Current Status and Difficulties in the Production of Barrier-free Teaching Materials for Low Vision Children: "Large-printed Textbooks"

CHIDA Kouki
Formerly Department of Educational Support

SAWADA Mayumi
Department of Educational Support

Abstract: "Large-printed textbooks" are useful teaching materials for children with low vision. The preparation of these books by volunteers and the relatively few specialist publishers in Japan involves enlarging and editing the text and pictorial cuts in original government authorized textbooks so that children with low vision can readily access these materials. The National Institute of Special Needs Education (NISE) has been conducting research and providing information on editing and preparing Large-printed textbooks taking into consideration the characteristics of the vision of individual children. This paper provides an overview of the outcomes and problems encountered, reviews the changes in social conditions and educational environment of Large-printed textbooks, and makes suggestions for future research to address these problems and to understand the special educational needs of low vision children.

Key Words: Large-printed textbook, Large-printed manuscript volunteer, Large-printed textbook drafting manual, Charge-free distribution, Universal design

I. Introduction

The fundamental philosophy of special needs education is "to provide appropriate instruction and necessary support suitable to cater to/ meet the education needs of each and every disabled infant, child and student." This is also true for the education of low vision children, and it is important in the provision of an easily accessible visual environment for low vision children. Based on this philosophy, in the future, it will become increasingly necessary to develop easily viewable and user-friendly textbooks based on the concept of "universal design," and suitable to meet the educational needs of disabled children.

For some low vision children/students with limited visual acuity, currently distributed texts and the pictorial cuts of authorized textbooks are too small and difficult to see. In this context, low vision children/students use Large-printed textbooks with enlarged texts and pictorial cuts.

The current research project is part of a larger-scale NISE research initiative. Previous completed research studies include, "*Survey Research on Large-printed Teaching Materials Suitable to Visual Characteristics of Low vision Children: Development and Support on Drafting Large-printed Textbooks for Low vision Children*" (Financial Year - FY2002-03), and, "*[An] Empirical Study on Developing Large-printed Textbook Drafting System and its Impacts on Education*" (FY2004-06). This research initiative has resulted in the accumulation of much information and understanding of easily viewable text size for low vision children/students as well as on text/picture enlargement/ optimization strategies. The results have been published in research reports and in a monograph entitled, "*Large-printed Textbook Drafting Manual*," published by The Earth Kyoikushinsha Co., Ltd.[5]. Concurrently, NISE has engaged in empirical research on Large-printed textbook drafting systems and their impact on education, in information services, and the diffusion of textbook barrier-free textbooks with the aim of establishing a barrier-free learning environment to ease the current restrictions on low vision students and other disabled students as much as possible.

Over the past few years, there have been significant developments in the editing and effective-use of Large-printed textbooks—such as the amendment to the Copyright Act—or in the method of distribution of free-of-charge textbooks. According to a report of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), "*Elementary/Secondary Education News No. 38," in FY2005, 9,000* Large-printed textbooks were distributed free-of-charge to 600 children/students nationwide. This distribution program provides textbooks to visually disabled children/students who local education boards deem appropriate to use Large-printed textbooks in the classroom.

In this case, the relevant school or municipal education board is required to take predetermined procedures, and then, the prefectural education board is required to act as a coordinator and report to MEXT.

On the other hand, low vision students and volunteer groups have been recently calling for the drafting of several versions of Large-printed textbooks suitable for individual low vision children/students. In addition, some volunteer groups engaged in the preparation of Large-printed textbooks have approached textbook publishers to provide authorized textbook digital data. As a teaching material, textbooks should be easily understandable for as many children/students as possible. However, currently authorized textbooks are not necessarily, "easily viewable and understandable," for low vision children/students with wide eyesight gap. In fact, they often present a significant barrier to learning.

This paper describes the historical background of Large-printed textbooks for low vision children/students in Japan as well as the background information on the drafting of Large-printed textbooks. In addition, it highlights the practical problems of developing and using Large-printed textbooks, and discusses the "universal design" of textbooks suitable for use in the education of low vision children/students.

II. Historical Background of Large-printed Textbooks

1. Large-printed Teaching Materials (Large-printed Textbooks)

(1) Commencement of education for low vision children

In Japan, education for low vision children began in December 1933 when Nanzan Elementary School in Asouku, Tokyo City established a "low vision class." Since at that time, education for low vision children was provided to protect and preserve eyesight, after a brief period, the class was renamed, the "Eyesight Preservation Class." The history of education for low vision children at Nanzan Elementary School was less than 12 years because the class was closed in April 1945 due to the Great Tokyo Air Raids, but it played a pioneering role in establishing an appropriate learning environment for low vision children in Japan.

For example, the classroom had (a) white ceilings, (b) white upper, cream-colored middle, and faint-green lower wall sections, (c) eleven 100-watt bulbs with white shades, (d) green boards at the front and back of the room, (e) single-person-use inclined desks with bookstands (i.e., the upper desk board inclined), (f) various magnifying lenses, and (g) custom-made teaching materials and notebooks. Today, these facilities are a model for classrooms for low vision children as illustrated by the simple replacement of lighting equipment with fluorescent lamps.

On the other hand, teachers at that time understood the necessity for Large-printed textbooks, but they used the same textbooks as ordinary classes because using larger Chinese characters would cause printing costs to escalate, and would pose many other difficulties. [4)]

(2) Education for low vision children and national language teaching aids in the elementary division of schools for the blind

In June 1953, MEXT circulated the decree, "*Criterion for Identifying Children/Students Requiring Special Education Attention*" (MEXT Vice Ministerial Notice). This promulgation defined low vision students as, "persons who are generally unsuitable for using ordinary child-use textbooks without modification and who are deemed as requiring other methods than visually-impaired person's education." This notice indicated the decision-making criteria for defining children with low vision, and the most appropriate action. MEXT had been providing administrative guidance that low vision students should be educated at schools for the blind or in special classes for low vision children/students, depending on the degree of their eyesight.

Schools for the Blind that mainly used Braille began to establish classrooms for low vision children/students. For example, since 1952, the Osaka Prefectural School for the Blind has been preparing Large-printed textbooks by handwriting textbooks with writing brushes and making the necessary copies of these. Similarly, other schools for the blind started to separate low vision students from visually impaired students.

In this context, since teachers felt the need for print textbooks with the same contents as Braille textbooks, in March 1963, "National Language Teaching Aids of Elementary Division in Schools for the Blind" (six books for each grade) were developed. Since April 1963, for a period of six years, teachers used Gothic font-based (First Class Gothic or Class 1 Gothic) textbooks for elementary school seventh graders and Class 2 Mincho font-based textbooks for second graders or older students. Although not textbooks for use by low vision students, they were of great significance as the first Large-printed teaching materials in Japan.

(3) Using the electronic magnifying copier "Elefax"

Following the development of the electronic magnifying copier, "Elefax," in 1962, teachers started using the copier to prepare Large-printed teaching materials for low vision students. In 1964, Hokkaido Prefectural Asahikawa School for Blind also introduced the "Elefax," and in the following year, teachers started using it for magnifying textbooks for some subjects. Five schools for the blind are reported to have used Large-printed textbooks improving outcomes for

education for low vision children. Based on this, MEXT attempted to introduce electronic magnifying copiers and offset printers at schools for the blind nationwide in a three-year plan commencing in FY1967. In FY1973, the Ministry also decided to introduce electronic magnifying copiers at low vision special classes (hereinafter, "low vision classes") as well. Following the introduction of commercially available enlargement/reduction copiers in 1985, teachers stopped using electronic magnifying copiers.

（4）Activities of Large-printed manuscript volunteers

The period 1965-67 saw the establishment of low vision classes, and subsequently, the demand for Large-printed textbooks for low vision children/students grew. Increasingly, in this period, volunteer groups began to prepare "Large-printed manuscripts" by rewriting texts in easily readable size for elderly people and visually impaired persons who used local libraries in the local community. In the 1975-1985, the Large-printed manuscript volunteer groups also started preparing Large-printed manuscripts of ordinary books and textbooks for low vision children/students nationwide.

The groups also prepared Large-printed manuscripts of textbooks on a voluntary basis for low vision children/students. However, as the demand grew, in the period 1985-89, analysts started to argue the necessity for "Large-printed textbooks" for low vision children/students that were usable nationwide. Some volunteer groups, such as the Large-printed manuscript volunteer group in Fukuoka, made enlarged copies of textbooks and donated them to schools for the blind and low vision classes across the country.

In this context, in 1997, Large-printed manuscript volunteer groups nationwide merged to form a Large-printed textbook network, called the "*National Large-printed Teaching Materials Production Council*," with the aim of preparing Large-printed textbooks suitable to meet the learning needs of every low vision pupil/student. At the time of the inauguration of the Council, there were 43 member groups, but as of September 2007, this number had risen to 63.

（5）The Japanese Association of Education for Low Vision

As teachers at schools for the blind and low vision classes called for Large-printed textbooks usable on a nationwide scale, in 1991, the Japanese Association of Education for Low Vision established a "*Large-printed Teaching Materials Taskforce*," to explore how to prepare Large-printed textbooks. On request from MEXT, in FY1991-92, the Taskforce" enlarged and edited authorized original textbooks for schools for the blind on behalf of low vision children/students. Edited versions of Large-printed textbooks for elementary school-level children published were (a) national language textbooks for 2nd to 6th grades, (b) junior high school level national language textbooks for 7th to 9th grades, (c) elementary school-level math textbooks for 3rd to 6th grades, and (d) junior high school level mathematics textbooks for 7th to 9th grades. Teachers have been using these national language and mathematics textbooks at schools for the blind and low vision classes since FY1992 at the elementary school level, and since FY1993 at the junior high school level.

2. Basic Perspectives on Large-printed Textbooks

（1）Providing a better learning environment for low vision children/students

An important and basic aspect of education for low vision children is how teachers can provide an easily visual learning environment. As basic approaches to improve visibility for low vision children/students and to foster their ability to see and skillful way of looking at things, teachers have been traditionally using the following methods:

1) Showing things widely and clearly (expanding retinal images)
2) Carefully comparing objects (improving visual awareness)
3) Coordinating eye and hand function (improving visual/physical coordination)
4) Adjusting light intensity through illumination or light interception
5) Enhancing/reversing/adjusting the contrast between pictures and background

There are several ways of providing an "easily viewable" environment. The expansion of retinal images—as mentioned in Item (1) above—is the most common approach. When using this, teaching methods include: (a) asking children/students to come closer, (b) expanding visual materials (i.e., enlarged copies and Large-printed

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Note 1) Electronic magnifying copier "Elefax"

It is a magnifying/reducing copier introduced for education for low vision children in order to prepare Large-printed teaching materials in 1965-1975 (Copier size: Approximately 1.4 meter high, approximately 1 meter wide and approximately 1.5 meter long). It works in the same manner as camera zoom. By adjusting lens distance, users are able to alter the magnification ratio seamlessly from 0.7 times to 1.4 times. This copier takes two steps for making copies. First, the copier sends out a duplicate with toner unfixed. At this stage, users are able to easily remove dirt, waste or unnecessary portions. After these modifications, it finishes off making a copy by fixing toner with thermal treatment.

textbooks), (c) using amblyopic lenses, (d) using low vision-use large image TVs (i.e., magnified reading devices, etc.), and (e) using other optical aids.

（2）Effective use of optical aids and Large-printed teaching materials for learning purposes

The use of magnifying lens for low vision persons is a typical optical aid—lenses optically enlarge retinal images. Various types of magnifying lenses are available dependent on intended usage. Commercially available loupes, monocles, and telescopes are also usable as low vision-use magnifying lenses and it is possible to select a magnification ratio suitable for the eyesight of each low vision pupil/student. However, low vision persons usually need high-power magnifying lenses. Higher-power magnifying lenses usually limit text/picture information in the effective visual field of the lens and require a certain amount of training on focus adjustment. In this context, as skills and motivation to use these lenses are required, low vision persons should be given adequate training to ensure their effective use.

In the case of magnifying TV-type reading devices, users are able to change the enlargement factor seamlessly and display on a color screen. In addition, users are also capable of reversing black/white presentations and adjusting contrasts through negative/positive selection. Since this device provides large magnifications of 20-fold or stronger, it is a very effective tool for very low vision persons who suffer difficulty in the use of low vision-use lenses (This device is covered with the visual disability-related daily tool subsidy program from FY1993, and the government offers a maximum subsidy of ¥198,000). As with the effective use of low vision-use lenses, training in the use of low vision-use magnifying TV is also required.

As Large-printed textbook show enlarged texts and pictures widely and clearly, children/students are able to detect these features, see the entire view from a comfortable distance, and analyze it by coming closer as necessary. In particular, Large-printed textbooks are important for young children and elementary school children because they are able to pick it up, obtain definite images and concepts, and feel no resistance to looking at things at an early stage in their lives.

III. Recent History of Large-printed Textbooks

1. Contribution of NISE

（1）Basic perspectives on editing/preparing Large-printed textbooks

As for education for visually impaired children/students, it is important to evaluate the difference in vision of each child/student from an educational perspective, and utilize teaching materials and educational tools suitable to their level of vision. In other words, it is important to provide and utilize Large-printed textbooks and optical aids in an appropriate manner.

Over the two-year period (FY2002-03), the Department of Research and Development at NISE has prepared and edited computer based Large-printed textbooks in the fields of social studies and science based on the recommendations of the "Large-printed Teaching Materials Taskforce" mentioned above. NISE has engaged in this work and associated research activities using the following premises:[1)]

1) From the very beginning of education for low vision children in Japan, teachers used Large-printed teaching materials recognizing that these teaching materials played an important role in determining education outcomes. Even today, this recognition remains unchanged.
2) Low vision children/students have different levels of eyesight. In addition, even if they have the same eyesight, they have differences in vision, depending on the nature of their ophthalmic disease. For this reason, it is necessary to prepare Large-printed textbooks suitable to meet the needs arising from these individual differences. However, it is difficult to prepare the variety and range of sizes of Large-printed textbooks necessary to that address all these needs on a nationwide-scale.
3) In this context of preparing Large-printed textbooks usable for as many low vision children/students as possible, NISE established a standard of appropriate text sizes, based on the assumption of a person with 0.1 vision on the Japanese eyesight scale (or 20/48 vision on the U.S.A eyesight scale) [1) 5)]. This standard emerged from the results of a quinquennial project conducted by Tsukuba University and NISE; the study by Tsukba University was entitled, "*Survey Research on Causes of Visual Disabilities of Children/Students at Schools for the Blind and Elementary/Lower Secondary-Level Low Vision Classes in Japan*,"[2) 3)] and the NISE survey was entitled, "*[A] Fact-Finding Survey on Elementary/Junior High-Level Low Vision Special Classes and Low Vision Resource Room Classes in Japan*." [6) 7) 8)]
4) However, a single version of Large-printed textbooks is inadequate to meet all needs of low vision children/students in Japan. For this reason, the special education needs of students having difficulties in using these Large-printed textbooks is required to be met from private sources, such as those of the Large-printed manuscript volunteer groups.
5) When editing/preparing Large-printed textbooks, NISE uses OCR devices to scan the original textbooks and store electronic data to edit and prepare the textbooks in a PC environment. By doing so, NISE is able to smoothly edit and prepare full-color textbooks

and publish Large-printed textbooks in color. NISE decided to employ this on-demand printing approach because it quickly addresses the needs of children/students requiring these textbooks and because not many children/students need this resource.

6) In the past, the preparation of Large-printed textbooks required permission from copyright holders and, therefore, posed a significant obstacle. However, due to the partial amendment of the Copyright Act in June 2003, it is now possible to prepare Large-printed textbooks by simply making contact with textbook publishers without obtaining approval from individual copyright holders (the amended Copyright Act came into effect on 1 January, 2004).
7) Nevertheless, the copyright problem remains when converting data into digital format. It is necessary to store digital data and edit the data without damaging the original textbook source.
8) When using Large-printed textbooks, low vision students and teachers should improve education outcomes by skillfully using appropriate tools suitable to individual needs, grade needs, and student characteristics, such as effectively utilizing optical instruments and visual aids, including the use of low vision lenses.

（2） Editing and publishing Large-printed textbook*s*

In the period FY2002-03, schools for the blind and low vision classes adopted as “Article 107 books,” Large-printed textbooks prepared and edited by NISE. In addition, since FY2004, these Large-printed textbooks have been distributed free-of-charge to low vision children/students in ordinary classes.

With amendments to textbooks, revised elementary school-level textbooks were adopted in FY2005. Schools at the junior high level adopted revised textbooks in FY2006. In this context, it became necessary to prepare new Large-printed textbooks and to research appropriate editing/preparing approaches capable of efficiently preparing textbooks to address the educational needs of a range of low vision children/students. To achieve this, NISE engaged in a three-year research project (FY2004-06) entitled, “*Empirical Study on Developing Large-printed Textbook Drafting System and its Impacts on Education*.”[1)]

In FY2004, NISE edited and prepared Large-printed versions of social studies and science textbooks for elementary schools, and in FY2005, NISE also edited and prepared Large-printed versions of social studies and science textbooks for junior high schools scheduled for use from FY2006. In this process, based on the research findings on the preparation and development of Large-printed textbooks, NISE has conducted research on appropriate Large-printed textbook preparation and digitalization methods capable of providing easily understandable textbooks and efficiently enlarging/editing textbooks.

In FY2005, schoolteachers in elementary and junior high schools used 1,250 Large-printed textbooks in the fields of social studies and science that had been edited/prepared by NISE. These were published by the Cues Corporation. As of FY2006, Large-printed textbook publishers provide a range of Large-printed textbooks (Table 1). [1)] Further, Table 2 shows the number of elementary/junior high school-level Large-printed textbooks used by teachers at each grade level in the fields of social studies and science that have been edited by NISE and published by the Cues Corporation. The number of copies is 1,822; Junior High Science 1 (Part 1) = 75 books, and Junior High Science 2 (Part 2) = 26 books. The textbooks actually used vary widely, but on average there are 52 textbooks for each subject area. In addition, teachers use 968 mathematics textbooks published by Daikatsuji Co., Ltd. [1)]

2. Activities of Large-printed Drafting Volunteers and Low Vision People

（1） The “National Large-printed Teaching Materials Production Council”

The “National Large-printed Teaching Materials Production Council” was established in October 1997 as a national network of volunteers producing Large-printed textbooks. As of September 2007, the council had a membership of 63 volunteer groups.

The council serves as a point-of-contact for Large-printed manuscript volunteers in Japan who prepare Large-printed textbooks on a voluntary basis for low vision children/students needing these resources. While there are currently some textbook publishers and Large-printed textbook publishers who provide these resources, in most cases, they are provided by the volunteers.

（2） The “Low Vision People Affairs Study Group”

To realize a society more friendly to low vision persons, in 1977 low vision people established the “Low Vision People Affairs Study Group.” Since its foundation, the study group has been working on various issues, such as employment opportunities, and barrier-free educational environment for low vision persons. From an educational environment perspective, it investigates career choice and school-life problems for low vision children. In terms of Large-printed textbooks, the study group also conducts various activities, such as submitting requests to MEXT to initiate a stable program to provide Large-printed textbooks from the elementary school to the high school levels.

3. The MEXT

As mentioned previously, Large-printed textbooks have

Table 1 List of "Large-printed textbooks" published by Large-printed textbook publishers

		Large-printed textbook					Original textbook (Publisher)
	Subject	Textbook title	Number of textbooks	Font size	Font	Publisher, point of contact	
Elementary school	National Language	National Language 2nd grade (Part 1) Tanpopo, (Part 2) Akatonbo	2	26P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 2nd grade (Part 1), (Part 2) (Mitsumura Tosho)
		National Language 3rd grade (Part 1) Wakaba, (Part 2) Aozora	2	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 3rd grade Part 1, Part 2 (Mitsumura Tosho)
		National Language 4th grade (Part 1) Kagayaki, (Part 2) Habataki	2	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 4th grade Part 1, Part 2 (Mitsumura Tosho)
		National Language 5th grade (Part 1) Ginga, (Part 2) Daichi	2	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 5th grade Part 1, Part 2 (Mitsumura Tosho)
		National Language 6th grade (Part 1) Souzou, (Part 2) Kibou	2	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 6th grade Part 1, Part 2 (Mitsumura Tosho)
	Math	New Math 3 Part 1, 3 Part 2	2	18, 22 or 26P	Round Gothic	Daikatsuji Tel: 03-5282-4361	New Math 3 Part 1, 3 Part 2 (Tokyo Shoseki)
		New Math 4 Part 1, 4 Part 2	2	18, 22 or 26P	Round Gothic	Daikatsuji Tel: 03-5282-4361	New Math 4 Part 1, 4 Part 2 (Tokyo Shoseki)
		New Math 5 Part 1, 5 Part 2	2	18, 22 or 26P	Round Gothic	Daikatsuji Tel: 03-5282-4361	New Math 5 Part 1, 5 Part 2 (Tokyo Shoseki)
		New Math 6 Part 1, 6 Part 2	2	18, 22 or 26P	Round Gothic	Daikatsuji Tel: 03-5282-4361	New Math 6 Part 1, 6 Part 2 (Tokyo Shoseki)
	Social Studies	New Social Studies 3/4 Part 1, 3/4 Part 2	2	26P	Round Gothic	Cues Tel: 03-3358-1049	New Social Studies 3/4 Part 1 3/4 Part 2 (Tokyo Shoseki)
		New Social Studies 5 Part 1, 5 Part 2	2	22P	Round Gothic	Cues Tel: 03-3358-1049	New Social Studies 5 Part 1, 5 Part 2 (Tokyo Shoseki)
		New Social Studies 6 Part 1, 6 Part 2	2	22P	Round Gothic	Cues Tel:03-3358-1049	New Social Studies 6 Part 1, 6 Part 2 (Tokyo Shoseki)
	Science	New Science 3rd grade	1	26P	Round Gothic	Cues Tel: 03-3358-1049	New Science 3rd grade (Tokyo Shoseki)
		New Science 4th grade Part 1, 4th grade Part 2	2	22P	Round Gothic	Cues Tel: 03-3358-1049	New Science 4th grade Part 1, 4th grade Part 2 (Tokyo Shoseki)
		New Science 5th grade Part 1, 5th grade Part 2	2	22P	Round Gothic	Cues Tel: 03-3358-1049	New Science 5th grade Part 1, 5th grade Part 2 (Tokyo Shoseki)
		New Science 6th grade Part 1, 6th grade Part 2	2	22P	Round Gothic	Cues Tel: 03-3358-1049	New Science 6th grade Part 1, 6th grade Part 2 (Tokyo Shoseki)
	National Language	National Language 7th grade-1, 7th grade-2, 7th grade-3	3	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 7th grade (Mitsumura Tosho)
		National Language 8th grade-1, 8th grade-2, 8th grade-3	3	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 8th grade (Mitsumura Tosho)
		National Language 9th grade-1, 9th grade-2, 9th grade-3	3	22P	Gothic	Mitsumura Tosho Tel: 03-3493-2111	National Language 9th grade (Mitsumura Tosho)
Junior high school	Math	New Math 1-1, 1-2	2	18, 22 or 26P	Gothic	Daikatsuji Tel: 03-5282-4361	New Math 1 (Tokyo Shoseki)
		New Math 2-1, 2-2	2	22P	Gothic	Daikatsuji Tel: 03-5282-4361	New Math 2 (Tokyo Shoseki)
		New Math 3-1, 3-2	2	22P	Gothic	Daikatsuji Tel: 03-5282-4361	New Math 3 (Tokyo Shoseki)
	English	NEW HORIZON English Course 1 Part 1, 1 Part 2	2	18, 22 or 26P	Gothic aria1	Daikatsuji Tel: 03-5282-4361	NEW HORIZON English Course 1(Tokyo Shoseki)
		NEW HORIZON English Course 2 Part 1, 2 Part 2	2	18, 22 or 26P	Gothic aria1	Daikatsuji Tel: 03-5282-4361	NEW HORIZON English Course 2(Tokyo Shoseki)
		NEW HORIZON English Course 3 Part 1, 3 Part 2	2	18, 22 or 26P	Gothic aria1	Daikatsuji Tel:03-5282-4361	NEW HORIZON English Course 3(Tokyo Shoseki)
	Science 1st Category	New Science 1st Category Part 1-1, -2, -3, 1st Category Part 2-1, -2	5	22P	Round Gothic	Cues Tel: 03-3358-1049	New Science 1st Category (Tokyo Shoseki)
	Science 2nd Category	New Science 2nd Category Part 1-1, -2, -3, 2nd Category Part 2-1, -2	5	22P	Round Gothic	Cues Tel: 03-3358-1049	New Science 2nd Category (Tokyo Shoseki)
	History	New Social Studies: History 1, 2, 3	3	19P	Round Gothic	Cues Tel: 03-3358-1049	New Social Studies: History (Tokyo Shoseki)
	Geography	New Social Studies: Geography 1, 2, 3,4	4	19P	Round Gothic	Cues Tel: 03-3358-1049	New Social Studies: Geography (Tokyo Shoseki)
	Civics	New Social Studies: Civics 1, 2, 3	3	19P	Round Gothic	Cues Tel: 03-3358-1049	New Social Studies: Civics (Tokyo Shoseki)

Table 2 Number of “Large-printed Textbooks” on Social Studies and Sciences actually used in FY2006

Elementary school	
Elementary School New Social Studies 3/4 Part 1	49
Elementary School New Social Studies 3/4 Part 2	49
Elementary School New Social Studies 5 Part 1	51
Elementary School New Social Studies 5 Part 2	51
Elementary School New Social Studies 6 Part 1	56
Elementary School New Social Studies 6 Part 2	56
Elementary School New Science 3	41
Elementary School New Science 4 Part 1	39
Elementary School New Science 4 Part 2	39
Elementary School New Science 5 Part 1	53
Elementary School New Science 5 Part 2	53
Elementary School New Science 6 Part 1	47
Elementary School New Science 6 Part 2	46
Junior high school	
(New edition) New Social Studies Geography-1	66
(New edition) New Social Studies: Geography-2	66
(New edition) New Social Studies: Geography-3	66
(New edition) New Social Studies: Geography-4	66
(New edition) New Social Studies: History-1	63
(New edition) New Social Studies: History-2	63
(New edition) New Social Studies: History-3	63
(New edition) New Social Studies: Civics-1	62
(New edition) New Social Studies: Civics-2	62
(New edition) New Social Studies: Civics-3	62
(New Edition) New Science 1st Category Part 1-1	75
(New Edition) New Science 1st Category Part 1-2	75
(New Edition) New Science 1st Category Part 1-3	75
(New Edition) New Science 1st Category Part 2-1	27
(New Edition) New Science 1st Category Part 2-2	27
(New Edition) New Science 2nd Category Part 1-1	74
(New Edition) New Science 2nd Category Part 1-2	74
(New Edition) New Science 2nd Category Part 1-3	74
(New Edition) New Science 2nd Category Part 2-1	26
(New Edition) New Science 2nd Category Part 2-2	26
Total:	1,822 textbooks

been distributed to low vision children/students at schools for the blind and low vision classes as "Article 107 books," but in FY2004, MEXT commenced a free-of-charge Large-printed textbooks distribution program (doc. No.: MEXT No.46, April 1, 2004) for low vision children/students in ordinary elementary and junior high schools.

This free-of-charge-free distribution program provides textbooks to visually disabled children/students who local education boards deem have educational needs requiring the use of Large-printed textbooks. In this case, the school or municipal education board is required to take predetermined procedures, and then prefectural education board, as the coordinating authority, reports to MEXT (see Figure 1). However, MEXT does not necessarily provide education boards and teachers with sufficient information on this program, and often fails to achieve their necessary understanding. For this reason, MEXT is making an effort to enhance the understanding of education board members and teachers about the use of Large-printed textbooks. Concurrently, the Ministry has requested prefectural education boards to establish "Large-printed Textbooks Counseling Desks," to provide information and counseling services for children/students needing these specialized textbooks, the parents of these children with special needs, and Large-printed textbook drafting volunteers (doc. No.: Primary Education No.16, August 2006). In this context, additionally MEXT has advised that "Braille Textbook Counseling Desks" need to be established.

On the other hand, schools for the blind are also playing a role as a local support center for visually impaired children/students. In FY2005, a "Large-printed Textbook Network," was established as a subordinate organization of the National Association of Visually-Impaired School's Principals. This network provides information on Large-printed textbooks and serves as a point-of-contact, together with the "National Large-printed Teaching Materials Production Council," which consists of volunteer groups.

IV. Dissemination of Large-printed Textbooks

1. Changes in social condition/environment of Large-printed textbooks

There have been significant changes over the past few years in the editing and use of Large-printed textbooks for low vision children/students, such as the amendment to the Copyright Act and the distribution of free-of-charge-free Large-printed textbooks.

(1) Free-of-Charge distribution to low vision children/students

In the past, if Large-printed textbooks have been adopted for use by schools for special needs education (e.g., schools for the blind, etc.), or special classes (e.g., low vision classes) as "Article 107 books," they have usually been distributed through the textbook free-of-charge distribution system as a substitute for authorized textbooks. Since FY2004, however, Large-printed textbooks have been available for low vision children/students in ordinary classes of elementary or junior high schools if the appropriate school authorities approve such usage.

As discussed in the "Introduction" section of this paper, according to a report of MEXT (Elementary/Secondary Education News, No.38), as of FY2005, approximately 9,000 Large-printed textbooks have been distributed free to approximately 600 children/students nationwide.

(2) Copyright exemption

Textbook copyright has previously caused problems in the preparation of Large-printed textbooks. However, since the partial amendment to the Copyright Act in June 2003—the Amended Copyright Act came into effect on 1 January 2004—publishers are now able to prepare Large-printed textbooks without obtaining an individual author's approval (i.e., in the same manner as used with authorized textbooks). This has enabled Large-printed textbook drafting volunteers to start textbook production by simply sending a facsimile letter to the Textbook Publishers Association of Japan (TPAJ) without obtaining prior approval from authors. In the case of publishers, they have to pay royalties designated by the Commissioner of the Cultural Affairs Agency, but they are also exempt from obtaining author approval.

2. Requirements made of Textbook Publishers

(1) MEXT and TPAJ (Textbook Publishers Association of Japan)

In the 164th Diet session, Commission Members of the House of Representatives and the House of Councillors discussed a "*Bill for Partially Amending the School Education Act*." The lawmakers noted that, "There is only a limited range of Large-printed textbooks available from textbook publishers and Large-printed teaching materials publishers, so it is necessary to change the current situation in which Large-printed textbooks are produced mainly by voluntary groups." Further, they noted that, "They (the publishers) provide only limited types of digital data, and the content is inadequate, as well." When voting on the Bill at the committee stage, lawmakers put forward the collateral resolution: "Efforts should be made for improving and diffusing Large-printed textbooks for visually-impaired persons."

Following this, on 22 July 2006, the Minister for Education, Mr. Kenji Kosaka, sent a letter to representatives of textbook publishers, stating, "I would like you to examine publishing Large-printed textbooks. If you don't do so, I would be grateful if you could make (your) best efforts, such as actively providing digital data." In addition,

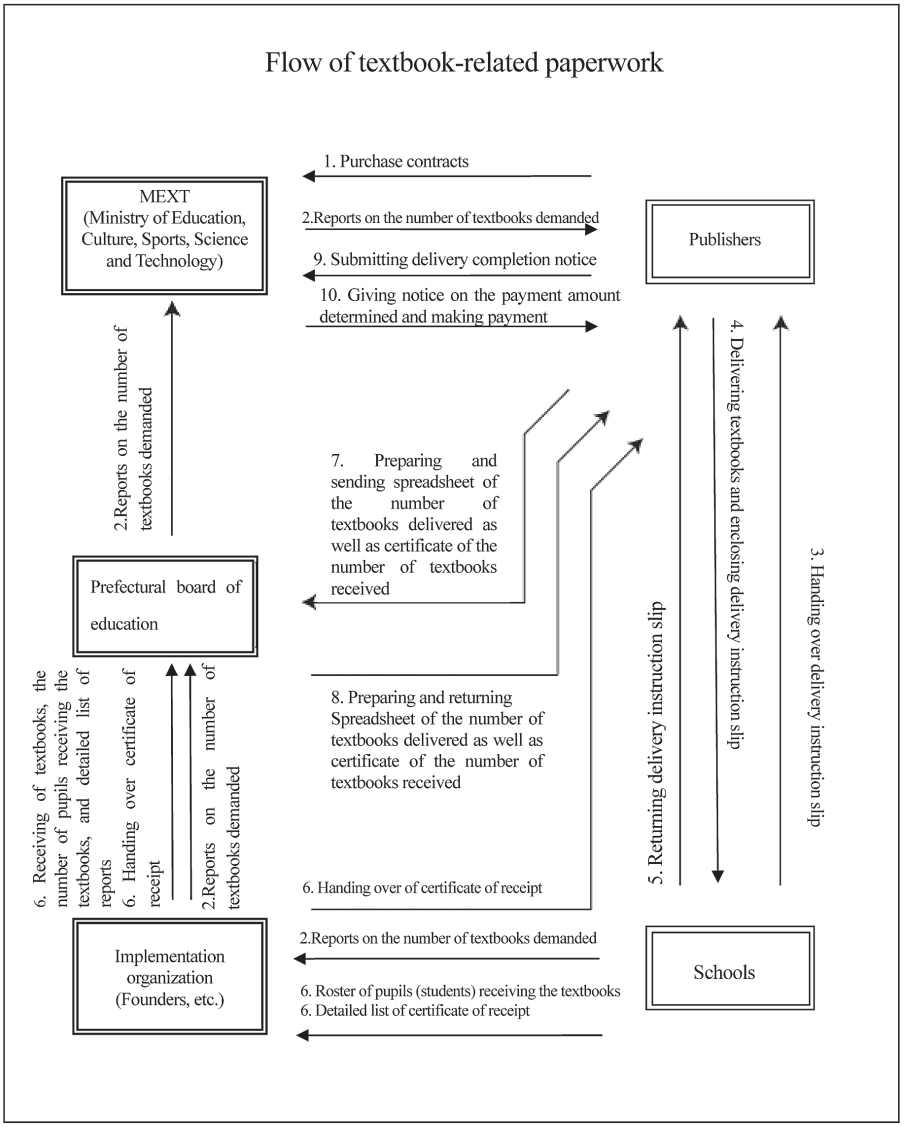

Figure 1　Flow of paperwork on application for Large-printed textbooks

on 3 August 2006, Mr. Zeniya, the Director-General of the Elementary and Secondary Education Bureau, fowarded a notice entitled, “Publishing Large-printed Textbooks and Providing Textbook Digital Data (Notice)” to TPAJ. In support of Minister Kosaka’s letter, the Director-General's notice also requested textbook publishers to make their best efforts, specifically examining the provision of digital data, as investigated by the TPAJ “Copyright Taskforce,” and examining publishing Large-printed versions of current published textbooks, as investigated by the TPAJ “Large-printed Textbook Working Group.”

In April 2007, TPAJ established a new unit entitled, the “Large-printed Textbook Investigative Meeting” to start examining possible approaches for providing digital data for textbooks and publishing Large-printed versions of currently available textbooks.

（2）Efforts of textbook publishers

To date, the “Mitsumura Tosho Publishing Co., Ltd.” has been preparing/publishing Large-printed versions of its own textbooks. Mitsumura publishes elementary- and junior high school-level national language textbooks in 22-26 point Gothic font (Table 1). In addition, in FY2007, the textbook publisher, “Gakko Tosho Co., Ltd.,” published a Large-printed version of the Junior High National Language 1 textbook. In the production of the Large-printed version, Gakko Tosho enlarged the A5-sized paper authorized for textbooks to A4 size (i.e., a 1.4 times larger version). The font size used was 14-18 points, which is smaller than Large-printed textbooks published so far. This Large-printed version simply looks like a 1.4 times larger version of the authorized textbooks. However, as pictures and photos are enlarged with the text, Gakko Tosho uses a new typesetting when preparing these Large-printed textbooks.

Best practice is for publishers to prepare and publish Large-printed versions of their own textbooks. However, Large-printed textbooks are not the same as authorized textbooks. In addition, as texts and pictorial cuts are enlarged, royalties must be paid to copyright holders. In this sense, even if a publisher expands or produces textbooks, there are problems. Consideration on these issues will be necessary in the future.

In this context, it is an important that textbook publishers have begun to publish Large-printed versions of their textbooks. Nevertheless, authors are expecting to prepare and publish more Large-printed textbooks in the future. In this way, the publishing environment of Large-printed textbooks in Japan has made significant advances.

V. The universal design of textbooks

To create Large-printed textbooks suitable for low vision children/students, it is necessary to lie out texts, pictorial cuts, and photos in an easily identifiable manner by using a text size recognizable by everyone. However, as low vision children/students view objects idiosyncratically, there is no "one fit for all" Large-printed textbook.

Low vision students and volunteer groups have been requesting the drafting of several types of Large-printed textbooks suitable for every low vision child/student. In addition, some volunteer groups that prepare Large-printed textbooks are calling for textbook publishers to provide the digital data for authorized textbooks.

As a teaching material, textbooks should be easily understandable for a wide range of children/students. However, many currently authorized textbooks are not necessarily "easily viewable and understandable" for low vision children/students who have gaps in vision. In fact, they erect significant barriers to learning.

Large-printed textbooks have been designed to carry enlarged and easily viewable texts, pictorial cuts, and illustrations of ordinary authorized textbooks for low vision children/students with weaker eyesight. Materials that are easily viewable and understandable for low vision persons should also be easily viewable and understandable for ordinary children/students. This also holds true for children with other diseases.

Through preparing and utilizing Large-printed textbooks, it is necessary to work on and suggest possible universal design of textbooks suitable for education for visually disabled students.

VI. Future Challenges

Social conditions and the education environment in which Large-printed textbooks are used has seen significant change in the past few years. MEXT commenced a new program to provide Large-printed textbooks for low vision children/students free-of-charge. Copyright restrictions on the publication of Large-printed textbooks have also been relaxed. In this sense, the education environment of low vision children/students has improved.

However, to address the educational needs of all the low vision children/students, there are social problems remaining that need mitigation and solution. For example, it is necessary to address the demand-supply imbalance between the number of Large-printed textbooks currently available and that of children/students need for such textbooks. With the exception of Large-printed textbooks published by a limited number of Large-printed textbook publishers, such demand has been met solely by the efforts of Large-printed textbook drafting volunteers. The focus of this initiative is the "National Large-printed Teaching Materials Production Council." However, since low vision children/students require various types of Large-printed textbooks, private services from Large-printed textbook drafting volunteers do not sometimes satisfy the needs of low vision children/students. For this reason, it takes a longer time to prepare the necessary volume of Large-printed textbooks.

In addition, low vision students and volunteer groups have been calling for the drafting of several types of Large-printed textbooks suitable for each low vision children/student. In addition, some volunteer groups that prepare Large-printed textbooks are requesting textbook publishers to provide the digital data of authorized textbooks. MEXT encourages textbook publishers to roll out Large-printed textbooks and provide the supporting digital data. In response to this request, TPAJ is currently examining possible approaches for providing digital data and publishing Large-printed versions of their textbooks. In this process, TPAJ commenced its efforts to provide text data on some elementary- and junior high school-level textbooks on social studies and science for FY2008.

To address these challenges, the central government should improve Large-printed textbook distribution programs and textbook publishers should actively engage in the production and publishing of Large-printed versions of their current textbooks.

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*** Endnote**

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NISE has been working on “A Series of Studies on Preparation of Large-printed Textbooks and Educational Support (2002-2007)” to date. In addition, social conditions have also been changing, such as adopting the “Convention on the Rights of Persons with Disabilities (adopted in 2006).” In this context, the Japanese government has been reviewing its education programs for disabled persons, in particular its policies on low-vision pupils/students.

After that, on June 10, 2008, Japanese lawmakers passed an “Act on Promotion of Distribution of Specified Books, etc. Used as Textbooks for Disabled Children and Students” in the Diet, which became effective on 17 September, 2008. In line with the principle of equal educational opportunity, this legislation is intended to encourage dissemination of specified books used as textbooks for disabled pupils/students so that they will able to receive sufficient education, regardless of their disabilities or other characteristic traits.

As this legislation has come into effect, in terms of encouraging the dissemination of Large-printed textbooks, MEXT is supposed to develop and publicly announce the standard guidelines on Large-printed textbooks, while textbook publishers are supposed to make best efforts to publish standard Large-printed textbooks in line with the minister’s guidelines.

In addition, by obliging textbook publishers to provide their textbook digital data to MEXT, etc. Japan has established the framework for smoothly providing the textbook data to Large-printed textbook creation volunteers.

In the wake of this legislation, MEXT developed the standard guidelines on Large-printed textbooks at the compulsory education level (elementary and junior high school levels) in December 2008 and started providing textbook digital data to volunteer groups in February 2009.

In January 2010, the Ministry also developed standard guidelines on Large-printed textbooks at the high school level, thereby expanding the Large-printed textbook distribution program to the high school level.

(NISE Bulletin Editorial Committee)