

Effectiveness of Universal Design Education at Japanese Schools

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Abstract. Majority of Japanese people now know the term “Universal Design.” It is not only because of publicizing effort by the local governments and their related organizations, but also schools have taken up universal design (UD) as a concept to be taught. Shizuoka University of Art and Culture has adopted UD as one of its fundamental policies since it was established in 2000, and the authors examined how the students of high schools and of the Shizuoka University of Art and Culture have learned UD. Authors compared the findings with UD education tools for pupils and students, including UD promotion by the local governments and Japanese language textbooks. The examination of the effect upon students’ knowledge of UD by these tools and actions suggests correlation between them, and what are sufficient/insufficient as to the contents of UD education. The authors discuss what UD education should be, based on the results.

Keywords. Universal design (UD), education, perception, primary school, high school.

Introduction

Majority of Japanese people acknowledge the term “Universal Design.” Survey results in several local governments [1,2] suggest that around 70% of citizens responded that they know the word, which is not only because of the publicizing efforts by the central and local governments and related organizations, but also schools have taken up UD as a concept to be taught.

Shizuoka University of Art and Culture has adopted UD as one of its fundamental policies since its establishment in 2000, and has been trying to deepen students’ knowledge through education [3,4]. However, we have found that many children still consider barrier-free design (BF) and UD as equivalent, which actually is not. These mistakes, focusing on specific solutions for people with disabilities, were common with primary school children and secondary school students who applied to the UD picture book competition, suggesting that education they received at school had such biases, i.e., their teachers themselves had misunderstood the crucial concepts of UD. This kind of misinterpretation of UD being equated with BF arises from the fact that BF became a major issue in the 1990s in response to the rapid ageing of the Japanese society [5]. It accelerated accessibility provision of the physical environment, particularly after 2000 when Accessible Transportation Law was enacted. Since then, UD was assumed to be a natural extension of BF [6]. The Ministry of Land, Infrastructure, and Transport

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changed the title of its Government Policy on Barrier-Free Design to Government Policy on Barrier-Free/Universal Design in 2005. This historical background resulted in the inclusion of BF concept in education first, and UD came to be taught later, which led to a situation where UD was interpreted as an alternative term to BF.

Kose, one of the co-authors, has acknowledged the problem of misunderstandings, and when asked to write an article to be included in a Japanese language textbook by Mitsumura Tosho Publishing (see note) for six graders [7], he carefully tried to avoid such source of misinterpretation from happening, just as the Principles of Universal Design [8] avoided the use of the term “disability.” In the textbook, the article was used as a starting point for children to continue their field surveys on the topic within their own environment. (This type of comprehensive learning through experience, going beyond classroom study, was a key idea that the Ministry of Education strongly endorsed for deeper understanding by children.) It was therefore assumed that children who learned the topic had acquired deeper understanding of UD as opposed to those who did not.

Previous research

In conducting an earlier research by the authors [9], hypotheses were set up that children who studied UD through the above mentioned Japanese language textbook would have learned more correctly, and the difference could be found between their understanding of BF and UD, which have slight but significant difference in meaning (BF with more focus on specific issues involving people with disabilities as opposed to UD for all people). The authors specifically set up two hypotheses to test. The first was that children who were taught with the Mitsumura textbook had deeper understanding of UD compared to those who did not use the textbook (i.e., they did not learn and experience UD as six graders but learned much later). The second was that by examining the difference of understanding between BF and UD, we could identify problems of UD education. The survey was conducted for newly enrolled university students as freshman in 2012, who learned the textbook in 2005, i.e. the first year of the textbook adoption (which lasted for six years from 2005 to 2010). Two universities and a college were chosen for the survey. The result was that full six years gap was too long to identify the difference between those who used the textbook and those who did not. A little more detailed survey was planned, and present paper reports the outcomes.

Hypotheses

The present study mainly surveyed students at high schools instead of universities. Three prefectures (Shizuoka, Saga and Tokushima) were chosen for the survey, and two or three high schools were included from each prefecture. Students enrolled as freshman at Shizuoka University of Art and Culture (SUAC) were also surveyed for comparison against the previous year. This time the authors set up a few hypotheses to examine. The first hypothesis was that high school students remembered what they learned from the textbook after three years. The second hypothesis was that in one prefecture (Saga) where some high schools taught more rigorously on UD after they entered, differences emerged between those who were extensively exposed to UD and those who were not. There, the second year students were also surveyed. The third

hypothesis was that students of two prefectures (Saga and Shizuoka) that have chosen UD as their local government policy are more knowledgeable than the other, i.e., Tokushima Prefecture.

Survey methods

The questionnaire covered both BF and UD keywords, and tried to find out influence from education at earlier stages, with possible proposals for better education planning. The questionnaire was distributed at the beginning of new academic semester (i.e., April). An outline of the questionnaire is given in Table 1.

Table 1. Structure of questionnaire

| | |
|---|--|
| Q1. Do you know “barrier-free design (BF)?” | Y/ N. |
| Q2. If yes, how did you know the word? (which subject:) | Local government publication/ Mass media/ School education |
| Q3. Please choose five keywords you will recall with BF. Please write these five in their order, choosing from the list below. (The keywords are in Japanese phonetic order.) | |
| Q4. Do you know “universal design (UD)?” | Y/ N. |
| Q5. If yes, how did you know the word? (which subject:) | Local government publication/ Mass media/ School education |
| Q6. Please choose five keywords you will recall with UD. Please write these five in their order, choosing from the list below. (The keywords are in Japanese phonetic order.) | |
| Q7. Please tell us when you graduated from your high school (month/ year:) | |
| Q8. Please tell us which city you are from. | |
| Q9. Which primary school did you attend as a six grader? (Name of school and address) | |
| Q10. How many family members do you live with? | |
| Q11. Please let us know your family composition and age: Great grandfather/mother; Grandfather/mother; Father/mother; Elder brother/sister; Younger brother/sister; other. | |
| Q12. Date answer was filled: | |
| Q13: Name of school, department: | |

The questionnaire was structured to ask if they knew the term “barrier-free design (BF),” and if the answer was yes, they were asked where they did get to know. Then they were asked to choose five keywords in successive order as they came up in their mind. The same process was repeated with the word “universal design (UD).”

In order to check their eligibility and their background, two questions were asked: from which city they came from; and where they were when they were six graders (this was crucial because by knowing this information we can identify if they learnt UD through Mitsumura textbook). The final question was their family situation, i.e., whether they live as an extended family with elderly or as a nuclear family without.

Results of the survey and their interpretation

At the Shizuoka University of Art and Culture (SUAC), the questionnaire was distributed to students when they were given instructions regarding various procedures as new entrants. At other high schools, it was requested that similar occasions and steps be used. Number of students replied is given in Table 2.

At SUAC, about a half used the Japanese textbook, but at high schools it was quite biased toward extreme. The result was not as was expected, but understandable because

students at every high school come from relatively nearby place, not far from because of commuting difficulties. (Unfortunately, the authors could not select which high schools to survey, geographically within prefectures.) With the textbook adoption system in Japan, it is chosen by the cities or towns, and if the local council did not choose Mitsumura textbook, the students at the high school were not likely to have used it. Close examination of the name list of local councils that chose Mitsumura tells that students in Tokushima used Mitsumura textbook while those in Shizuoka and Saga did not use it. In contrast, the SUAC students come from various localities all over Japan, and it is the reason that the ratio was nearly half and half.

Table 2. Number of responses and use of Mitsumura textbook

| Prefecture | School name | Used Mitsumura | Did not use Mitsumura | No answer | Total |
|------------|--------------------|----------------|-----------------------|-----------|-------|
| Shizuoka | SUAC* | 85 | 95 | 0 | 180 |
| | Shimada | 2 | 76 | 0 | 78 |
| | Fujinomiyahigashi | 3 | 80 | 0 | 83 |
| Tokushima | Johnouchi | 73 | 6 | 0 | 79 |
| | Johoku | 75 | 4 | 0 | 79 |
| Saga | Ushizu** | 11 | 141 | 6 | 158 |
| | Taku** | 1 | 147 | 2 | 150 |
| | Kashima Vocational | 2 | 155 | 0 | 157 |
| | Karatsu Seisho | | | 102 | 102 |

*Only SUAC is a university. All others are high schools.
**Ushizu and Taku are designated as UD education promotion program schools in Saga.

Figure 1 summarizes the result whether the students know the words BF and UD.

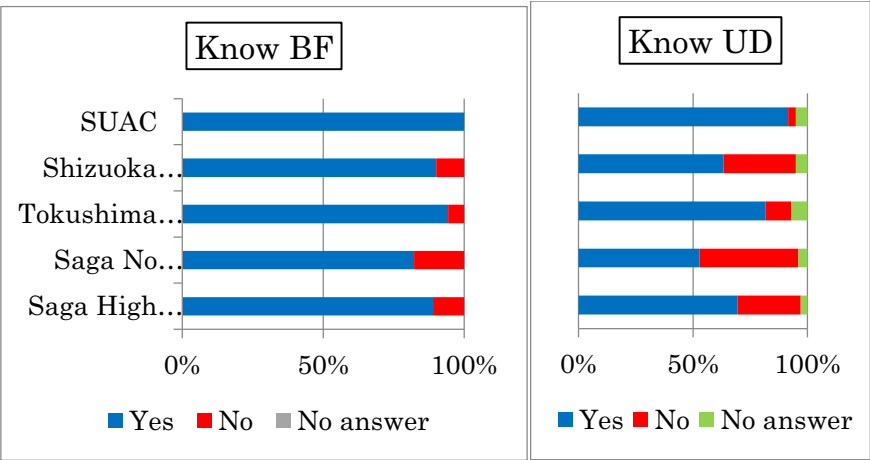


Figure 1. Knowledge of the words: BF and UD

Majority of students know the word BF, but the ratio drops with UD. As to SUAC, every student knew BF and only a few did not know UD perhaps because the university has placed UD as its education policy. In Shizuoka and Saga, the prefectures give emphasis on UD as local government policy, but most of high school students surveyed did not use the textbook. The outcome is that their knowledge of UD is not so high compared to Tokushima where the prefecture does not place UD as its policy agenda.

In Tokushima, most students used the Mitsumura textbook, and it may suggest that using the textbook (and comprehensive learning experience on UD) has contributed to deeper understanding of UD.

Figures 2 through 5 give more detail of the answers regarding whether students know the word BF and UD. In all schools and all grades, BF are better known than UD. Another point to note is that as with Taku High School and Kashima Vocational High School in Saga, second graders are more cognizant of UD than the first graders. It might be because Saga Prefecture is actively pursuing UD as its key policy. However, the difference between schools looks larger. General knowledge of Ushizu High School students was better than other three high schools, and only after a full year UD teaching, similar level of knowledge was reached at Taku High School.

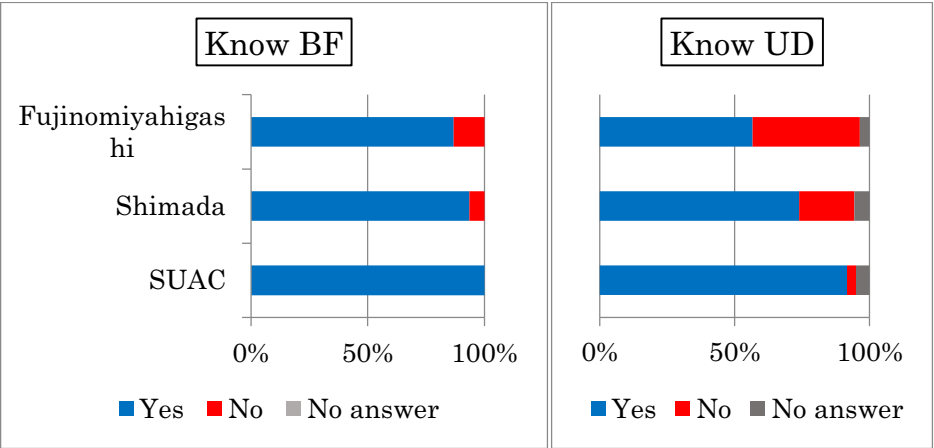


Figure 2. Knowledge of the words: BF and UD in Shizuoka.

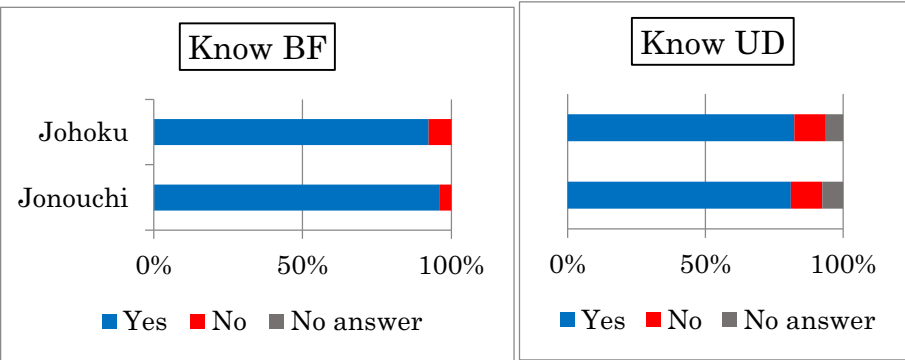


Figure 3. Knowledge of the words: BF and UD in Tokushima.

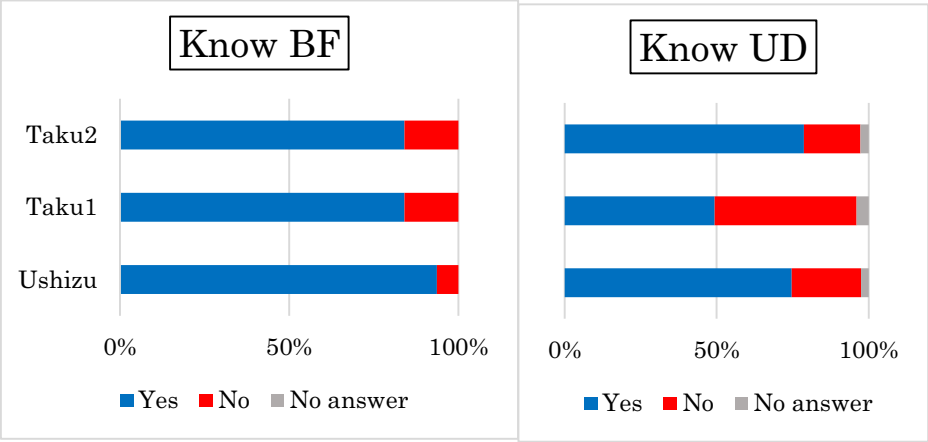


Figure 4. Knowledge of the words: BF and UD in Saga with UD education program.

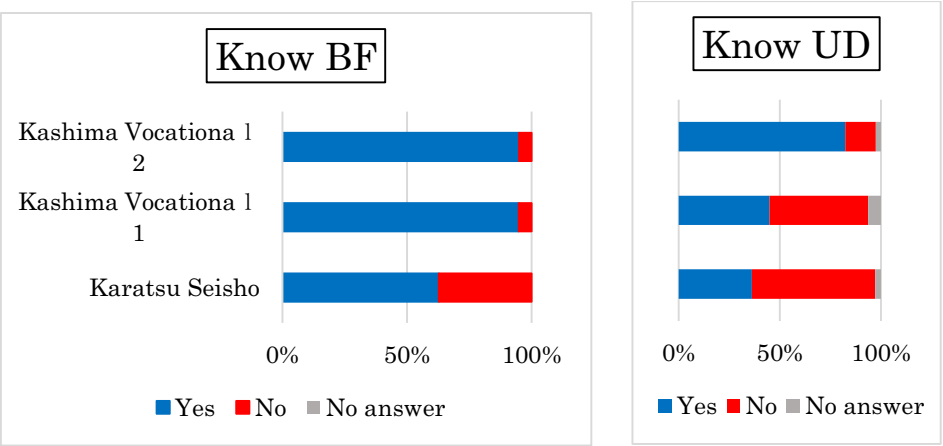


Figure 5. Knowledge of the words: BF and UD in Saga without UD education program.

Regarding where they did come to know the word UD, only one SUAC student replied a Japanese language textbook as its source, and more students referred to Social Sciences textbook. In contrast, 23 Shizuoka high school students replied that they got to know BF and UD from a Japanese language textbook (although it is not the textbook in question here). There was only one student from Saga who referred to Japanese language textbook as the source of UD, and in Tokushima, 14% of students referred to Japanese language textbook for UD. Other sources include Social Sciences, Home Economics, and Art.

Keywords recalled with BF and UD

Keywords that SUAC students identified as related to BF or UD are given in Figures 6 and 7. Figure 6 are the answers obtained from students who did not use Mitsumura textbook, and Figure 7 are from students who used it. The keywords listed on the upper side in the figures are ones the authors classified to be more related with BF, and the

lower side are more related with UD (see Table 3). Less frequently cited words are omitted from the figures.

Table 3. Keywords related with UD and BF (sequence as listed in figures 6 through 8)

| | |
|----|--|
| BF | Tactile Walking Surface Indicator; Braille; Steps; Sign Language; Screen Reader; Condensed Transcription; Communication by Writing; Lip Reading; Cane; Slope; Disabled People; Vulnerable; Caption; Assistive Device; Wheelchair Accessible Toilet; Wheelchair; Common Use; Magnification; Assistance; Caring; Audio Guide; Ostomate; Accessibility. |
| UD | Lever; Display Size; Non-step Bus; Non-step Bathroom; Everyone; Physical Burden; Automatic Door; Children; Elderly; Equity; Securing Space; Coexistence; Foreigner; Bidet Toilet; Large Switch; Elevator; Safety; IC Chip Card. |

The pattern is fairly similar between the students who used Mitsumura textbook and those who did not. However, those who used Mitsumura textbook have a slight tendency to coincide with what the authors assumed. The keywords more related with BF, particularly those tools for solutions to specific disabilities such as “Slope,” “Tactile Walking Surface Indicator,” or “Common use” are less frequently cited as UD by students who used the textbook.

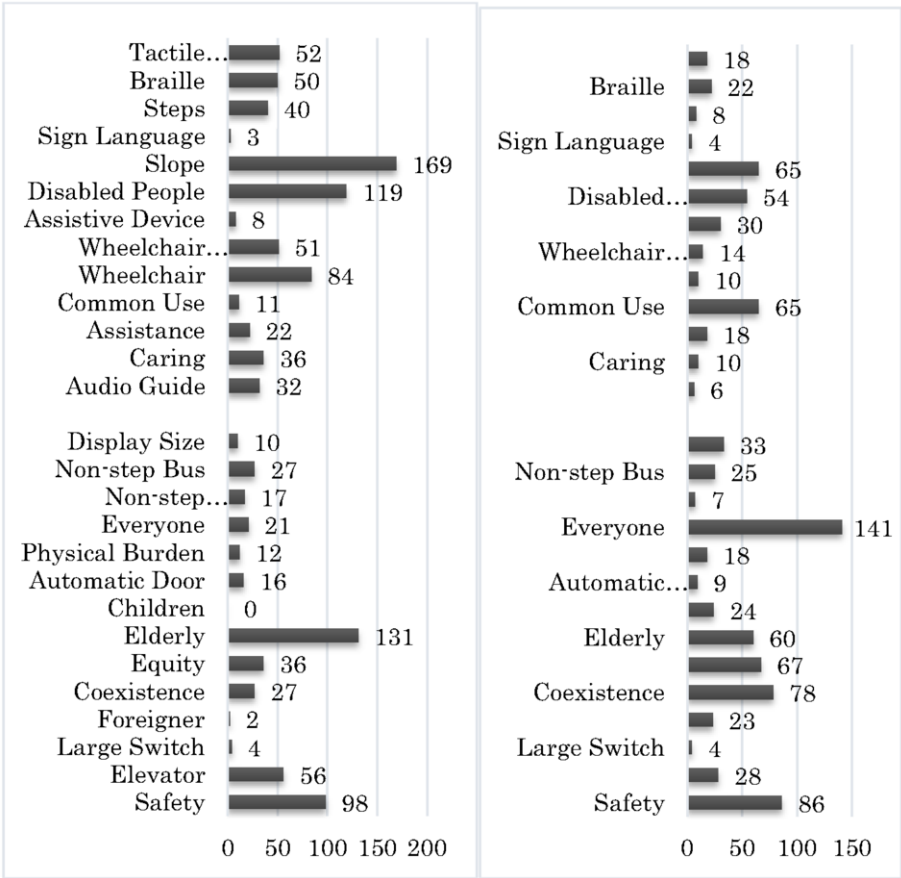


Figure 6. Chosen keywords related to BF, from SUAC students who did not use Mitsumura. (left). And chosen keywords related to UD, from SUAC students who did not use Mitsumura. (right)

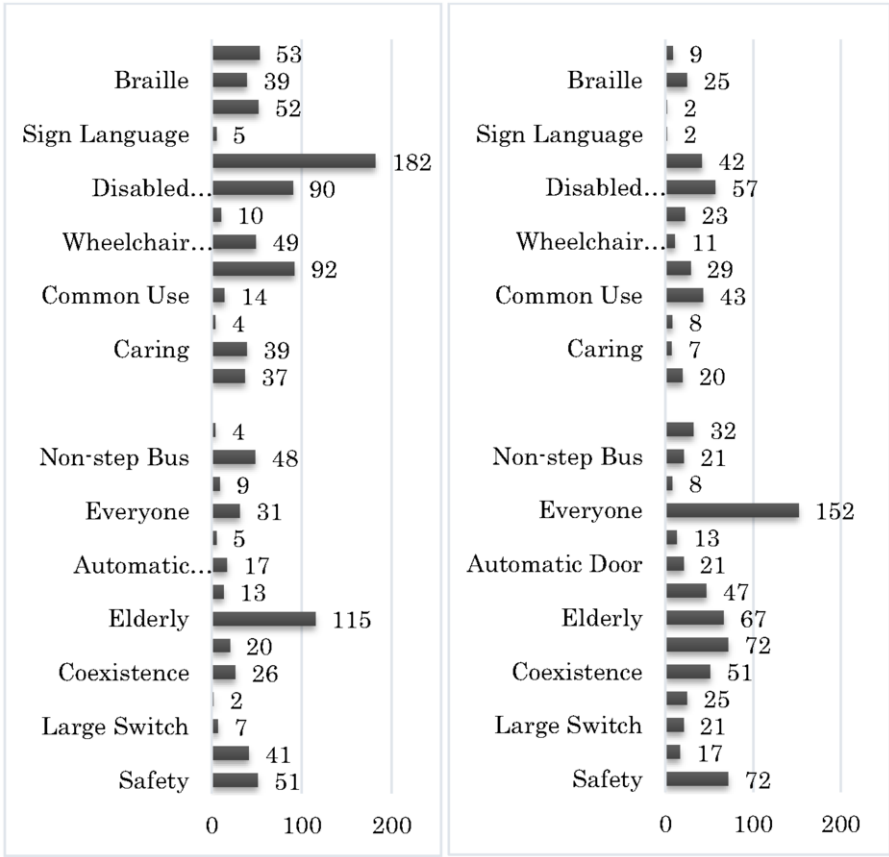


Figure 7. Chosen keywords related to BF, from SUAC students who used Mitsumura. (left). And chosen keywords related to UD, from SUAC students who used Mitsumura. (right)

A clear difference from what the authors assumed was that the keyword “Elderly” was classified as more BF related than UD, being referred to about twice with BF. It may be due to the fact that elderly people and people with disabilities are coupled as main beneficiaries of the Japanese Accessibility Act on the Built Environment.

Figure 8 show keywords recalled by Tokushima students. Most of the students in Tokushima used Mitsumura textbook, and their patterns show that BF related keywords and UD related keywords are more clearly separated compared to SUAC students who did not use Mitsumura textbook. This suggests that Tokushima students had kept deeper understanding of the difference between BF and UD after three years they learned the concepts as a six grader.

SUAC students, in contrast, have been exposed to more information on BF and UD after they used Mitsumura textbook, and thus whether they used the textbook or not as the source of information has become obscured in six years. This is in line with the result of previous year’s research.

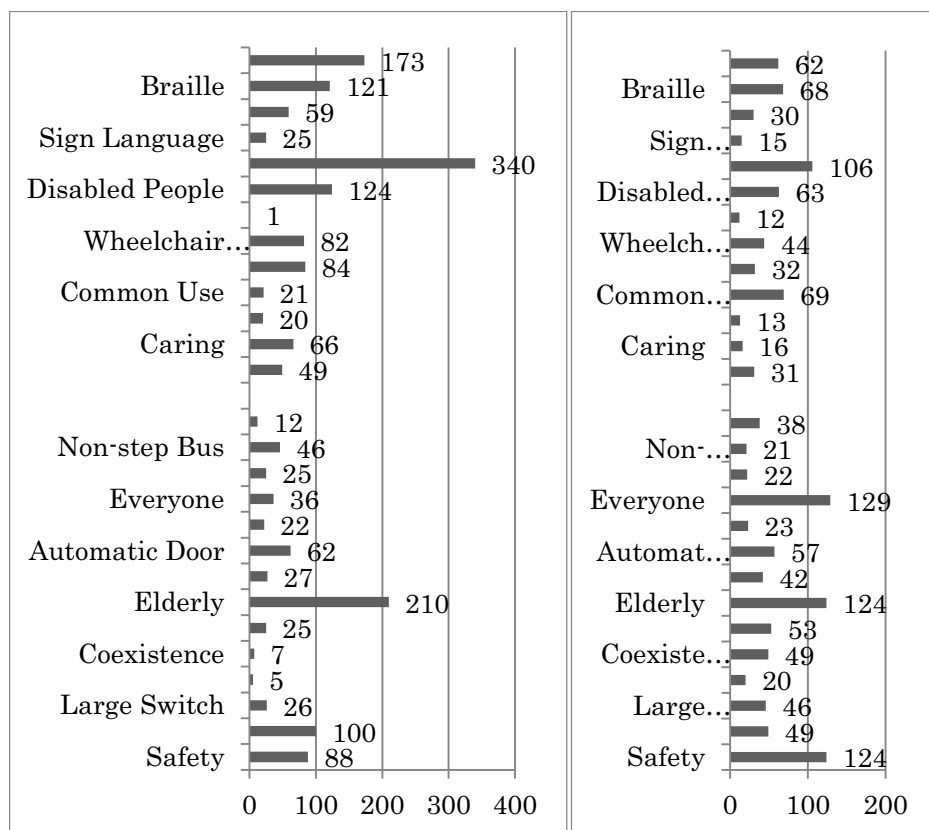


Figure 8. Chosen keywords related to BF, from Tokushima students. (left). And chosen keywords related to UD, from Tokushima students. (right)

Conclusion

The authors examined three hypotheses. The first one, that high school students remembered what they learned from Mitsumura textbook was verified. The second one, that UD program at high schools will effectively work was to some extent verified. It is true that second grade students have better understanding of UD in comparison to first graders, but the difference between high schools was evident, and it is too early to tell whether UD education for one year brought the difference. A further survey is planned. The third one, that students of two prefectures with UD policy agenda are more knowledgeable was not verified. Contrary to the expectations, UD policy implementation by the local governments is not effectively communicated to high school students at least for the moment. If it was done better, the high school students should know more about UD than the result suggests, even if they did not learn with Mitsumura textbook. Some rigorous strategy such as learning by experience in the field needs to be implemented to develop deeper understanding of UD.

In that sense, the policy change by the Education Ministry toward giving less emphasis on comprehensive learning through experience (and reducing time to be

allotted for such activities) should be taken as a backward move. Learning BF/UD as desk work will never attain the intended goal (which was the case with almost all of the textbooks Nomura surveyed [10]). The Mitsumura textbook was the only one that integrated teaching article and experiential learning, with good suggestions on how to conduct the survey in the field.

Note

In Japan, school textbooks must be examined and officially certified by the Ministry of Education, Science, and Culture. They are then circulated to the Education Committee of localities (cities and towns), who will select among alternatives. Therefore, high school students who reside in the convenient commuting distance are likely to have learnt using the same official textbook. That is the reason why vast majority of high school students used, or not used, Mitsumura textbook. Regarding the Japanese language textbook for primary schools, Mitsumura has a large share, and almost about a half of all children have used it.

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