

What Science Experiences Do Elementary School Teachers Expect in Early Childhood?¹⁾

Kazushige Mizobe²⁾

Hyogo University of Teacher Education

Abstract

The purpose of the present study is to examine what science experiences elementary school teachers regard as necessary for children in elementary school and kindergarten/child care. Participants are 116 elementary school teachers specializing in Living Environment Studies who have experience working with early grades of elementary school. Our findings are as follows. First, the mean value of ‘Environment’, ‘Plants’, and ‘Animals’ was high in Life Environment Studies (LES) and Kindergarten/child care (KIN). The mean value of ‘Gravity’ and ‘Rocks & Minerals’ in LES and KIN was low. A significant difference in 8 items (ex. ‘Animals’) was found between LES and KIN. Second, less experienced teachers and female teachers want children to have experiences about “Plants” and “Animals”, but they don’t want children to have science experiences about “Rocks and Minerals” and “Gravity”. Third, the activities for ‘Human body’, ‘Sound’, and ‘Environment’ which were recommended by the teacher were included.

Keywords: science experience, living environment studies, elementary school teacher, kindergarten/child care

Purpose

This study focuses on elementary school teachers who have experience working with early grades of elementary school and are interested in Living Environment

1) A part of this paper was presented at the Pacific Early Childhood Education Research Association 10th annual conference, July 24, 2009 in the Philippines.

2) mizobek09@jewel.ocn.ne.jp

Studies, and its purpose is to examine what type of science experiences such teachers regard as necessary in Living Environment Studies and kindergarten/child care.

Background

The revised basic policy in curriculum guidelines released in January 2008 highlights two issues for Living Environment Studies: “improving teaching to stimulate the intellectual curiosity of children and develop the foundations of scientific perspective and thinking” and “stressing experience-based learning about the value of life and natural events.” The policy recognizes the reality of children who find it difficult to adapt to school life – as seen in the so-called “First Grade Problem” where first graders cannot settle down and learn in the first grade environment – and calls for “concrete cooperation between early childhood education and elementary school education.” Therefore, in order to develop the foundations of scientific perspective and thinking, Living Environment Studies must “incorporate learning activities where students can experience the wonder and fascination of nature” and “improve learning activities so that students can experience the magnificence of nature and the value of life.” There has also been guidance calling for “cooperation with early childhood education” and “greater promotion of education activities between different ages” (Ministry of Education, Culture, Sports, Science and Technology, 2008a). Cooperation with elementary school education has also been clearly indicated and stressed in revised education guidelines for kindergartens (Ministry of Education, Culture, Sport, Science and Technology, 2008b).

New curriculum guidelines have stressed points like the above, but from the time it was originally established, Living Environment Studies has been characterized as a subject where students are taught through direct involvement with their immediate natural and social environment, while taking into account the developmental status of children who have many of the characteristics of early childhood (Nakano, 1990). However, the content of the latest revision suggests that it is still too early to say that adequate results have been obtained. Therefore efforts should be made in this area as a currently relevant issue. Dealing with this issue will require a thorough examination of “scientific activities as part of cooperation between kindergarten and elementary

school” where there is an intersection between “stressing the relation with early childhood education” and “improving scientific learning activities.” In particular, factors such as the approach and practical abilities of the teachers who support student learning will likely be key points.

It is now recognized that there has been a significant accumulation of proposals and implementation reports on cooperation between kindergarten and elementary school (e.g., Akita et al. 2002, Sasaki et al. 2004, Zenyoken (National Early Childhood Education Research Association) 2006). Other contributions include a series of research reports which attempt to use the experiences of children for curriculum development (Asakura et al. 2004, Inoue et al. 2005, 2006, 2007, 2008, and 2009), and the unique report of Kawasaki et al. (2003) which makes cooperation between kindergarten and elementary school the focus for interaction between children and interaction between teachers. Practical implementation and research reports have also begun to appear which focus on the scientific abilities of children (e.g., Koizumi et al., 2007, Sumida et al., 2005, Suzuki et al., 2007). A number of investigations of kindergarten and elementary school teachers have also appeared (e.g., Tamba et al. 2005, Matsuzaki et al. 2008). Reports by Yamaguchi et al. (2003) and Sakuma et al. (2008) are examples of fact-finding surveys, which include elementary school teachers. In the report by Yamaguchi et al., cooperation was determined to be possible for both kindergarten and elementary school teachers at the level of mutual visits by children and teachers and exchange of information, but the report suggested that kindergarten teachers feel that elementary school teachers do not understand kindergarten. Especially, it is not clear what images (including knowledge) the elementary school teachers have of scientific activities in the kindergarten. And the necessary activities might depend on either the gender or teaching experience of the elementary school teachers. The report by Sakuma et al. summarized the extent and advantages of cooperation activities for elementary school teachers, but the nature of that cooperation was not covered. There is clearly room for an attitude survey of elementary school teachers concerning scientific content, from the standpoint of cooperation between kindergarten and elementary school.

Due to this current situation, the author feels there is an urgent need to conduct a

basic survey of scientific activities based on cooperation between kindergarten and elementary school, and of the teachers who provide that instruction—as one part of furthering research on the science we wish students to experience in the early grades of elementary school. Continuous research resulting in development of specific units must also be conducted.

Therefore, it was decided to position this research as the first step in a basic survey of scientific activities based on cooperation between kindergarten and elementary school. To achieve that, it was decided to administer an attitude survey—on science experiences from the perspective of cooperation between kindergarten and elementary school—to elementary school teachers.

Method

Participants

In order to focus on elementary school teachers with experience of teaching Living Environment Studies, 116 elementary school teachers specializing in Living Environment Studies were selected. The selection area covered 5 cities (Osaka, Amagasaki, Nishinomiya, Kobe, and Akashi). The reason is to consider it become special because the materials for Living Environment Studies are often made from the event and the nature of the area.

The gender breakdown of the participating teachers was 19 men and 97 women. In terms of the number of years of experience in Living Environment Studies, the breakdown was 73 with less than 5 years experience, and 43 with 5 years or more experience.

Description and Procedure

Science Experiences Needed for Living Environment Studies and Kindergarten/Child Care. The 13 science experiences (Harlen, et al. 2007) used as objects for this research are Plants, Animals, Human body, Air, Water, Weather, Rocks and Minerals, Magnets, Gravity, Machines (Lever, wheel, screw, etc.), Sound, Light, and Environment. For each item, scoring was done with a 4-category method (4 point perfect score). T testing for the 13 science experiences was performed between

Living Environment Studies and kindergarten/child care. And variance analysis was conducted for 3 factors (gender: male or female; experience teaching Living Environment Studies: less than 5 years, or 5 years or more; and the 13 science experiences).

Science Experiences Recommended by Teachers. The teachers were asked to freely describe activities they recommend for 3 topics almost never covered in Living Environment Studies ('Human body', 'Sound', and 'Environment')—even though they are included in the 13 science experiences addressed in this research.

Results

Science Experiences Needed for Living Environment Studies and Kindergarten/Child Care

Table 1 showed the results that compared with the mean value (the expectation score) between science experiences to be expected in Living Environment Studies (LES) and science experiences to be expected in Kindergarten/child care (KIN). The highest of the mean value of the science experience in LES was 'Environment (3.12)'. The mean values of both 'Plants (2.99)' and 'Animals (2.92)' were high, following that of 'Environment'. The lowest of the mean values of the science experiences in LES was 'Gravity (2.10)'. 'Rocks & Minerals (2.15)' and 'Magnets (2.21)' came just above 'Gravity'. The mean values of 'Plants' and 'Animals' were the same (3.08), and this was the highest score (3.08) in KIN. In addition, 'Rocks & Minerals (1.65)' and 'Gravity (1.85)' were the science experiences which had the lowest mean values in KIN.

Using t-test, the mean values (the expectation score) for each of the items were compared between LES and KIN. As the results, Significant difference about 'Animals' was found between LES and KIN ($t(105)=2.18, p < .01$). Significant difference about 'Plants', 'Human body', 'Weather', 'Sound' was not found between LES and KIN. Significant difference about 'Air', 'Water', 'Rocks & Minerals', 'Magnets', 'Gravity', 'Machines', 'Sound', 'Light', and 'Environment' was found between LES and KIN (4 : $t(105)=3.19, p < .01$, 5 : $t(105)=2.14, p < .05$, 7 : $t(105)$

$=3.27, p < .01, 8 : t(105)=3.03, p < .01, 10 : t(105)=3.11, p < .05, 12 : t(105)=4.71, p < .01, 13 : t(105)=5.55, p < .01$).

Table 1. *The Results of T test to Science Experiences Needed for Living Environment Studies and Kindergarten/Child Care*

	1	2**	3	4**	5*	6	7**	8**	9**	10*	11	12**	13**
LES	2.99	2.92	2.60	2.48	2.71	2.34	2.15	2.21	2.10	2.36	2.44	2.66	3.12
KIN	3.08	3.08	2.52	2.28	2.55	2.23	1.65	2.04	1.85	2.14	2.40	2.35	2.79
t-value	-1.63	-2.18	1.21	3.19	2.14	3.27	3.27	3.03	5.07	3.11	0.82	4.71	5.55

number : mean, () : SD, $df=105$, * = $p < .05$, ** = $p < .01$

LES : Living Environment Studies, KIN : Kindergarten/child care

1 : Plant, 2 : Animals, 3 : Human body, 4 : Air, 5 : Water, 6 : Weather, 7 : Rocks&Minerals, 8 : Magnets, 9 : Gravity, 10 : Machines, 11 : Sound, 12 : Light, 13 : Environment
 $p < .05, 12 : t(105)=4.71, p < .01, 13 : t(105)=5.55, p < .01$).

Teachers and Science Experiences Needed for Living Environment Studies

Table 2 showed the mean value and SD (Standard Deviation) of 13 items for 4 groups of teachers. The teachers as participants were categorized into 4 groups, which were the male-less experienced group (Ml), the male-experienced group (Me), female-less experienced group (Fl), and female-experienced group (Fe). Taking the mean value of those groups as the dependent variable, variance analysis consisting of 3 factors, which were the gender (male-female), teaching experience (less experienced-experienced), and 13 items (science experiences) was conducted. Significant mutual interaction of 2 dimensions was found. After examining the simple interaction as a low test, a significant interaction between teaching experiences and questions was found in male groups, but a significant interaction between teaching experiences and questions was not found in female groups.

So as a low test, after reviewing the simple main effects, multiple comparisons in each group, there were not any significant differences in paired comparison between 13 items in Me group. However, in the other three groups, for example, the following results were obtained.

For ‘Gravity’ and ‘Environment’, three significant differences were observed in

both groups. In addition, ‘Gravity’ and ‘Plants’ in comparison with the same significant difference was observed in three groups. ‘Gravity’ and ‘Human body’, ‘Gravity’ and ‘Sound’ also showed the same results. The three other items were obtained as a significant difference in the group among, ‘Environment’ and ‘Human body’ and ‘Environment’ and ‘Rocks & Minerals’. There was no significant difference between ‘Rocks & Minerals’, and ‘Gravity’. There was no significant difference in this way, ‘Plants’, ‘Animals’, ‘Human body’ and ‘Sound’.

Table 2. *The Mean and SD of 4 Groups for Science Experiences*

	1	2	3	4	5	6	7	8	9	10	11	12	13
Mn	3.21 (.67)	3.14 (.74)	2.57 (.82)	2.36 (.48)	2.71 (.45)	2.57 (.62)	1.71 (.70)	2.36 (.61)	1.57 (.62)	2.50 (.50)	2.43 (.50)	2.50 (.50)	3.28 (.59)
Mv	2.60 (.49)	2.60 (.49)	3.20 (.75)	2.60 (.49)	3.00 (.00)	2.60 (.80)	2.60 (.49)	2.80 (.40)	2.60 (.49)	2.60 (.49)	2.80 (.40)	2.60 (.49)	3.60 (.49)
Fn	3.05 (.70)	2.98 (.73)	2.66 (.63)	2.42 (.72)	2.78 (.67)	2.48 (.62)	2.05 (.59)	2.27 (.63)	2.07 (.58)	2.32 (.62)	2.48 (.65)	2.49 (.67)	3.05 (.83)
Fv	2.82 (.60)	2.76 (.63)	2.47 (.69)	2.53 (.55)	2.66 (.66)	2.47 (.60)	2.05 (.65)	2.29 (.56)	1.97 (.54)	2.21 (.66)	2.45 (.55)	2.40 (.67)	3.20 (.51)

number : mean, () : SD

MI : male-less experienced, Me : male-experienced, FI : female-less experienced, Fe : female-experienced,

1 : Plant, 2 : Animals, 3 : Human body, 4 : Air, 5 : Water, 6 : Weather, 7 : Rocks&Minerals, 8 : Magnets, 9 : Gravity, 10 : Machines, 11 : Sound, 12 : Light, 13 : Environment

From the above, Me group did not show a significant difference among the items that one area is considered important. On the other hand, for the MI group, Fe group and FI group, as shown earlier, it was shown that there are important variations between regions in the evaluation.

The mean value of ‘Environment’ was the highest mean value in each teacher group. The next highest mean value was ‘Human body (3.20)’ in Me group, and in all the other groups ‘Plants (MI: 3.21, FI: 3.05, Fe: 2.82)’ was the next highest. In addition, the third highest value item was ‘Water (3.00)’ in Me Group, but ‘Animals (MI: 3.14, FI: 2.98, Fe: 2.76)’ was the third highest in the remaining three groups. ‘Gravity’ and ‘Rocks & Minerals’ were found to have the lowest mean value and the

second lowest value in all groups.

Activities Recommended by Teachers

Table 3, Table 4, and Table 5 list examples of activities given in free comments for ‘Human body’, ‘Sound’, and ‘Environment’.

Table 3. *Human Body: Activities Recommended by Teachers*

activity	number
Growth of the body (my birth, growth of my body, my mother’s body before my birth, family’s wish)	15
Nutrition education, food and body, travel of food in the body	13
Role of sense organs (eye, mouth, ear, nose, etc.), Games using 5 senses	10
Excrement, how to use a toilet	7
Hygiene (lifestyle)	6
Checking your health	4
Importance of life	4
Difference between male and female, face and body	3
teeth	3
Investigation in the body	2
Listening to the sound of the pulse and the heart	2
Moving (tag, dance, etc.)	2
Caring for the body, ways to relax, sleeping	2
Body image (knowledge)	2
Expression (emotion)	1
Outstaring game	1
Body parts which are injured easily	1
Oviparity and viviparity	1

Table 3 showed the activities about ‘Human body’. As described in item 79, in ‘Growth of the body (my birth, growth of my body, my mother’s body before my birth, family’s wish)’, 15 items were concentrated. ‘Nutrition education and food and body, and travel of food in the body (13)’, ‘Role of sense organs (eye, mouth, ear, nose, etc.) and Games using 5 senses (10)’ and many others were listed. In addition,

‘Excrement, how to use a toilet (7)’, ‘Hygiene (lifestyle) (6)’, ‘Importance of life (4)’, and ‘Checking your health (4)’ were also included.

Table 4 showed the activities about ‘Sound’. The number of ‘Listening to various sounds, collecting sounds’ was 20 and the number of ‘Listening to sounds in the forest, listening to sounds made by birds and insects etc.’ was 13. If both of them are added together, it would be about 40 percent of the whole. ‘Examining the different sounds made by different materials’ and ‘Making sounds’ were 14 and 3. ‘Making a musical instrument’ and ‘String telephone’ were the highest account. ‘Examining the sounds of mechanism’, ‘Music for the hearing-impaired person’ to be found even a small number of cases.

Table 4. *Sound: Activities Recommended by Teachers*

Activity	number
Listening to various sounds, collecting sounds	20
Examining the different sounds made by different materials	14
Making a musical instrument	14
Listening to sounds in the forest, listening to sounds made by birds and insects etc.	13
String telephone	9
Making a music scale, Enjoying rhythm and melody etc.	4
Making sounds	3
Using things at hand to make a toy which produces sound	3
Examining the sounds in the water, in the human body	3
Examining the sounds of mechanism	1
Music for the hearing-impaired person	1

Table 5 showed the activities about “Environment”. The highest number was ‘Picking up garbage, sorting garbage, techniques to minimize trash (21)’, the second was ‘Recycling wastes, 3R (17)’, the third were ‘Conserving paper (10)’ and ‘Exploring the town in each season, nature observing (10)’. It also included ‘Protection of living things (6)’ and ‘Growing vegetables, make composts (5)’. It also ‘Conserving Water, Stop wasting (5)’. ‘Global warming (2)’, ‘Forestation, role of forest (2)’, and ‘Biotope (1)’.

Table 5. *Environment: Activities Recommended by Teachers*

Activity	number
Picking up garbage, sorting garbage, techniques to minimize trash	21
Recycling wastes, 3R	17
Conserving paper	10
Exploring the town in each season, nature observing	10
Protection of living things	6
Growing vegetables, make composts	5
Conserving water, Stop wasting	5
Tidying up, Cleaning expert	4
Global warming	2
Making a toy using nuts, planting acorns	2
Afforestation, role of forest	2
Biotope	1

Discussion

Science Experiences in Living Environment Studies and Kindergarten/Child Care

The results relating to science experiences for kindergarten/child care suggest that there is an intent to cover material on the environment in Living Environment Studies rather than in kindergarten/child care. The mean values for “Plants” and “Animals” were also high for Living Environment Studies, and this can be regarded as support for covering those topics at that level, but since the mean value for kindergarten/child care is also high, it is evident that there is also support for these as activities in kindergarten/child care. On the other hand, the mean values for “Gravity” and “Rocks and Minerals” are low for Living Environment Studies, but the means for kindergarten/child care are even lower, and thus teachers do not really expect these topics to be covered in kindergarten/child care. A significant difference was not found in ‘Plants’, ‘Human body’, ‘Weather’, and ‘Sound’. However, a significant difference was found among ‘Air’, ‘Water’, ‘Magnet’, ‘Machine’, and ‘Light’ in LES and KIN.

Science Experiences in Living Environment Studies Depending on Teachers

In the results of 3 factors various analysis (Table 2), it was cleared that the

average value of “Environment” was the highest of the 13 items and it was supported by all teachers regardless of gender or teaching experience. In the results for Ryan’s method, there were 4 groups (Ml: male-less experienced, Me: male-experienced, Fl: female-less experienced, Fe: female-experienced). No significant difference was found in the Me group, and it was suggested all items were equally important. In the other 3 groups, there were significant differences between “Gravity” and “Environment”, “Gravity” and “Plants”, “Gravity” and “Human body”, “Gravity” and “Human body”. It was suggested that “Gravity” was specially treated. In the same case, significant differences were found between “Rocks and Minerals” and “Plants”, “Rocks and Minerals” and “Environment”, so “Rocks and Minerals” was specially considered in 3 groups, but not in the Me group. There were no significant differences between “Plants” and “Animals”, “Human body” and “Sound”, “Rocks and Minerals” and “Gravity” in all groups, which supports the view that all teachers would consider these items specially regardless of gender or teaching experience.

Science Activities Recommended by Teachers in Living Environment Studies

The activities for ‘Human body’, ‘Sound’, and ‘Environment’ which were recommended by the teacher were included in the extensive. In ‘Human body’, the physical development of the birth and growth ‘of the body’ had been mentioned in concentration, ‘Role of the organ’ and food and nutrition, exercise, lifestyle, health maintenance, facial expressions, the importance of life. The following contents were presented about ‘Sound’. These were Collecting ‘sounds’ in the town and nature, ‘Examining sounds’, ‘Making sound’, ‘Making Instruments’, ‘String telephone’, and ‘Music for the deaf’ etc. In ‘Environment’, there were ‘Garbage Disposal’ and ‘Recycling’, ‘Waste of resources’. ‘Cultivation of vegetables’ and ‘Protected wildlife’, ‘Global warming’, ‘Protected forest’, and ‘Biotope’ were also included.

As mentioned above, the contents were described, what are they spread across multiple sectors and areas, the protection of young people like to play as a nursery and say that in common with the region perceived as a complex. Presenting these learning activities spread over several fields might assist cooperation between LES and KIN.

Issues for the Future

This research focused on elementary school teachers whose research subject is Living Environment Studies, and clarified how they regard science experiences for Living Environment Studies and kindergarten/child care. The results were as described above. Based on those results, the following two points can be raised as issues for the future.

The first is to conduct a survey on “science experiences from the perspective of kindergarten/child care teachers, and their expectations for Living Environment Studies.” In analogy to this research, which has surveyed science experiences for Living Environment Studies and kindergarten/child care from the perspective of elementary school teachers, this would involve conducting the same attitude survey on teachers of kindergarten/child care, and then making a comparison. This would enable confirmation of the differences between kindergarten and elementary school teachers reported by Yamaguchi et al. (2003). Furthermore, the author feels that examination of similarities and differences will reveal the best approach to science experiences in cooperation between kindergarten and elementary school.

The second is the development of instructional materials and classroom implementation. This involves preparing specific instructional materials based on the survey research in the first point above, and conducting trial implementation using the same materials in different types of schools. This will further clarify the content of science experiences resulting from cooperation of teachers between kindergarten and elementary school.

Acknowledgement

This study was supported in part by a Grant-in-Aid for Scientific Research (C) (No. 20500782, Representative: Shozo Fukada).

References

- Akita, K. & Arima kindergarten and elementary school (2002). *Curriculum development and implementation examples for cooperation between kindergarten and elementary school –Results of 3 years of kindergarten/elementary school cooperation where children meet and teachers can connect –*. Shogakkan.
- Asakura, A., Inoue, W., Ishii, N., Ikeda, A., Emoto, S., Okano, Y., Okamoto, F., Okui, K., Kaneoka, M., Shimono, M., Nakayama T., Matsushima H., Mitoh K., Yokomura, Y. & Yoshihara, K. (2004). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (1) –The development of new units as the subjects of “Challenge” and “Expression”, *The Annals of Educational Research*, 32, 111-119.
- Harlan, J. D. & Rivkin, M., S., (2004). *Science experiences for the early childhood years; An integrated affective approach, 8th Edition*. NJ: Pearson.
- Kawasaki, M., Asada, K., Kitatani, M., Sugisawa, K., Nishihara, N., Fujimoto, H., Matsumoto, K., Yamazaki, M., Yamada, Y. & Yoshida, K. (2003). Practical research report on problems in cooperation/connection between kindergarten and elementary school –Focusing on efforts to achieve interaction between children and interaction between teachers. *Bulletin of the Integrated Center for Educational Research and Practice*, 23, 55-62.
- Koizumi, H., Akita, K. & Yamada, T., (2007). *Developing a scientific mindset in early childhood*, Tokyo: Shogakukan.
- Nakano, S. (1990). *Theory and methods of education in living environment studies*, Tokyo: Toyokan Publishing.
- Sakuma, M., Kaneko, T., Sasaki, K., Komatsu, A., Hayashi, K. & Kawakida, M. (2008). *Exploring issues of cooperation between kindergarten and elementary school in Kodaira City –From surveys of elementary school first grade teachers*. Annual report of the Shiraume Gakuen College Center for Education and Welfare Studies, 13, 66-77.
- Sasaki, H. (2004). *Smooth collaborative education between kindergarten and elementary school –Implementation and model curriculum*. Tokyo: Child Honsha.

- Sumida, M. & Fukada, S. (2005). Young children's high competence in science and its implication for improving the Japanese science curriculum. *Journal of Science Education In Japan*, 29 (2), 99-109.
- Suzuki, Y., Shimizu, K., Zaima, Y., Matsumoto, S., Sugeta, N., Hayashi, Y. & Nishii, Y. (2007). Study on the effects of kindergarten and elementary school cooperation fostering scientific thinking —A suggestion to educational professionals to combine scientific experiences and intellectual learning. *The Annals of Educational Research*, 35, 29-36.
- Ministry of Education, Culture, Sports, Science and Technology (2008a). 小學校學習指導要領解説 生活編. Retrieved from http://www.mext.go.jp/compon tent/a_menu/education/micro_detail/_icsFiles/afieldfile/ 2009/06/16.pdf
- Ministry of Education, Culture, Sports, Science and Technology (2008b). 新しい學習指導要領. Retrieved from http://www.mext.go.jp/a_menu/shotou/new-cs/your you/you/ryuui.htm
- Inoue, W., Asakura, A., Kake, S., Ishii, N., Emoto, S., Kake, S., Nakayama, F., Miyamoto, H. & Murakami, T. (2005). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (2), *The Annals of Educational Research*, 33, 107-116.
- Inoue, W., Asakura, A., Kake, S., Ikeda, A., Kake, S., Kuhara, Y., Yuba, N., Aohara, Eiko., Ishii, N., Kato, K. & Murakami, T (2006). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (3). *The Annals of Educational Research*, 34, 197-206.
- Inoue, W., Asakura, A., Kake, S., Kimioka, T., Ishii, N., Ohashi, M., Kato, K. & Yoshihara, K. (2007). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (4). *The Annals of Educational Research*, 35, 19-28.
- Inoue, W., Asakura, A., Ikeda, A., Kake, S., Kimioka, T., Aohara, E., Ishii, N., Kato, K. & Kaneta, T. (2008). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (5). *The Annals of Educational Research*, 36, 135-144.
- Inoue, W., Asakura, A., Ikeda, A., Kimioka, T., Nakayama, F., Aohara, E., Ishii, N.,

- Ohashi, M. & Kaneta, T. (2009). The curriculum development for collaboration between kindergarten and elementary school from the point of children's experiences (6). *The Annals of Educational Research*, 37, 205-210.
- Yamaguchi, K., Yamada, H., Kondo, S. (2003). A survey of teachers' opinions on cooperation between kindergarten and elementary schools: A case in Okayama. *Bulletin of Faculty of Education*, 124, 65-71.
- Zenyoken (National Early Childhood Education Research Association) (2006). continuity of learning and development. — Issues and outlook for connection between kindergarten and elementary School. Tokyo: Child Honsha.

