"Environmental Teaching Material" Development and Teaching Practice on "Environment Theory of Child Care Content"
—With the Help of Unit in "Link" by Harlan, J.D—

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This study introduced 'link' activity, which is environment teaching material by Harlan, J.D (2004), in the class of "Environment Theory of Child Care Content". In the study we also let the students actually practice it, and verified how the class should be with examining availability of it. The participants in the class reached the number over 100 and were divided into four groups. The 'link activity' was practiced in the class by micro teaching method.

In conclusion, we found some typical characteristics of the study and clarified availability of the teaching material and the reflection points. This study seems to be beneficial for teaching the most basic concept of "link" to children in "environment" learning by visualizing the concept. We assume that it was a reflection point for the study to have possibility falling into a mere word association game. So, we reconfirmed importance of preparation for the class by teachers and of raising right questions to children in order to lead a class in right direction. The points which need to be improved for teaching the class were also made clear.

Key words : Environment Theory of Child Care Content, Teaching Material Development, Lesson Planning, Environment Teaching Material, Link

1. Introduction

"Environment Theory of Child Care Content", which is accredited as two credits, is taught at Hyogo University of Teacher Education as a common subject (seminar style) for the teaching profession. First goal for this class was to understand the significance and the necessity of having relationships with two major environment factors such as nature and society by a child. Second goal of the class was to study how to deal with the two major environmental factors where he/she belongs.

"Life in a living web" which belongs to the section 16 "Environment" of the chapter two "Concepts, Experience, and Integrating Activities, Pearson" in Science Experiences for the Early Childhood Years by Harlan, J. D. and Rivkin, M. S. was used as a new course material for "Environment Theory of Child Care Content" in 2006 school year. We examined possibility of it, which was studied and practiced by participants in the class, as a practical teaching material.

2. The Flow of the Study in "Life in Living Web"

"Life in Living Web", which is in the first division "CONCEPT: There is an interconnectedness among things: plants, animals, air, water, weather, rocks, and ourselves."

of the section 16 "Environment" of the chapter two "Concepts, Experience, and Integrating Activities, Pearson" in Science Experiences for the Early Childhood Years by Harlan, J. D. and Rivkin, M. S. is written as a third study.

The purpose of the first study was to let children aware "which one is connected to the other", in a particular sense, to let them feel a sense of safety and introduce a concept of interconnectedness with other people. In an actual class children have written down people's names around them and connected a card where a person's was written to others' to understand a concept of 'link'. So, a teacher could tell "your mom is connected to you" and "your friend Taylor go to Andrew's house" to show the example to them.

The purpose of the second study was to let children to understand "what is related with things outside" in an enjoyable way. At this point, a teacher introduced a term "environment" to the class. "Environment" can be explained as "the place where we are and everything which surrounds you". Next, children have sit in a circle and done a brainstorming about one environment such as a brook. In this step a teacher should lead it so that they can come up with what they can see, hear, smell, and

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touch in an environment. Children have written down the
ideas on cards and connect them to other by line just as
they had done before. A teacher could ask questions such as
"what will happen if there is no X?" so as to let children
have their own questions. Questions such as "what will
happen if there was no water in the world?" or "what will
happen if the sun never set?" should be prepared to give
them a vivid image.

The third one was "Life in a living web" which we
had taken in this class. The purpose of the study was "to
let children have a sense of belonging to environmental
elements and/or to a certain group". First, a teacher
prepared a rolled string which was formed like a ball.
Next, the teacher made a circle with the rolled string and
let them stand up inside the circle, then, asked them to
say names of plants which live in the region where they
live. When a child answered a plant name, the teacher
asked him/her to hold. Moreover, the teacher asked
children what kind of creature ate the plant. If the answer
was reasonable, stretched the string, connected the first
child and a second child. The teacher continued asking
questions which related to what children had mentioned
and stretching the string until all children were connected.
This means all children has been connected with certain
relationship. At the end, the teacher asked them what would
have happened if one of elements has gone. (cf. who
would be pulled off if the tree standing here has fallen
down?). The purpose of the question was to make them
feel the environmental elements are intertwined each other
in a variety of ways.

Those are the outline which dealt with material "link" in
"Environment Theory of Child Care Content". Students took
charges both as child roll and as teacher roll in the class
to follow the flow of the study in "Life in Living Web".

3. Outline of the Study

Number of participants: 101 (including sophomore to
grad students)

Date: January 29th

Length of the Class: 90 minutes

Course materials:
1) Hand out (Section16 'Environment', Division 1 'Link')
2) Work sheet
   * Student number( ), Name( ), Teacher roll and
child roll

1) Observe other groups and write down comments
(reflection points of your group).

Group 1: __________________________
Group 2: __________________________
Group 3: __________________________
Group 4: __________________________

2) Choose the best group which showed the smoothest
link with environments and give your reasons.

3) Write down what teacher should prepare and be careful
for teaching the class.

4) Write down your opinion which you would think useful
to improve today's class.

5) Write down comments after you have practiced envi-
ronmental "link" in the class.

4. The Flow of the Class

1) Distribute handouts and worksheets

2) Explain today's outline

A purpose of today's class was to let participants
experience the way which they will make children understood
an idea of 'link' being the basic concept of "environment"
throughout the activity. Also, the participants were expected
to see critical points in teach children.

3) Understanding a concept of 'link'

Handout of "Link" activities of devisio1 of Section 16 by
Harlan and "Link" activities of this class were explained. It
was made sure that all participants understood the class
focused on the third "link" activities of division 1 Section
16 by Harlan and children had a basic knowledge
concerning "link" to a certain extent. It was also made
sure that participants should make the children understood
the concept that "environment" was "the place where they
are and everything which surrounds them". So, the
importance of understanding the basic concepts for
environment by children mentioned above was prerequisite
for the today's class.

4) Group division

As the participants of the class were over100, they were
divided into four groups and micro teaching method was
employed for the class. One group consisted of approxi-
mately 25 students and a student was chosen as a teacher
roll, another student was selected as a sub-teacher roll,
and the rest of students performed child roll. Sub teacher
roll took a memo about what child roll said and helped
the teacher roll out if he/she was in a trouble. Students of
child roll wrote down their own name on packing tape
and used it as a name tag. Participants were varied from
sophomore to graduate students. So, the name tag was
used because students were unfamiliar each other.

5) Micro teaching and class observation

Micro teaching was performed in an order from group
1 to group 4. The other three groups except for the performing group observed it and wrote comments down on given worksheets. Each group had fifteen minutes for the micro teaching performance. The record of the observation was kept as a material for discussion at next lesson. It was considered that the record helped students to observe the micro teaching by the other groups objectively and see right questions to guide the children toward the right direction. The record was also used to find reflection points for the group they belonged.

First key words such as dandelion, field, butterfly, or brook, which were relatively easy to teach, were given. A student of teacher roll could help students of child roll only when he/she could not find any answers. For example, a student of teacher roll could ask child roll students if there was anything related with X or how it was related with X. A child roll student could be connected with more than two other child roll students if the teacher roll student thought that it was important. Teacher roll should end the activity after everybody was linked. At the end of the activity, teacher roll asked child roll students "what will happen if there was no water in the brook or the entire tree died" to make the child roll felt the sense of "link".

6) Evaluation of the activity

After all the micro teaching, each group was asked to choose the best group in this lesson. That was a second assignment on worksheet 2. Several students were asked to make comments in order to make students be aware of points for the observation and evaluation. Actual evaluation has been done on the next lesson.

5. Results of the Practice

The outline of practice of each group was shown on Table 1. Group 1 and 3 selected "butterfly" as a first key word. Group 2 and 4 chose "field" as such. Since only fifteen minutes was allowed for micro teaching as it was shown in table 1, not everybody was linked by the end of it. Consequently, the last question was asked and the last activity was done before everybody was linked.

Although they were all university students, they were not quiet sure what to do as none of them had previous experience for "link" activity. In the beginning of the activity, students of teacher roll in group 1 did not come up with a question and students of child roll for the same group wondered what to ask. Among four groups, group 4 acquired 52 votes in 101 votes while group 2 obtained 37 votes in 101 votes. So, the group 4 obtained the highest vote for preference.

A student of teacher roll in group 4 tried to ask questions relating to environment toward child roll. That was probably why group 4 obtained the highest vote for preference. However, the flow of the activity for the group sometimes stopped as they put too much consideration on environment. In addition, a student of teacher roll had a trouble to deal with topics such as a sloth since it was an unexpected answer.

As group 2 could refere to group 1, which performed previously, the activity of them went through well. Especially, students of child roll could feel that animals and plants were mutually interconnected when the final question of "what will happen if there is no X" was asked. In addition, a student of sub teacher roll started taking a memo from group 2. Group 3 has shown the best flow of the practice.

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enjoy the activity the most as students of child roll responded vigorously toward questions. When the last question "what will happen if there were no sea" was asked, the group obtained many answers which were interconnected. So, the group seemed to be very excited about finding connections of their answers. However, the practice was not supported by other groups because it seemed more like a word association game rather than understanding "link" of environments.

6. What Students Learned After the Practice
When we look at worksheet ③, we can see what kind of ideas students obtained for preparing the practice as a teacher. The summary of it was as follows.

Prior preparation
A teacher needs to think about questions and key words in advance.
A teacher needs to research connections of nature and expect answers from children.
A teacher needs to have an idea about environmental destruction.
A teacher needs to understand connection of nature and know what kind of animals and plants are around a school.
A teacher has to set clear theme for the practice, otherwise, it often falls into a mere word association game. So, it would be good to set a point for each question such as to eat, eatable, dwellings, coexistence, and so on.

1) The teacher's attitude
Need to keep a key word of "Environment" on his/her mind.
Felt difficulty and importance of asking questions.
Need to be always aware of giving comments which link with "Environments" when a teacher practices a lesson.
Need to be aware of not talking too much when a teacher asks questions

2) How to make students answer questions
Need to make various questions over many fields.
Accept a child opinion first in order not narrow the range of answers down.
Make atmosphere in which a child can answer freely.
Need to progress a discussion with taking care of time distribution which can allow all the class give opinions.
Try to have a clear image about how to give students opportunities to answer and progress the class before the class starts.

3) How to make good atmosphere for the class
Need to create good atmosphere for students to be able to speak their opinions more.
Rhythm is important.
Make sure to maintain certain tempo for questions and answers.
A teacher should always try to cultivate themselves with thought of "link" in order to draw children's attention by giving them enjoyable questions.

4) Importance of summary
It is necessary to think about the question for the last summary part enough. The question for the last summary part determines the quality of the class.

The opinions mentioned above have been extracted from ③ of student's work-she. Most students pointed out the necessity of preparation prior to the practice. In this teaching practice, the student was suddenly nominated for the teacher roll. Thus, the student was not able to prepare prior to it and develop the activity. As a result, the teacher roll could not have time to get ready for drawing answers out from child roll who had not thought about 'link' in their environment. As this point was clearly seen in the practice, it is thought observers might have focused on it and made comments.

Moreover, in the comments for teacher's attitude, students mentioned importance of asking a relevant question to lead a discussion on the truck due to the fact that one of four groups has fallen into the activity ending up with a word association game. This point of view was also mentioned in the comments for how to make children answer, how to draw answers from them, and how to make comments without deviation.

Some students mentioned the tempo had been stagnated because the teacher talked too much. Some students also mentioned the issues which were beyond this practice such as "Although this practice is linked with environment, what would happen if an actual practice is done for children instead for the students".

Most students pointed out importance of final summary. In this practice, it would become useless if all the children cannot feel “link”. It is thought to be a significant achievement that the students noticed this respect.

7. Points to improve this practice
The description of the work-she ④ was analyzed to find out points to improve this practice. Comments from the students were as follows.
Table 1 Outline of the Micro Teaching by Four Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Flow of Answer</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>butterfly →(image?) → alpine meadow → (what kind of creature is there?) → mantis → (what do they eat?) → fly → (what kind of animal eat it?) → frog → (where does it live?) → pond → (what kind of creature live there?) → fish → (what does it eat?) → plankton → (damage?) → red tide → (result?) → fish dies → (what is formed by it?) → nutrition → (what type of nutrition?) → vitamin C → (what can be associated by it?) → lemon → (squeezed lemon?) → (for what meal do we use it?) → Kanaage (fried chicken) → birds → (where do they live?) → field → (what lives there?) → butterfly → •&gt;summary</td>
<td>Since group 1 tried first, the talk leaped a little further. It started from butterfly and linked with pond, fish, plankton, and finally to red tide which related to environmental problem. The answers of students started from creatures and could link with lemon and vitamin C due to teacher’s interesting questions. At the end, the first key word “butterfly” was mentioned. Thus, it was proved that everything is linked. However, the teacher seemed to be having problems in asking questions.</td>
</tr>
<tr>
<td>2</td>
<td>Field → (what kind of creature is there?) → butterfly → (what does it eat?) → honey → (where is honey?) → flower → (what kind of insects come to the flower?) → bee → (What is it collecting?) → honey → (who eat honey?) → bear → (where does it live?) → mountain → (what kind of animal live in mountain besides bear?) → wild boar → (what does it eat?) → potato → (what kind of animal live in mountain besides bear and wild boar?) → rabbit → (where does it live?) → soil → (who live in a soil?) → earthworm → (who eat earthworm?) → rabbit → (where does it live?) → tree → (What can we get from tree?) → acorn → (who eat acorns?) → squirrel → •&gt;summary</td>
<td>The discussion started with a word, “field” and it was linked with things which lived there such as “bee”, “bear”, and “wild boar”. Many animals’ and plants’ names were drawn due to questions, which related to those creatures, such as “what kinds of thing does X collect?”, “where does X live?”. In a final question teacher roll said that “what would happen if X was destroyed”. It was so effective that child roll could understand that all animals and plants were needed.</td>
</tr>
<tr>
<td>3</td>
<td>butterfly → (where does it live?) → field → (who live in the field?) → rabbit → (what does it eat?) → carrot → (Where can we have it?) → field → (who live in the field?) → earthworm → (who eat it?) → bird → (what do you associate with it?) → bird flu → (what do you associate with a bird?) → Okayama → (what do you associate with a bird?) → Soto → (what do you associate with a bird?) → sea → (what live in a sea?) → tuna → (anything else?) → crab → (anything else?) → octopus → (anything else?) → squid → (anything else?) → oyster → •&gt;summary</td>
<td>Discussion went through under enjoyable atmosphere although it was a bit like a word association game. A teacher roll drew out many answers about sea related animals. It would make the practice even better if teacher roll could have had ideas which allowed children roll to think “sea” as one unit. Since many answers toward one question were drawn, it made child roll easier to understand “link” when the final question was asked.</td>
</tr>
</tbody>
</table>

<Comments by teacher roll> Could ask only simple questions as the teacher roll did not have an idea how to lead a class. Should have explained how to lead discussion beforehand. Gave few questions. Might cause confusion as some questions were given which related to two words ahead. Should consider how to give questions to avoid unrelated answers toward environment.

<Comments by teacher roll> It was hard to ask good questions to a child roll. It would be needed to ask various types of questions because similar questions such as “where does it live?” and “what does it eat?” were often used. It was an effective way that sub teacher roll took a memo. It would be important to pick up a reasonable answer from children because they popped up with more ideas.

<Comments by teacher roll> From the middle of discussion, the key point was deviated from “environment”, however, child roll could focus on it again when a teacher roll asked a question about sea. Most importantly, the teacher should pay attention not to fall into a word association game. Questions of
the latter half were extremely important as it determined whether all the practice became meaningful or not.

Field linked with many flowers and animals which lived in the tree on it. Thus, many connections could be seen. The key points of the lesson were easily understood as it was continuously focused on “environment” related subjects such as animals, plants, dwellings, and so on. The practice did not flow smoothly from time to time since it fell into a quiz like style as a whole.

<Comments by teacher roll>

The same type of questions such as “where does it live?” were used repeatedly when the word “animal” showed up. It seemed to be important to give questions rhythmically.

It was thought to be necessary to organize questions and simulate the practice in advance. Felt embarrassment when treating unexpected answers.

1) Points which should be improved for assuming actual class intended for children

- A child needs a card which they hang with string from the neck to write down what he/she has said on it. So, it is thought to be helpful for him/her to catch up with the practice.
- If the teacher had read the picture book concerning the key word or showed a video before the lesson, a child would have had a better understanding.
- Children should stroll in the schoolyard and obtain knowledge concerning the practice beforehand. So they can obtain ideas such as “who eat leaves?”, “what is needed for rabbits living here to grow up?”, and so on.
- The teacher should firmly explain to the child what the string shows.
- The teacher should make the image-map.
- Children should actually go out to the field after the activity.
- It could be a good idea to show an illustrated book to children to increase their knowledge.
- Teachers should utilize strings more to make children understood “link”.
- It would be a good idea to show picture in the class for children who cannot have clear image.
- It is thought to be a good idea to add comments on children’s answers.
- The teacher should teach the activity to children in a small number of people because they are not good at waiting.
- A card which children hang with a string from the neck to write down what they have said on it seems to be helpful.
- Teachers should be cautious that the practice should not fall into a word association game.
- The children might be able to feel “link” with a group if they were lined up by hand in hand instead of being connected by the string.
- It might be helpful for children if key words such as “tree”, “field”, and so on, were written in a card which is hung with a string from their necks.

2) Points need to be improved for this class

- The teacher should have understood what kind of questions children would ask prior to the class.
- No preparations for the class have done. In addition, teacher roll was designated on the spot. So, it made tough to understand main points of the class, especially at the beginning of the class.
- As it was time-consuming to write the name in the packing tape, it is thought to be unnecessary.
- Sub teacher roll student should have had more positive roll.
- It might be a good idea to have a leader for this activity.
- It seems that about ten is the suitable number for the class.
The points to improve the practice from student' aspects were divided into two major points. One was related to the activity for making children understood a concept of 'link', the other was related to how to progress teaching in this class. The first point was thought to be related one which fosters understanding of children. Because a child has less knowledge than a university student, many students mentioned the important for a child to have guidance prior to the class. The point concerning this was explained at the introductory part of the class as follows. The activity was set as the last section among the three; however, the students did not seem to understand the explanation. Needless to say, it is of importance for children to acquire concepts of the first two sections just as the students mentioned. In addition, it is thought to be a good idea for each child to carry an answer card being hung from the neck with a string because even university students sometimes forgot how they previously answered. Furthermore, not only conversation between a teacher and child roll but also the number of people in the activity was needed to be reconsidered.

Most of the students pointed out that time for preparing the class should be given in this practice. We should reconsider the point and will try to improve it in the next school year practice.

8. Conclusion
The necessity of this practice was discussed based on descriptions in worksheet ⑤.

The students' opinions about this research were shown below.

- It was understandable that the environment was complexly related by looking at a string, however, the focus should also be on quality of the practice.
- It was felt that an animal and plant were always connected with something. So, we knew that all the things were interconnected and influenced by each other, especially at the time when one of them was lost or destroyed. It would be better if we prepare materials which contribute for the smooth flow of the class.
- Since we practiced the lesson without having enough knowledge, it would be more interesting if we could develop the course material by ourselves.
- It was good to be able to see interconnectedness among things visually through the experience that one of knots in the string was loosen.
- It was easy to understand the concept 'link' by oneself, but hard to give good questions and teach it to children. Children could be aware of themselves and their surroundings seeing a string related with each other.

- It was a good way to introduce a concept 'link' to children and let them think about environmental problems.
- It was thought to be tough not only for children but also for ourselves to do this practice, however, it is thought to be a very interesting teaching method to introduce 'link'.
- Using a vinyl string was a great method to teach children "link" visually.
- It was very interesting and effective way to experience the conduct of pulling a string in teaching food chain and interconnectedness among things visually to children.

The comments by students mentioned above are not special. Majority of them had a positive attitude toward this practice to teach 'link'. It is thought to be one of good characteristics for this practice that children can visualize "link", which is a basic concept for "environment" study, with a help of a string. It is thought that this "link" activity is proved to be beneficial as an "environment" study material because majority of students had a positive attitude toward this point. We introduced the teaching material in a form of micro teaching as a part of university lesson; however, we have to add comments that we need to improve the way to deliver the practice. The practice was originated from the third activity of 1st division of "link" in "environment" Section by Harlan. We should have made students to practice the activity in a first half of the class or explained concepts of the class more in detail. If we did so, the students might not have had confusion toward the intention of the activity and delivery of the class. In addition, we gave little time for students to prepare the activity, so it caused the activity to be stagnated and made it fallen into a word association game. These reflection points mentioned above should be improved next school year. The reflection points were made clear through the activity and we could share them with the students. Thus, we believe that each student will be able to take them into account as key points when they teach "environment" study to children in the future.

Reference