



Lesson improvement through lesson studies: A case study on the lessons for responsible living and consumption in elementary home economics education

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Introduction

In Japanese elementary schools, home economics is compulsory for fifth and sixth graders. Elementary school provides a foundation for developing many life skills. “Family and family life,” “food, clothing, and housing,” and “consumption and the environment” are comprehensively taught to all children up to high school. The home economics education framework is important when it comes to developing individuals who value responsible living. Of the courses of study that will be implemented sequentially from fiscal year (FY) 2020, the content of the “consumption and the environment” module has been enhanced in response to the need for building a sustainable society (Ministry of Education, Culture, Sports, Science and Technology [MEXT], 2017). However, a survey of elementary school teachers shows that consumer education is a low priority for teachers (Okutani & Nishimura, 2011, Onoda et al., 2015) and that the subject lacks teacher training and teaching materials (Ishikawa, 2014).

Approximately 30% of all Japanese elementary school home economics classes are taught by means of a subject-based teacher assignment system, in which one teacher takes responsibility for a specific subject (MEXT, 2019). The percentage of subject-based teachers within home economics is the third highest after music and science. However, home economics teachers rarely have specialized training like secondary school teachers do. It has been reported that there are many classes in elementary school home economics where only practical activity is performed without clear objectives (Kishi, 2019). Home economics teachers in elementary schools, including classroom-based teachers, have few opportunities for training in the latest topics within the subject. In-service training is indispensable when improving the quality of lessons on today’s issues, such as responsible living and consumption.

For public school teachers, there is a regular training system in place from the first year of employment to ensure their continuous development as teachers (MEXT, 2015). In addition to lectures at educational centers, tours such as company visits, and practical training programs, lesson studies are conducted in Japan. Based on Lewis et al.’s (2006) organization of the Japanese lesson study, it can be categorized under four processes: identify focus, planning, research lesson, post-lesson discussion; moreover, it is characterized by repeated cycles of research and outside expertise. In the planning stage, teachers collaborate in groups in order to carry out *kyozai kenkyu*, which is the study of materials relevant to the research theme. This leads to the production of a written plan for a research lesson. Collaborative planning is widely seen as a form of teacher training in Japan. These lesson study styles are summarized in a handbook and are expanding internationally (e.g., Lewis & Hurd, 2011; Stepanek et al., 2007; Dudley, 2014). However, lesson studies for subjects related to home economics are not as widespread as those for other subjects (e.g., Lim et al., 2011). On the other hand, training for

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teachers on “responsible living and consumption” includes efforts through international collaboration such as the ProfESus.eu project. In Japan, seminars for teachers are held in cooperation with consumer centers in each region. Teaching proposals and teaching materials are distributed and can be downloaded as teaching support for teachers through the PERL project and other organizations in many countries (National Institute on Consumer Education Japan, 2011, 2014, 2017). Examination of lesson studies as a training method for class development and reflection, based on actual lesson practice, was undertaken at an international conference in Tokyo in 2017 (The research group of lesson study in Home Economics, 2018). However, even in Japan, where lesson studies are common, there are few studies that indicate in detail how home economics classes improve and through what kinds of efforts.

Therefore, in this study, we focus on the lesson study of “consumption” lessons in elementary schools and show how teachers gained a deeper understanding of the topics and improved their lessons through lesson studies based on case studies. The purposes of this study were to outline the process of improving the class through lesson studies and to examine effective ways of training teachers based on lesson practices. The strength of this study is that teachers with little experience or specialty can gain insights into how to enhance teaching in the subject.

Methods

The study was conducted on the unit “Good use of things and money and shopping” from FY2015 to FY2017 at an elementary school affiliated with University A. There were three reasons this case was chosen: first, the same theme was examined through repeated cycles of lesson studies; second, the author served as an advisor for these lesson studies; and third, detailed materials were available. This research can be called action research. University A’s affiliated schools, in cooperation with the local board of education, have the role of providing local lesson models for each subject and of training local teachers. Therefore, the subject-based teacher assignment system is basically adopted in university-affiliated schools. Local teachers will be assigned to the affiliated school for a period of about three years due to personnel exchanges between the board of education and the university. Affiliated schoolteachers conduct lesson studies several times a year for the subject of which they are in charge. The subject teacher in charge of home economics had been teaching at a public elementary school for about 20 years. They were assigned in FY2015 and spent three years at the university-affiliated school.

The lesson plans submitted for the meetings, videos of the research lessons, and field notes of the lesson planning and review discussions were collected. First, we focused on the planning process and analyzed the teaching plan shared in the study process and the final plan of the research lessons. Second, we analyzed changes in the quality of teaching and learning, utilizing the two recorded research lesson videos in FY2015 and FY2017.

As a matter of ethical consideration for the research, we obtained the prior consent of the school principal and the teacher in charge of recording lessons and discussions, following the code of ethics of the University of Teacher Education Fukuoka.

Findings

Lesson planning process and the research lesson in FY2015

Changes in lesson plans

In FY2015, lesson studies on “how to choose and buy things” were conducted in fifth grade home economics classes. In this case, the core members comprised the teacher in charge of home economics, school colleagues, senior schoolteachers who were previous home economics

teachers at the school, and a university researcher of home economics education. The planning process for the open class in FY2015 was as follows. At the beginning of the year, it was decided that a research presentation depicting all grades of research and classes would be held in February. To prepare for this, the teachers made a first draft of a lesson plan around December. The first plan was reviewed once by colleagues in the school during the winter vacation. Then, in mid-January, the teacher separately contacted senior members and the university researcher for advice on the first proposal. The teacher emailed the proposal to the university researcher the day before the consultation and then conducted a face-to-face discussion. One week later, the teacher sent a revised lesson plan to the advisers. The teacher exchanged comments with both senior and university members by email, and the teacher had to decide the lesson plan for the open class, although they did not have enough time to finalize agreement with the advisers. Figure 1 shows how the outline of the lesson plan changed in the above process. The main learning activity of the envisaged plan is a simulation of comparing and selecting information on products. The time spent on this activity in the plan was 6 unit-hours, and there was no change throughout the consultations.

When looking at the teaching materials in this study, changes have been made to the first draft. Initially, the teaching materials for product selection and purchase dealt with daily necessities and food, such as sweets, paper cups, and fruits used for a sayonara class party. It was a plan that could lead to many viewpoints when shopping. However, the university researcher indicated that the link between the simulation at school and the plans to practice at home was not clear, and the flow was interrupted. One of the senior teachers also advised that it would be better to draw a connection to previously completed lessons. In contrast to the original proposal, the revised and final proposals have been changed to purchasing materials for making miso soup. The idea was to focus on the selection of ingredients for cooking as an example of daily purchase. As a result of this, in the revised proposal, even the main theme of the subject was a narrow one: to buy miso soup ingredients. The main theme in this unit was confirmed after the university researcher advised that shopping for ingredients should not be the final goal, and the final lesson plan was generalized to making good choices and purchases.

In 2015, the teaching materials changed with each consultation. There were several reasons for this. First, it was necessary to modify the original goal because the teacher's intention when selecting teaching materials and the purpose of the lesson were insufficiently clear. Second, it is probable that the teacher could not properly explain the necessity of the original drafting materials to the advisers of the lesson study, was then influenced by different ideas from third parties, and was ultimately forced to restart at square one in considering the teaching materials each time. In addition, the teacher was initially unable to understand the consultation process itself. Therefore, at the time of the consultation, the advisers were not informed of the review process or the presence or comments of other advisers. In their first home economics lesson study, the teaching plan changed repeatedly, even for the teachers with plenty of teaching experience. This was because the lesson plan progressed through self-study and one-off exchanges with multiple advisers.

Unit: Let's consider ways to use things and money.

First proposal version

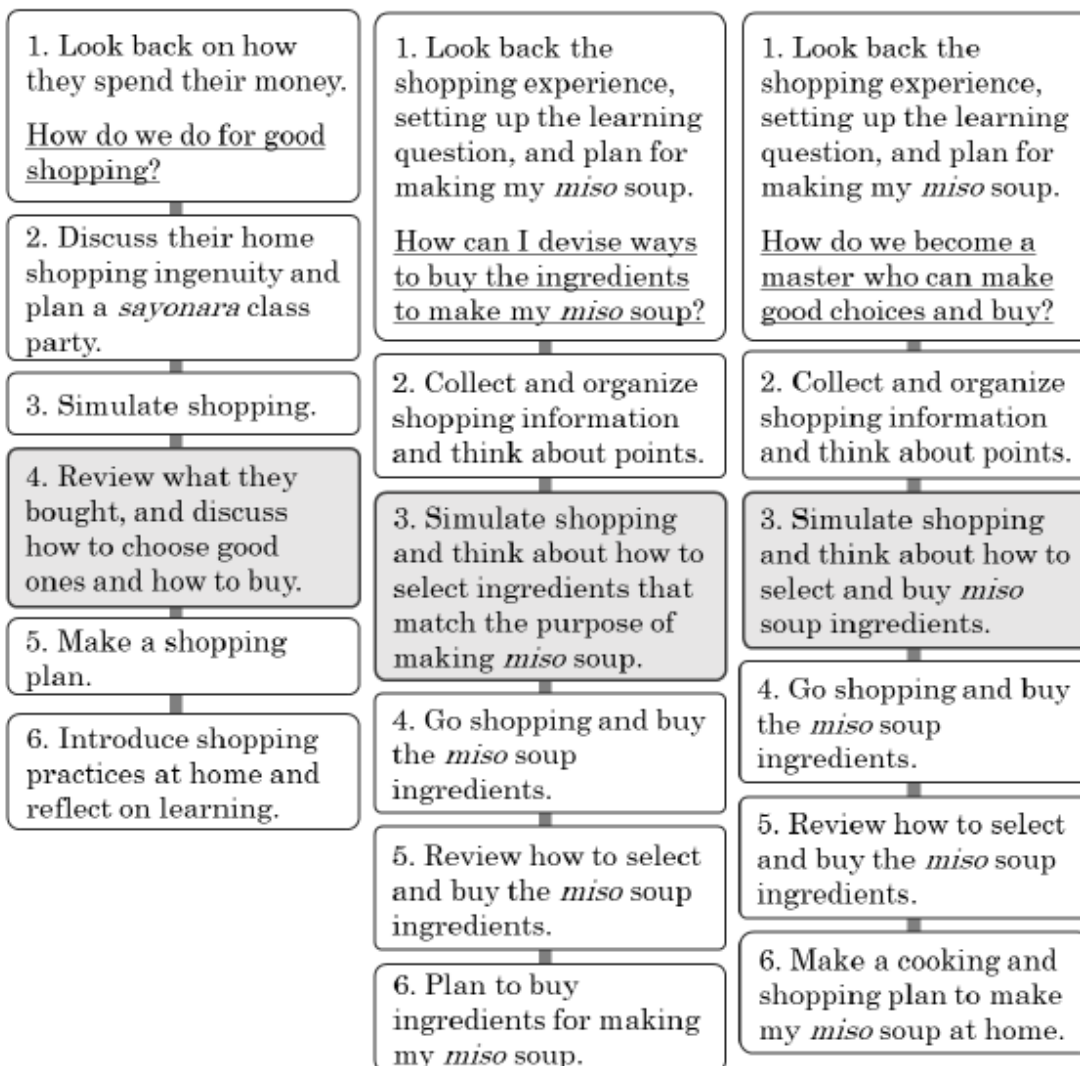
Revised version

Final version

Lesson: (Students to:)

Lesson: (Students to:)

Lesson: (Students to:)



□ :50 minutes □ :the research lesson (open class) ___ :the learning question

Figure 1 Changes the unit plan through consultations in planning phase in FY2015

The research lesson “Let’s consider ways to use things and money” in FY2015

In the 2015 research lesson, a simulation of grocery selection for *miso soup* was conducted. At the introduction of the class, the children were divided into eight groups of five pupils per group and given the task of choosing the groceries used by the family for one of two families, differing in the number of family members and the date of using the food (Appendix 1). The teacher briefly showed the lesson points for product selection established up to the previous lesson. Subsequently, the children began discussions about Japanese white radish and *Abura age* (fried soybean curd), which are used for *miso* soup, in each of the three types of products, considering the purpose and family’s conditions. Figure 2 shows part of the pupils’ discussions.

Group1: six family members,
need ingredients four days later

SQ No.	T/S	Utterances
15-122	S-Nasu	No difference between A and B.
15-123	S-Izu	Two days later.
15-124	S-Nasu	What? Should I have domestic food?
15-125	S-Mita	(Fried-tofu) C is cheap, B is expensive, but the same price.
15-126	S-Nasu	The expensive one is better.
15-127	S-Sei	What? Why... the same?
15-128	S-Mita	Not the same! ...higher than this per gram.
15-129	S-Izu	Then, this one (C).
15-130	S-Yura	I think B. 'cause no need to calculate.
15-131	S-Nasu	Cheap one.
15-132	S-Izu	How about the radish?
15-133	S-Yura	B
15-134	S-Sei	A
15-135	S-Yura	What? B,B,B!
15-136	S-Nasu	Just smell it.
15-137	S-Mita	The leaves are wilting.
15-138	S-Yura	Because organic ones are like this. You don't usually eat leaves.
15-139	S-Mita	What? You can eat it.
15-140	S-Nasu	Expensive!
15-141	S-Izu	But the difference is only 20 yen.
15-142	S-Yura	Look, the budget is only 200 yen.
15-143	S-Izu	No need for organic products, this is better.
15-144	S-Yura	No way. I feel like it's not safe.
15-145	S-Sei	Umm, but...
15-146	S-Nasu	How about the taste? Taste!
15-147	S-Mita	(Farmer) Kibe san' is best!
15-148	S-Sei	If it's not Kibe's product, it may be this one.
15-149	S-Yura	No, no...let me see.
15-150	S-Nasu	Expensive one is better.
15-151	S-Izu	Which one? B or Kibe's?
15-152	S-Nasu	Kibe's!
15-153	S-Izu	This part looks something spoiled.
15-154	S-Yura	That's okay. because it's organic vegetable.
15-155	S-Mita	This one is...
15-156	S-Yura	The only problem is bad looks.
15-157	S-Sei	If the problem is just a matter of appearance....if the condition is bad...
15-158	S-Yura	Firstly, C is not good.
15-159	S-Mita	But people don't eat anything that looks bad.
15-160	S-Nasu	Some people may buy without looking.
15-161	S-Izu	There is no such person.
15-162	S-Mita	You should look and buy the vegetables.
15-163	S-Nasu	Umm, but...

Group2: three family members,
need ingredients tomorrow

SQ No.	T/S	Utterances
15-38	S-Fujii	Look, Kume san's (The producer name in radish label)...., it's better not to choose.
15-39	S-Tani	These leaves.
15-40	S-Sato	Why? The radish leaves are irrelevant.
15-41	S-Fujii	Some people use the leaves, but others don't.
15-42	S-Tani	I don't expect people who don't use them.
15-43	S-Oota	I don't.
15-44	S-Fujii	Well, it can be used for something.
15-45	S-Sato	This one, C...Really? It's limp!
15-46	S-Fujii	But, it looks better...
15-47	S-Tani	We'll eat it tomorrow, this is fine.
15-48	S-Sato	Well...even if you eat tomorrow.
15-49	S-Oota	This family.
15-50	S-Sato	The family has three members.
15-51	S-Tani	We are three members.
15-52	S-Sato	But, it 's expensive.
15-53	S-Fujii	It's domestic, domestic products are good...
15-54	S-Tani	Full of food additives.
15-55	S-Sato	But it's cheap!
15-56	S-Fujii	Yes, this one shows clearly domestic...
15-57	S-Sato	Well, then...which radish should we choose?
15-58	S-Fujii	this (A) or this (B).
15-59	S-Sato	This one (C)...No? These are...
15-60	S-Oota	Both are 250g.
15-61	S-Sato	Both are 250, then the size is the same, but this one goes bad.
15-62	S-Fujii	But, C is impossible, isn't it? You'll throw away all the leaves later, won't you?
15-63	S-Sato	In that case, you can choose C, if you don't use the leaves anyway.
15-64	S-Kato	50 yen.
15-65	S-Sato	This (C)... inside... it doesn't go bad. Inside is the same.
15-66	S-Oota	This one is okay.
15-67	S-Kato	I feel reliable without additives.
15-68	S-Tani	Because there are few additives.
15-69	S-Oota	For three family members, four pieces are okay.
15-70	S-Sato	What? We don't need four pieces, Two pieces are enough.
15-71	S-Fujii	It says that it is domestic.
15-72	S-Tani	Well, fried tofu is needed for one third per person. So we need one piece.
15-73	S-Fujii	Moreover, it says that it's domestically produces, and the others are probably from foreign countries. This is the best.
15-74	S-Tani	The one which food additives are few.
15-75	S-Oota	Yes, this one. I think this is the one.
15-76	S-Tani	I agree with you.

N.B.: All names in the text are pseudonyms.

Figure 2 Utterances of the children's group discussions of the research lesson in FY2015

In both cases, firstly the children thought they would meet the conditions given to them, such as the statements “because they are a family of three” and “because they have two days.” Many children commented on the lesson points of food selection. On the other hand, the simulation was a little complicated and had many factors to consider. In the discussions, it was observed that each pupil was arguing their own factors of caution, such as safety and security, rather than justifying the choices based on the purpose and condition of the foods.

At the sharing opinions stage, the children came up with points to note, such as freshness, safety, price and quantity, and proximity to production areas. However, debates continued outside the context of the substance, and opinions of unclear scientific evidence were not confirmed. For example, it was debated whether or not a single fried *tofu* fills the stomach, organic vegetables are better because they are expensive, and additives are harmful to the body.

In the summary, a child said, “I should do shopping according to the conditions.” However, the teacher vaguely rephrased, “It will change depending on the purchase.” The rephrasing was a bit confusing for the children and was not shared as a summary. Finally, the children were given time to fill out the shopping plans for the various ingredients they would go to buy next week, but the pupils’ understanding was fragmented and did not lead them to develop an actual shopping plan.

Through the unit, many children were able to understand the individual factors to consider in purchasing food. However, there was no opportunity to think about the various products, nor was the generalized concept of shopping conveyed. Therefore, the whole lessons would not promote enduring understanding (Appendix 2).

The ambiguity of the teacher’s understanding of the aims at the time of planning was revealed when the lessons were summarized. There were two issues left: a lesson plan that would give enduring understanding and a selection of teaching materials that would lead to authentic learning.

Transition of lesson plan for three years

In the fall of 2016 and 2017, lesson studies on how to choose and buy things were conducted. Unlike in 2015, only the former home economics teachers at the affiliated school and the university researcher participated as advisors in these lesson studies. Lesson study members tried to share the advice of senior schoolteachers and the university researcher as much as possible. Figure 3 shows the outline of the final lesson plans actually implemented over three years.

The initial lesson plan proposed in 2016, which was an attempt to improve two of the tasks in the 2015 plan, consisted of seven hours. First, sweets and stationery were compared to illustrate that the information used for selection differs depending on the product. Later, the simulation of an activity relating to stationery, sweets, and food was proposed. The necessity of spending seven hours was discussed in this context, as the average number of hours using authorized textbooks is about four hours. The amendment proposed using five hours, adding extracurricular activities, with the spillover to public schools in mind. With an awareness of the various products, the plan included a proposal to simulate activities concerning food and textiles at the same time, simulating cooking or producing textile articles for the family. Afterward, through two rounds of consultation, the teaching materials were carefully selected with consideration for circumstances of purchase and for what kinds of products are relevant to children’s daily lives.

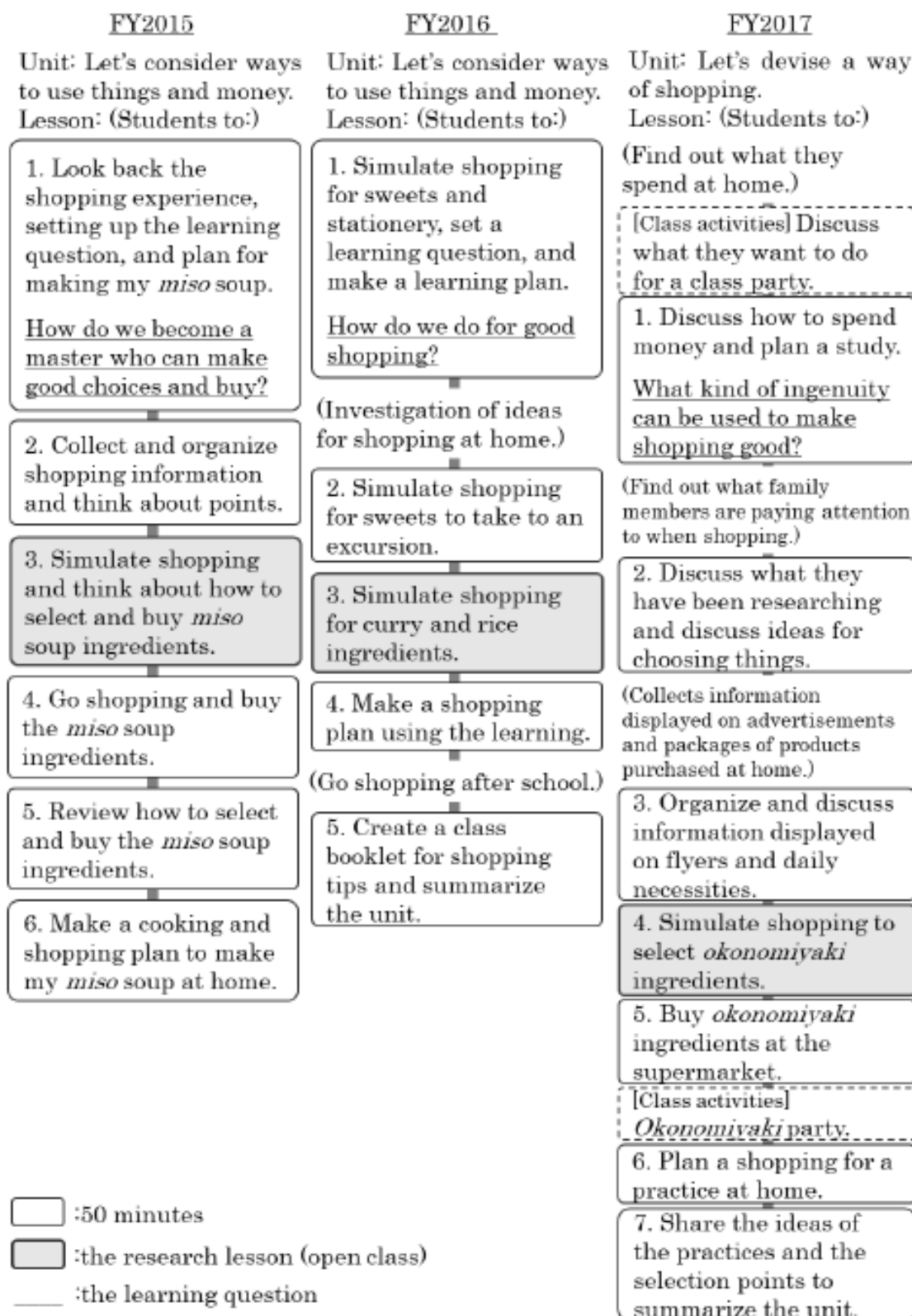


Figure 3 Changes the unit plans through consultations in planning phase from FY2015 to FY2017

Eventually, research lessons in 2016 were held for the following tasks: introducing learning tasks through simple selections of stationery and sweets. After the extracurricular activities of

the home shopping survey, select a sweet for an excursion and simulate the purchase of curry and rice ingredients made at home. Make a shopping plan for family practice.

In FY2017, the plan was proposed and teaching materials were selected with the aim of deepening the link between children's learning and their home and school life experiences. In addition to extracurricular activities, a cross-curriculum with classroom activities was organized. There was only one consultation before conducting the research lesson in 2017.

During the consultation, it was mentioned that it was necessary to spend more time on understanding the tasks in order for the pupils to learn problem-solving. As a result, and according to children's actual situation, the final proposal allocated seven hours to the research lesson, in addition to the extra activities. The main contents of learning are as follows. First, as an extracurricular activity, children surveyed shopping at home and gathered information such as product containers and labels. At the same time, the students talked about cooking at a party during class activities. After that, in home economics, children set up learning tasks from simulations that chose familiar items such as stationery. Then, the children simulated shopping for the ingredients used at the party and made plans to use them for shopping at home.

Over the three years of continuous lesson studies, the teacher developed a clear idea of what they wanted the pupils to achieve.

Teaching and learning in the research lesson "Let's devise a way of shopping" in FY2017

In the 2017 research lesson, it was time to choose the ingredients to make *okonomiyaki* (Japanese pancake) at the classroom party. First, during the introduction, the teacher looked back on the previous lessons. That is, daily necessities and foods had information useful for purchasing. The pupils were then able to set up their own learning task. The teacher presented two types of cabbage, eggs, and flour. The teacher picked up remarks by the children, confirming some words and their meanings as keywords when making food choices, such as clearance sale and organic farming. Next, the teacher had the children think about which item to buy so that they could conform to a budget while looking at the real products (Appendix 3). They also exchanged opinions in each group and discussed which item to buy. Figure 4 shows part of the overall sharing situation. The teachers checked the children's remarks and compiled "good-choice" keywords such as price, quantity, freshness, allergy response, expiration date, and so forth. The teacher asked, "Quality first or quantity first?" and deepened the child's thinking while noting that each point had a priority. In addition, the teacher asked, "What is it all about?" A child said, "skillful choice is different for each person within the budget, (priority points) are different. Therefore, it is only necessary to make choices and purchases that suit you." In response to repeated statements from the children saying "*Mottainai* (wasteful)," the teacher asked, "Is it important to have no waste?"; subsequently, the teacher presented the current state of food loss and waste with data and proposed that environmentally friendly shopping with individual actions could solve social issues. In retrospect, a child said, "I was happy to find out why my mother was spending (shopping) time every day after doing today's simulation." It can be said that this is a statement that recognizes the meaning of family behavior and links the lesson to experiences in daily life. "It's different to choose daily necessities and food, ... so I'd like to make choices when I think about expiration dates and budgets." It is a remark to summarize learning and make use of it in daily life due to the difference in how to select daily necessities (Appendix 4).

SQ No.	T/S	Utterances
17-230	T	Then, if you can make these three points, you can choose well, ...fresh food. There was a lot of information here. This is important,.... yes, Sada-san, please.
17-231	S-Sada	I think the expiration date is necessary, for example, cabbage or sweets, ...for example, if you eat gummies that have expired, there is no way to eat it, and if the taste is grape, seems something cloudy. I think that the expiration date is.... so when you talk about cabbage, you can eat the crispy texture and characteristics as it is, so I think we should care about the expiration date.
17-232	S-Kita	Someone have allergies like Takata-kun, so it is better to consider allergic substances.
17-233	T	Okay. Let's think about it.
17-234	S-pupils	Allergies. Allergies!
17-235	T	In the case of Takata-kun, first allergy, second is the expiration date ...
17-236	S-pupils	Expiration date! It must be expiration date.
17-237	T	This is really important for people with allergies.
17-238	S-pupils	First priority.
17-239	T	That means, first, second and so on, this is the best, depending on the person.
17-240	S-pupils	Quality. Expiration date. Quantity.
17-241	T	Quality first? Quantity first? Which is the first?
17-242	S-pupils	Quantity! Quality!
17-243	T	Quantity first?
17-244	S-pupils	Yes! Yes!
17-245	T	Quality first?
17-246	S-pupils	Yes! Yes!
17-247	T	Why do you think, Yamada-kun?
17-248	S-Yamada	Even if the expiration date has expired, it is okay if the quality is good. Take-san.
17-249	S-Take	Well, because it's a best-before date, it can be eaten deliciously unlike the expiration date. And if the quality is good, the expiration date has expired and it is delicious, so I think quality is important. Mae-san.
17-250	S-Mae	Also, no matter how much the amount is, for example, if A is a large amount and the quality is bad, it will hurt your stomach when eating, so do not choose by the amount. If both quality are good, I think that you should buy the one with the larger amount.
17-251	T	Okay, let's put it all together. You guys said.... how about after that?
17-252	S-Satomi	Let me see.... Depends on you?
17-253	T	So what do you mean by buying your own way? Ah, Akita-kun.
17-254	S-Akita	The best way to choose is price and budget, and ... it's different for each person.
17-255	T	It's different for each person. Priorities vary by person. But the budget is the first.
17-256	S-pupils	Umm... Ah...
17-257	T	Okay. Earlier, you guys said that you want to avoid waste. Is it so important not to waste? Actually, have you ever heard the word "food loss"?
17-258	S-pupils	I know. Ah. Yes!
17-259	T	It means food that can still be eaten but discarded. When I'm too busy and haven't opened the refrigerator for a while, I sometimes find things expired, and think it's a waste. It is said that 6.3 million tons of food loss occurs annually in Japan alone.
17-260	S-pupils	Wow. No! I hate it!
17-261	T	That is about twice the amount of food aid worldwide. In addition, about half is discharged from households. Expiration date expires, even if you know it, throw it away without using it. It may be connected to what you guys has just said.
17-262	S-pupils	No! Umm. What should I do?
17-263	T	So where are we going next? Everyone goes shopping. Summarize the best ways to shop in each group based on your thoughts today. Finally, I'll ask two of you to present your looking back..... Makino-san.
17-264	S-Makino	In my house, my mom is shopping when she comes back from work. I don't usually care much. When I did a shopping simulation, it was good to understand why she took a long time to shop, because she was collecting a lot of information and trying to buy the best one. Noda-san.
17-265	S-pupils	(Applause) Surely.
17-266	S-Noda	In the previous lesson, we compared the two daily necessities with the group members and were concerned about the quality and which one was better. When it comes to food, I chose it after considering the taste and what to do when I eat it. Choosing foods and daily necessities is different. So... the next time I'll make <i>okonomiyaki</i> I would like to carefully consider what happens when I eat, the expiration date, and the budget.
17-267	S-pupils	(Applause)
17-268	T	That's all for today's class.

N.B. All names in the text are pseudonyms. The words "-san" and "-kun" are suffixes which are added to a person's name.

Figure 4 Utterances of the closing parts of the research lesson in FY2017

Discussion and summary

During the three years of continuous lesson studies, the teachers and the advisors met face-to-face and through email exchanges. In the consultations, the advisors with considerable lesson study experience asked the teacher, who had no previous experience in home economics research, to reconsider the appropriateness of the goal setting and evaluation criteria of the lessons, repeatedly questioning the meaning of the teaching materials. Then, the lesson study group members shared and considered the idea of the research lessons.

As a result, from the second year onward, the teacher had a clear idea of what they wanted home economics pupils to achieve. The teaching plan had become more than just a simulation of an individual shopping experience but offers a more comprehensive understanding of the shopping elements from the experience. Furthermore, the teacher was able to introduce cross-curriculum and extracurricular activities to envision the flow of learning with teaching materials along with the real world in accordance with the motivations and interests of the children.

In actual classes, in 2015 and 2017, simulations enabled children to think and compare the information they needed when choosing food based on the real products. In both classes, the pupils sometimes misunderstood the conditions or had discussions about things that were not essential when choosing products due to their lack of experience.

In 2015, the setting conditions of the activity were complicated, and the teacher could not clearly grasp the goal of the lesson. Students' lack of understanding of the role of food additives and the amount required for cooking was therefore not corrected until the end, and the teacher only emphasized the importance of individual components of food purchases. In 2017, many improvements were made. Specifically, the teacher carefully selected simulation conditions, looked back on the previous lessons, confirmed the meaning of keywords, and secured time for the children to conceive their own thoughts before starting the simulation. It was possible to observe improvements in the teacher's teaching skills, such as refraining from explanations and drawing connections among children's remarks. The teacher had a clear idea of the goals of the lesson, was able to identify the children's remarks leading to the goal, and worked to share them with other children. Therefore, it is presumed that there were statements that achieved the goal, such as differences in points of buying depending on the goods and the meaning of family shopping behavior. It was considered that the third-year class promoted an enduring understanding of shopping.

Conclusions

This research outlines a case study of lesson plans by one teacher. The lesson practice recorded in the third year was a class where the teacher was in charge of the homeroom. Although in the same year the response of students in another class was equally positive, the daily involvement with the children may be one of the factors that led to the particularly active classes. No consideration has been given to this aspect in this study. In addition, we did not conduct any direct interviews with colleagues in the affiliated school or with senior teachers. For these reasons, there is a limit to the generalizability of these research results. However, from the data obtained, lesson studies that enhance collaboration among teams and improve classes through discussions of goals and evaluation settings for specific home economics lessons

have been observed to be useful for teacher training. The future task is to accumulate case studies and examine more diverse factors.

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Appendix 1 The simulation settings “Let’s choose ingredients for miso soup” in FY2015 Food items for miso soup (per person)

The simulation settings “Let’s choose ingredients for *miso* soup” in FY2015 Food items for *miso* soup (per person)

Abura age (fried soybean curd) 7g (A one third per one piece), Japanese white radish 40g
Budget 200 yen

Case of the family 1: six members, need the ingredients four days later

Case of the family 2: three members, need the ingredients tomorrow

Items:

	A	B	C
Fried tofu	Ingredients: Soybeans (Domestic), edible vegetable oil, Coagulant NET weight: 2 Pieces Expiration date: 21st Feb. 2016 Storage method: keep refrigerated (10 degrees or less) Manufactured by A Ltd., Ogori city Fukuoka Pref. (*Local) Price: 54 yen	Ingredients: Soybeans, vegetable oil, Coagulant for tofu NET weight: 2 pieces Expiration date: 24th Feb. 2016 Storage method: keep refrigerated (10 degrees or less) Manufactured by B Ltd., Aso county Kumamoto Pref. Price: 47 yen	Ingredients: Soybeans, vegetable oil, Coagulant, Defoamer NET weight: 4 pieces Expiration date: 24th Feb. 2016 Storage method: keep refrigerated (10 degrees or less) Manufactured by C Ltd., Gyoda city Saitama Pref. Price: 47 yen
White radish	1/4 (250g) 80 yen	1/4 (250g) 100 yen Organic cultivation Local products Kibe’s Farm	1/4 (250g) 50 yen (clearance sale)

Appendix 2 Photos of the blackboard after class in FY2015



Appendix 3 The simulation settings “Let’s choose ingredients for okonomiyaki” in FY2017

Food items for Okonomiyaki (per 4 persons)

-Cabbage a half ball, 4 eggs, Flour 400g

Budget 500 yen

Case: need the ingredients tomorrow

Items:

	A	B
Cabbage	Fukuoka Pref. (*Local) Price: 150 yen	Gunma Pref. Price: 100 yen
Egg	Expiration date: 19th Nov. 2017 NET weight: 6 Price: 250 yen	Expiration date: 23rd Nov. 2017 NET weight: 6 Price: 150 yen
Flour	NET weight: 1 kg Price: 250 yen	NET weight: 500 g Price: 150 yen (clearance sale)

Appendix 4 Photos of the blackboard after class in FY2017

