teachers of education for children with speech-language disorders

The term is used for the teachers involved in the education of children with speech-language disorders. In this paper, we used this term for the teachers of the "speech-language training class." Some teacher-training colleges have a teaching curriculum for fostering teachers of the "speech-language training class;" however, there is no licensing system that ensures the expertise of such teachers. Specialists in speech-language disorders are qualified under the teacher's licensing system for self-care activity in schools for disabled children; however, this system is not designed for teachers who are responsible for "resource-room training (of children with speech-language disorders)."

### (8) Speech-language therapy

Generally, "the process of promoting linguistic improvement and interpersonal adaptation of a person with speech-language disorders is called speech-language therapy (Encyclopedia of Speech-language Disorders: Iwasaki Academic Publisher)."

### (9) Therapy class

This term is used for the remedial training class for children having delay or difficulties in learning Japanese and arithmetic. Aside from specialized teachers, the teachers of regular classes teach the class concurrently in some cases.

### (10) National Public School Association of Education for Hearing and Speech-language Disorders

This is a nationwide association consisting of teachers of special classes for children with hearing disorders and children with speech-language disorders; it was established in 1971. It has promoted research on the content and method of training and has made efforts to improve the educational conditions. National conventions are held yearly in cooperation with related organizations across the country. It also publishes the journal "*Kikoe-to-Kotoba* (Listening and Speaking) (in Japanese)."

(11) "Pioneering the 21st century: desirable education (support) for children with hearing and speech-language disorders" was discussed from various viewpoints by the Promotion Committee for Training and Management of the National Public School Association of Education for Hearing and Speech-language Disorders.

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## Tactile graphics in braille textbooks: Practical guidelines for making tactile drawings

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**Abstract:** Braille textbooks include not only Braille text but also tactile drawings. These text and drawings are edited and made based on original ordinary textbooks. Among these ones, tactile drawings are not understood tactually unless they are made with various ideas. In Japanese Braille textbooks, tactile drawings made by Braille dots has majority. So we aimed to investigate practical guidelines for making tactile drawings by dots in Braille textbooks. We mentioned these five points as follows, giving examples with tactile drawings based on pictures and charts in ordinary textbooks. 1) Textbooks have pictures and charts that are not necessarily important from a viewpoint of its content. We have to appropriately choose pictures and charts in textbooks to be made tactile drawings. Occasionally, we should substitute suitable text for pictures and charts. 2) In tactile drawings by Braille dots, lines, surfaces as well as dots are made by dots. So tactile graphics by Braille dots has some restrictions due to making tactile drawings by dots alone. 3) Tactile perceptions have some characteristics that are different from visual perception. We need to make tactile drawings, following some criterions on the distance between two components, number of components in some unit area and so on. 4) Textbooks include various pictures and charts. So we need appropriate guidelines according to these ones. But, before we do so, it is effective that we classify various pictures and charts from two viewpoints; whether exact form of these ones is important and which information has priority in these ones. 5) Detailed explanatory notes in Braille should be added to tactile drawings. This promotes understanding of tactile drawings.

**Key Words:** Tactile drawing, Tactile drawing by Braille dots, Practical guidelines, Braille textbook, Visual impairments

## The study of generalization about question-answering behavior to the interrogative sentences for a child with autism

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**Abstract:** We studied about question-answering behavior of interrogative sentences for a child with autism. This training applied the technique of matrix training. Two kinds of questions (behavior + whom and man + what) were asked to one photograph stimulus. The card with which the name of a person or the behavior was given as a choice. By presenting a question sentence only an interrogative, it became possible it not only can to choose a card appropriately, but to answer in verbal languages. And it became possible to answer also about two kinds of questions, behavior + whom and mane + what. We considered about the generalization of question-answering behavior to the interrogative sentences for a child with autism.

**Key Words:** Children with autism, Question- answering, Interrogative sentences, Generalization

## Considerations on support systems in regular schools designated as “The model schools project for LD” : Through questionnaire on systems during and after the “The model project for LD”

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**Abstract:** In “A project for making a support system for children with Learning Disabilities substantial” put into practice in 2000-2002, 98 elementary and junior high schools were specified for the project. In this study, the actual conditions of those schools were researched. Results showed that how to make a committee for the support with LD in each school was classified into 4 ways. The committee in each school acted according to the condition of each school. The cooperation with a team of specialists and a consultant who made his rounds was important for school, but it was found difficult to adjust the schedules of them. After the termination of the project the committee has kept up its action in about 75% of schools. To push on with the action of committee in school, it is important to ① share information of child with all the staff, ② to act regularly according to an annual plan, ③ to be adjusted by special support education coordinator, ④ to act independently without depending on specialists, ⑤ to evaluate of its action.

**Key Words:** A support system in school, The model project for LD, A committee in school, Evaluate

## Early intervention in educational guidance of school for the deaf

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**Abstract:** The purpose of this present study is to investigate on the existing condition of early intervention in educational guidance of school for the deaf. The investigation items are included the first session after hearing impairment diagnose, interpretation for parents on deaf and hard of hearing, estimate of hearing level through auditory assessment, coordination on multi-disciplinary working and child care support. Concerning the first session after hearing impairment diagnose, it is suggested that the staff of educational guidance should be provide the environment which parents are apt to talk on their thought and concentrate to listen to their talking. On the interpretation for parents on deaf and hard of hearing, communication, deaf education, and usage of hearing aid is more important than physiological information of auditory region. On the estimate of hearing level through auditory assessment, it is suggested that the staff of educational guidance should be estimate the hearing level of infant through his/her behavior through hearing to sound with his/him parents and also should be refer to parent's document on his/her behavior through hearing to sound on daily life on the estimation of hearing level. Concerning coordination on multi-disciplinary working, the school for the deaf would be appeal to the authorities concerned on the function of school through school exhibition. It is necessary that the function of school is understand by the authorities concerned. Finally, on the child care support, it is suggested that it is important to extend to primary child development except to the deaf concerned on parent's angle.

**Key Words:** School for the deaf, Education guidance for infants and children, Early intervention

# The concept of special educational needs and development of special education in japan: A point of controversy about this concept in britain and the implication in japan

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**Abstract:** Britain introduced the concept of "Special Educational Needs" in special education by the Education Act 1981. The special educational provision for children with special educational needs has been improved by using the concept "Special Educational Needs" instead of the concept "Disabilities" since 1981. The concept of "Special Educational Needs" has spread in European countries and international organizations as OECD and UNESCO, and became a central concept in the education for children with disabilities. The purpose of this research is to examine details of the introduction of this concept, to consider the problems and the critical points when 20 years passed afterwards in Britain. In addition, this research aimed to consider the point which had to be noted when Japan will introduce a similar concept to develop special education. The following points are given as problems which relate to this concept in Britain. ① Function of labeling, ② Original concept for education, ③ Realities which exceeds the definition, ④ Revival of concept about disabilities, ⑤ Type division of needs for explanation. It was pointed out that the concept of "Special Educational Needs" was improper in the following reason when thinking about the development of special education in Japan. ① The implication of the concept "Special Educational Needs" is not discussed, and "Disabilities" concept is not reexamined. ② "Needs" is used by a lot of different contexts, therefore the confusion of the meaning is caused. It was considered that Special Educational Needs was not an appropriate concept in the idea of the development of the special education in the future. It was discussed that it would be important that "Educational Difficulties" and "Activity Limitation" were assumed to be key words in the future. This discussion suggests that these are Relative Concepts which arise from the interaction a child and his or her environment. "Educational Difficulties" and "Activity Limitation" do not always start from within the child.

**Key Words:** Special educational needs, Britain, Educational difficulties, Activity limitation, Relative concepts

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## The study for educational programs and instructional methods for students with autism

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**Abstract:** We made a study on educational programs and instructional methods for students with autism in special schools of intellectual disabilities. For the purpose of our research, we asked for questionnaire investigation to teachers of special schools. We categorized six categories about educational programs and four categories about instructional methods. From the result of comparison among divisions of school (elementary, lower secondary and upper secondary) about educational programs, we found there were differences about educational programs among divisions of school. From the result of comparison among divisions of school about instructional methods, we found instructional methods in elementary divisions were better than others. And from the results of comparison among situation of divisions, we discussed on importance of school organized activities.

**Key Words:** Students with autism, Questionnaire investigation, Educational programs, Instructional methods

## Study on change in staff at the schools for visual impairment in Japan

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**Abstract:** A research was conducted to take hold on the trend of changes in personnel at school for the visual impairment in Japan. The data of past ten years from 1992 to 2001 on “annual survey on the actual situation on school for the visual impairment in Japan” was used in this research. From the overall standpoint, It was indicated that service years of personnel in the school for visual impairment is several years on an average and as service years wore on, the number of personnel decreased with year. Number of years with the school of teachers on division of elementary school, junior high school and high school were for five or less years. Dames of students residence and teachers of vocational course were relatively long-term career.

**Key Words:** Change in personnel, Schools for visual impairment, Specially of a teacher

# Idological genealogy in background of “individua educational support plan”

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**Abstract:** The conversion from "Special Education" to "Special support Education" is being accomplished in our country, and various revisions of the system of the education are done now for that. In the above-mentioned situation, it is assumed to be one of the important elements to promote "Special Support Education" to make "Individual Educational Support Plan". In this research, the meaning of "Individual Educational Support Plan" was analyzed from historical and ideological viewpoints in two areas of the education and welfare.

**Key Words:** Special education, Individual educational support plan, Welfare

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