

**2021** Edition

SUZUKI's Education for the Blind Students

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# Look by Ears, Read by Hands, Walk by Head

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Read by Hands,  
Walk by Head**

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Walk by Head**



# INTRODUCTION

## What is unique about education for children with visual impairments?

When teaching students with visual impairments, people might assume that they will never be as successful as those who have normal vision. However, many children with visual impairments grow to be very talented and even smarter than their seeing peers. Therefore, we should teach them essential skills as early as possible to help them reach their highest potential. The essential skills they need to master will be referred to as look by ear, read by hand, and walk by head.



### Look by ears

**Look by ears** is understanding the environment and processing it using auditory information sensed by the ears. Children with visual impairments can “see” what is behind them even without turning around. Their ears can grab auditory information simultaneously from all directions.

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**Read by hands** is reading braille to understand the environment, reading tactile signs or maps using the hands, as well as using them to weigh objects or sense temperature.



### Read by hands



### Walk by head

**Walk by head** is navigating a route and reaching the destination through orientation while using mobility skills. Blind children can move to the target location by using a cane once they learn how to read tactile maps.



**LOOK BY EARS**

## 1. LOOK BY EARS

### 1. How Sounds and Echoes Inform Children with Visual Impairments

People who teach children with visual impairments are often surprised to see the student's amazing sensitivity to sound. For example, they can identify a person just by listening to their footsteps and recognizing the pattern. They also find intersections when walking down the street by listening to the sounds of traffic.

Clues of sounds and echoes. Sounds, are those coming directly from car engines or tires, footsteps, or music played by shops along the street. It is easy to gain information from these sounds in the surrounding area. Echoes come from a cane's tapping or footsteps, and these also render clues. Children with visual impairments can catch slight differences in the echoes when the sounds bounce off walls, fences or other objects. Therefore, if there is a tree or pole or telephone box on the street, blind children will identify it by listening to the echoes.

Once a blind child has learned how to recognize and distinguish various sounds and echoes, it is time for them to practice in the real world.

### 2. Technology Using Ultra Sonic Waves: The Sonic Guide






Sonic Guide



K-sonar

**The Sonic Guide** is assistive technology that tells the distance of an object. It sends ultrasonic waves in the direction the user is facing and relays audible acoustic signals; 1m is signaled by the sound of 1khz, 2m by 2khz, 5m by 5khz, and so on. Besides just telling the distance, it can also identify the type of object. Its signal varies depending on the type of material the sonic wave bounces off of.

The Sonic Guide plays the role of a magnifying glass to users because it provides more detailed information of the environment. The same material will have two different sounds, depending on whether the user is moving or standing still. It offers clear information to the user who can then compare the sounds to know what is ahead.

Examples of acoustic signals when user is moving or standing still			
OBJECT	 Telephone pole / concrete	 Streetlight / iron	 Waved Fence
SOUND			
Moving(移動中)	Pin Pin!~	Pin Pin!~	Shufin Shufin~
Standing Still(停止)	Bin Bin~	Pin Pin~	Rion Rion~
OBJECT	 Wired Fence	 Bush Fence	 Brick Wall
SOUND			
Moving(移動中)	Pin Pin!~	Shua Shua~	Byu Byu~
Standing Still(停止)	Ryoshu Ryoshu~	Shoa Shoa~	Rion Rion~

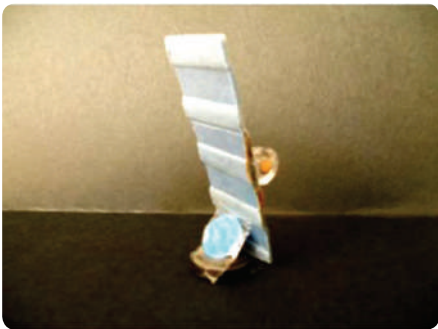
(! : means the sound rapidly fade out)

Mr. Suzuki used miniatures 3D models with students that were using the Sonic Guide. He made diorama sets with miniature trees, poles, fences and cars which represented the real environment. The student would then compare the miniature set with the real world using the Sonic Guide. Students could better understand sound signals' implications about various objects in the area.

### Communication pole



### Overpass stairway



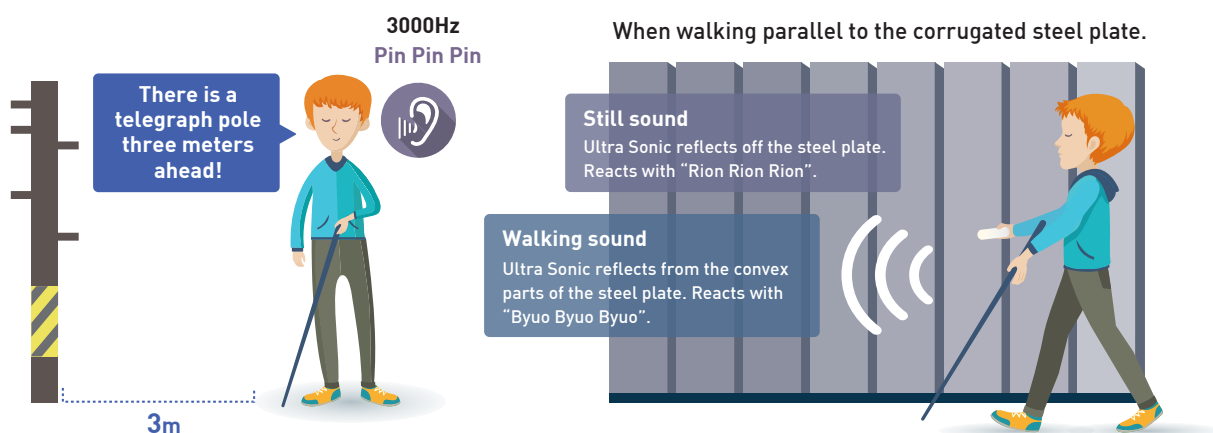
### Building mini village



In one case, a student had lost his vision during middle school. He practiced walking using the Sonic Guide and diorama sets. Later, when he got used to the technology and gained meaning of sound signals, he could draw the shape of the road with tactile pen by listening to sounds from the Sonic Guide.

### 3. Technology Using Ultra Sonic Waves: K-Sonar

Mr. Suzuki gained more expertise in teaching blind students using another technology, K-Sonar. This was basically a more developed version of the Sonic Guide. Students could have a greater awareness of various environments by using this device. Many teachers of the blind in Hokkaido noticed its effectiveness and followed suit. They engaged students in activities by practicing a combination of using the K-Sona and 3D miniatures.



As instructors taught the sounds that came from the machine, students were more engaged, while listening to the change in tone as various objects translated into unique signals. Eventually, they became more curious about general sounds even while they were not using assistive devices. They started trying to notice small changes in sounds and echoes that came from their cane, traffic, walls and fences. That was the most important thing that teachers intended from the start: understanding one's surroundings and knowing one's position in the environment.



**READ BY HANDS**

## 2. READ BY HANDS

In 1970, Mr. Suzuki started teaching in Hokkaido at Sapporo Blind School. He learned that students in vocational training classes who were studying acupuncture, moxibustion, and massage, would receive a national license for their own business after graduation. Mr. Suzuki noticed that learners did not use braille textbooks, even though they offered many that contained relevant professional knowledge. As a result, most students studied using a cassette player that had recordings of the teachers' voice from class. The blind students felt they had to study in their dormitory rooms. They didn't want to bother others in class with the sounds coming from the cassette player. Mr. Suzuki wondered why students did not study using the braille textbooks.

### 1. Why Students Did Not Like to Read Braille

The reality was, it was easier to write in braille, but reading braille was an extremely difficult and slow process, even after plenty of practice. So, people who accidentally lost vision later in life acknowledged that learning and studying with braille textbooks was almost impossible. However, Mr. Suzuki doubted that.



**Reading Braille Book**

In 1966, Mr. Seo Masao, a teacher at the blind school in Tokyo, taught braille to 4 children at elementary 1st grade. His lessons started in April. He tested students' progress in May, June, and July. He discovered that of the 46 Japanese braille symbols, students demonstrated various levels of difficulty; 17 letters were simple to learn, another 16 letters were of a 'medium' difficulty, and the last 13 were very difficult.

## 2. Grouping of Letters



Using these results, Mr. Suzuki categorized Japanese braille into 5 levels according to how difficult the letters were to learn. However, his method was a little different from Mr. Seo's categorization in that he took distinctive features of each symbol into consideration. He started teaching level 1 letters, the easiest, to 3 students in vocational training classes. All of them had acquired visual impairments later in life. He taught them every day after supper because they stayed in the dormitory. (Table 1)

**Table 1** SUZUKI's Grouping

No 1	A ●○ ○○ ○○	Me ●● ●● ●●	Re ●● ●● ○○	Fu ●● ○○ ●●	U ●● ○○ ○○	I ●○ ●○ ○○	Ni ●○ ●○ ●○	Ku ●● ○○ ○○	○○ ○○ ○○	○○ ○○ ○○	○○ ○○ ○○
No 2	Ko ○● ●○ ○○	Ka ○● ○○ ○○	O ○● ●○ ○○	Yo ○○ ○○ ●○	Hi ○○ ○○ ●●	Nu ○○ ○○ ●○	No ○○ ●○ ●○	To ○○ ●○ ●○	Na ○○ ○○ ●○	○○ ○○ ○○	○○ ○○ ○○
No 3	Ta ●○ ○○ ●○	Sa ○○ ○○ ○○	Shi ○○ ○○ ○○	Mi ○○ ○○ ●●	Wa ○○ ○○ ●○	Mu ○○ ○○ ●○	Ne ○○ ○○ ●○	Mo ○○ ○○ ●○	Tu ○○ ○○ ●○	○○ ○○ ○○	○○ ○○ ○○
No 4	Yu ○○ ○○ ●●	Su ○○ ○○ ○○	Wo ○○ ○○ ○○	Ya ○○ ○○ ○○	Ha ○○ ○○ ●●	Ru ○○ ○○ ○○	Ma ○○ ○○ ●○	So ○○ ○○ ○○	Ki ○○ ○○ ○○	○○ ○○ ○○	○○ ○○ ○○
No 5	He ●● ○○ ●●	Ke ●● ○○ ○○	Nn ○○ ○○ ●●	Ho ○○ ○○ ●●	Ra ○○ ○○ ○○	Se ○○ ○○ ○○	Ti ○○ ○○ ○○	Ri ○○ ○○ ○○	Ro ○○ ○○ ○○	E ○○ ○○ ○○	Te ○○ ○○ ○○

Later, he also taught braille to students in elementary and middle school, who were gradually losing sight and expected to lose it entirely in the coming years. While teaching them, he did periodic tests in which students had to read braille letters of a random sampling. He categorized braille letters into 5 groups based on these test results.

(<http://onoderashingo-zaidan.or.jp/pdf/article/cont04/034.pdf>).

Level 1 has あ(a) め(me) れ(re) ふ(hu) う(u) い(i) に(ni) く(ku). These are the easiest letters to read. They are simple and clearly distinguished when reading with left index finger. (Graphic1 )



Graphic 1

a A ●● ○● ○●	αの形 あ ●● ○● ○●	me ME ●●● ●●● ●●●	めだま め ●●● ●●● ●●●	re RE ●●● ●●● ○●	れの形 れ ●●● ●●● ○●	hu HU ●●● ○●● ●●●	っの形 ふ ●●● ○●● ●●●
a	Me	Re	Fu	U	I	ni	ku
●	●● ●● ●●	●● ●● ●●	●● ●● ●●	●● ●● ●●	●● ●● ●●	●● ●● ●●	●● ●● ●●
u U ●● ○● ○●	う ウ ●● ○● ○●	i い ●● ○● ○●	い イ ●● ○● ○●	ni NI ●● ○● ○●	に ニ ●● ○● ○●	ku KU ●● ○● ○●	く ク ●● ○● ○●

Suzuki's method was proven to be very effective when he was teaching elementary 1st grade students. This is why it can be applied to even those who lost sight from diseases or accidents, as the most effective way to acquire fluency reading braille in the shortest period of time. The letters in level 1; あ(a) め(me) れ(re) ふ(hu) う(u) い(i) に(ni) く(ku), are usually mastered in 5 to 10 minutes if one carefully studies the shapes.

For example, あ(a) looks like a dot, め(me) is a block, れ(re) is a small block, ふ(hu) is a railway with empty space in-between, う(u) is a horizontal line, い(i) is a short vertical line, に(ni) is a long vertical line, and く(ku) is consists of three dots, which is just one more dot added to う(u). This is how students learned level 1 letters. They read the letters using their fingers while listening as the teacher reviews the shapes of each one.

### 3. Suzuki's Braille Education

Once they got used to the shape of each letter in level 1 group, it was time to try sentences made up of these letters.

#### Examples

Combination of letters	Meaning
1) あめ(a/me) あめ(a/me) ふれ(hu/re) ふれ(hu/re):	rain rain drops drops
2) あに(a/ni) めいに(me/i/ni) あいに(a/i/ni) いく(i/ku):	going to see brother and sister

Even those with acquired visual impairments could easily read the sentences shown above without consuming much time. It gave students a great sense of accomplishment when they successfully read sentences in braille. Reading in braille gave them hope and confidence for living this new life after losing their sight. The following is detailed information of Suzuki's braille reading guide. (table 2)

**Table 2** Three Principles of Suzuki's Braille Education

#### 1. Starting with the easiest letters

あ(a) め(me) れ(re) ふ(hu) う(u) い(i) に(ni) く(ku) are the easiest letters to read. Suzuki grouped Japanese braille symbols into 5 levels, from easiest to most complex. When a student mastered letters of a certain level, Suzuki added another letter, one by one, for slow and steady improvement.

He always thought about how to make learning braille a fun activity, so he came up with words and sentences that students could practice in each level. This improved their proficiency, and students became more interested in learning braille. Suzuki found positive praise as another effective way to encourage children. When students read braille correctly, he would not hesitate to say, 'Good!' 'Great!' 'You are doing awesome!'. It couldn't be said too many times and it surely kept students motivated.

## 2. Drills

Drilling is a very important part to enhance braille fluency. Teachers should cooperate with parents or dormitory staff to encourage students to review their classroom lessons after school. In this case, recording teachers' voice can be very effective. Students can replay the lesson from a recorder and practice at home or in the dormitory.

## 3. Individualized Teaching Plan

Students' abilities, reading habits and skills are different from each other. Teachers must plan individualized education for each student and practice with love and patience. To do that, the first thing is to understand student's current level of braille competency. A worksheet with random letters could be helpful to assess how well the student can read. Below is the worksheet Mr. Suzuki used in class. He instructed students to read the letters so that he could evaluate the student's current reading level.

は(ha) おお(o) う(u) つ(tsu) て(te) や(ya) さ(sa) ろ(ro) ま(ma) め(me) そ(so) し(si) の(no)  
い(i) あ(a) ひ(hi) り(ri) れ(re) こ(ko) み(mi) と(to) ら(ra) ん(nu)

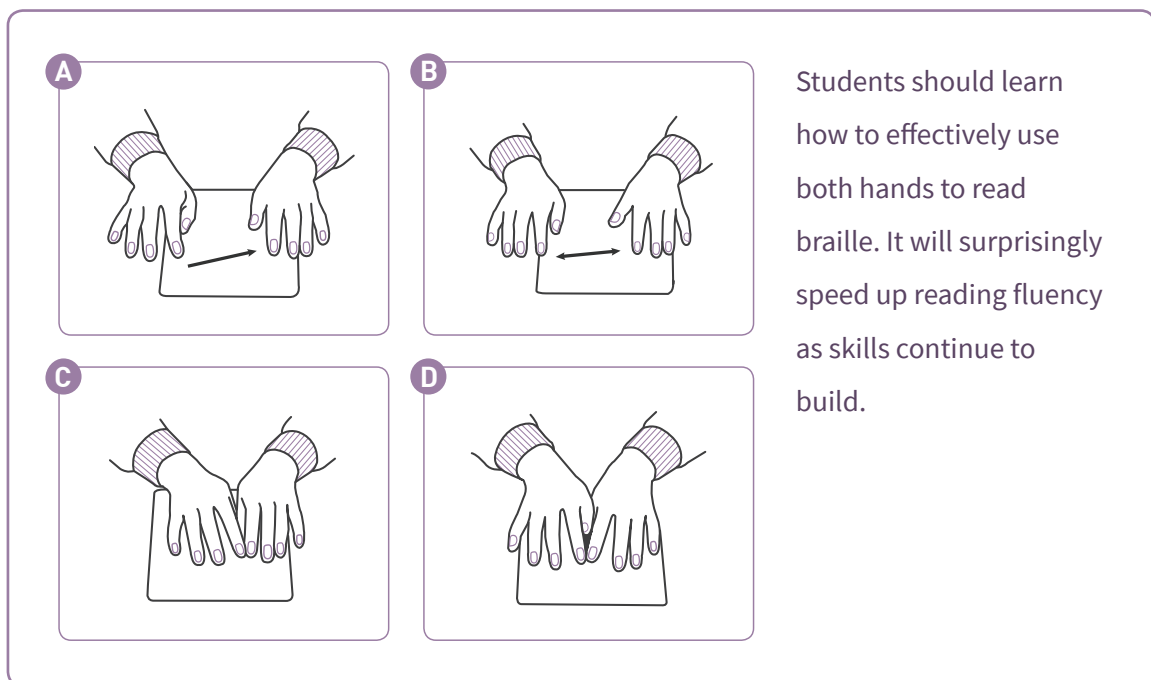
#### 4. Importance of Correct Posture



Correct Posture

Meanwhile, it is very important part to ensure students sit up straight and hold the correct posture. The book should be located with centerline of the body. The level of desk should reach as high as elbows while reading, and the height of the chair must be adjusted until student's entire sole of the feet securely contact the floor.

#### 5. Coordinated Reading Using Both Hands



Students should learn how to effectively use both hands to read braille. It will surprisingly speed up reading fluency as skills continue to build.

Coordinated reading by both hands

Moreover, learning Hiragana is highly recommended for blind children, too, because it will enhance their communication skills and understanding of their mother language. Mr. Suzuki and Mr. Fukuda teamed up to sort 46 Hiragana letters into 6 categories based on their structure. In other words, letters in the same group have more in common according to their shape and form.

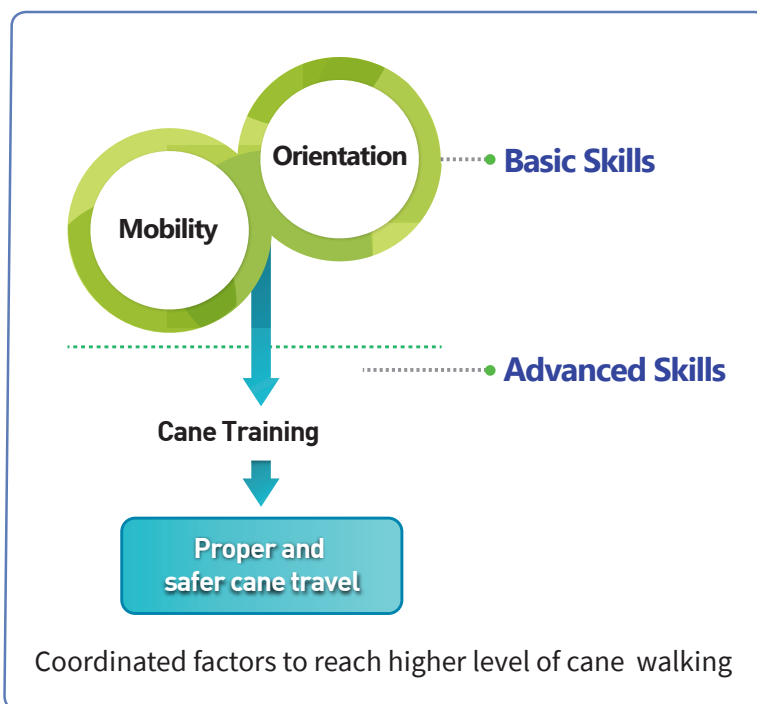


### 3. WALK BY HEAD

There are two primary ways to teach environmental orientation and mobility skills to children with visual impairments. First, students travel through a planned route. In this scenario, they already know the destination and the necessary clues to reach it. They locate the clues using a cane or their feet. When they find the last one, they know they are close to the destination. The second way is when students travel through an unfamiliar environment. They create a mental map by making connections between sensed information and clues on the path.

The former is for those who begin to learn basic skills in early stage or have limited intellectual abilities. As higher level students develop proficiency in these basic skills, teachers should set long-term goals that develop the ability to create mental maps, in various settings, and to walk to the destination, using as many methods and paths as possible.

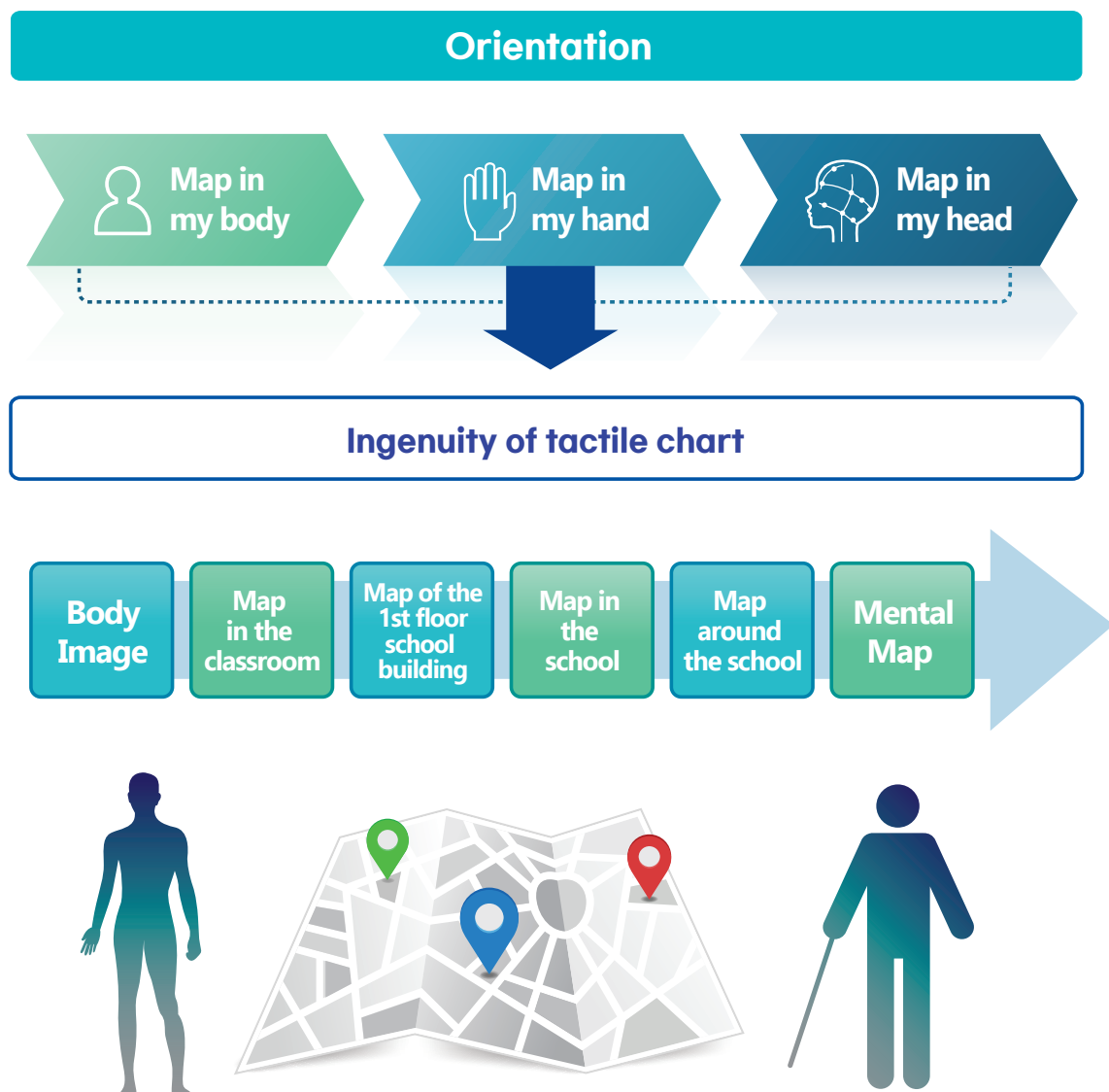
Orientation and mobility are basic skills for children to master before having the ability to move independently. These factors were found after teaching many children about environmental clues and how to walk with cane. Children with higher orientation skills usually have better spatial understanding and awareness.



Those with better mobility skills, even when they don't have high intelligence, can acquire sufficient abilities to "look by ears" because their mobility skills helps them find and understand things in various environments. With cane skills built on ample orientation and mobility, children can achieve proper and safe moving ability.

Therefore, to raise children's ability to move independently, educators, before everything else, should train them to "look by ears": understanding the environments with sounds, to "read by hand": reading braille with fingers and understanding things through touch, and to "walk by head", utilizing skills to create mind maps and navigate the environment.

Mr. Suzuki highlighted three steps to develop orientation skills for blind children: the 1st is understanding the body's map, 2nd is understanding the map in hands which means reading a braille map, 3rd is having a mind map.



He taught 12 subjects shown below to teach students, from kindergarten to high school, sufficient orientation and mobility skills

## 1. 12 Subjects for Advanced Orientation and Mobility Skills

①	Body Image / basic understanding of body's structure
②	Directions / Understanding on directions
③	Detecting Sounds / Detecting the direction where sound comes from
④	Sound trajectory / Sounds tracing
⑤	Route trailing / Following decided route
⑥	Orientation by the sun and wind / Getting clues from warmth of sun and winds
⑦	Understanding familiar spaces / exploring familiar places
⑧	Cane handling / basic skills
⑨	Cane techniques / advanced skills
⑩	Signs and letters on tactile map / basic understanding of tactile map
⑪	Walking with tactile map / practical use of tactile map
⑫	Walking on snow-covered area / Hokkaido is a snow country

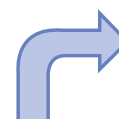
Above all, it is very important to teach blind children according to their developmental phase. The following is a good example of teaching children about the use of mental-mapping.

## 2. Steps to Teach Mind Mapping

### Step 1. Trajectory

#### Sound trajectory

- Sound trajectory on empty space
- Marking sound trajectory on paper or board as it is heard



#### Route trailing

- Walking on trail
- Walking in a certain direction felt on the map



## Step 2. Understanding map

- a. Map of school
- b. Map of school and surrounding area



## Step 3. Drawing maps

- a. Map of school
- b. Map of school and surrounding area

## Step 4. Walking with map

- a. Familiar place
- b. Challenging new places

## Step 5. Further Study on Tactile map

- a. Shapes and signs
  - Shapes on tactile maps
  - Signs on tactile maps



- b. Useful tactile figures that can be used to make tactile map
  - Miniatures from the Ohwaki Intelligence Test Kit
  - Miniatures from the Stanford-Kohs Tactile block Design Set



- c. Planar figure(three dimensional figure cut open and laid flat)
- d. Reading tactile maps
  - Comparing real place with tactile map
  - Drawing with the Raise-writer
- e. Making 3-dimensional set
  - Using Science kit
  - Using Plastic model
- f. Learning general letters used by sighted people

### 3. Walking in Snow

Idea of snow tip and study over snow pattern Snow country Hokkaido!



Hokkaido is the region that has the most snow in Japan. People live with snow a third of the year. It brought the need to teach blind students safe and effective ways to walk on snow.

#### 1 Introducing Snow Tip

##### Snow Tip for better detection during snowy season



when blind people would walk in the snow, their cane would not clearly detect snow because it is hard and sharp. Mr. Suzuki tried to attach various things on the tip for better detection, such as Ping-Pong ball, but still couldn't be sure of its usefulness. Eventually, he found that the rubber bulb from a baster was perfect to be used for a snow tip. For the Snow tip, cut the base of the rubber bulb to the thickness of a white cane and wear it on the tip of the white cane.

#### 2 Studying snow patterns

Mr. Suzuki took pictures of snow patterns on roads for 3 years. Then he analyzed pictures and sorted snow-covered roads into 3 patterns as shown below.

**Pattern 1. Snow starting**



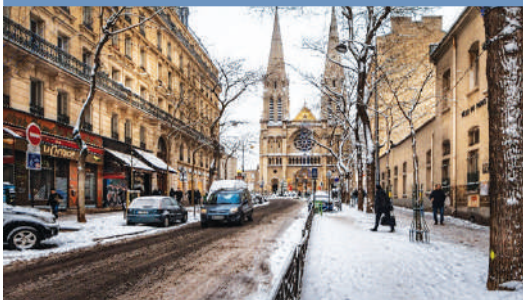
Snow found on the shoulder of roads

**Pattern 2. While Snowing**



Snow piles on intersection, sidewalk, and around the curb

**Pattern 3. Melting**



Sidewalk is still frozen while roads are clear of snow

### **3 Proposals for Walking in Snow**

- Teachers should Help children to have positive feelings about snowy weather and lead active life style in snowy environment
- Blind schools in snowy countries should build up network for educational cooperation
- Students should get used to assistive technologies to better detect things under snow : the Sonicguide and the Tri Sensor are useful tools

## 4. AS CLOSING

### My Answer to Education for Blind Students

Teaching students with visual impairments should be based on the same curriculum with their sighted peers, only methods and standards can be revised to help them achieve qualifications aimed by the curriculum.

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