Transferring an Established Curriculum from one University to Another
- Extraction and evaluation of conditions for transferring -

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Abstract
This study investigates conditions for transferring an already established practice to a new situation. Practice-based, concrete goals of transfer were extracted from careful observations on the established case, and then translated into practical activity plans to conduct the new implementation. Three practical pieces of guidance, assuring enough time for the formation of initial hypothesis, enhancing collaborative reflection through relation making activities, and explicitly encouraging knowledge integration by the learners themselves, are implemented and evaluated on the new site, yielding positive results.

Observation of an established case of college level collaborative learning
Some established cases of college-level collaborative learning have been identified in Japanese learning science community. The author observed, as a member of its project team, one of such cases whose learning goals are the followings.

1. At the beginning, it is important that the learners are explicitly encouraged to externalize their initial hypothesis, as each member’s unique “Idea.”
2. Collaborative reflection is encouraged for developing their initial ideas into more conceptual understanding, through relation-making activities supported by their computerized conceptual mapping tool.
3. Knowledge Integration is the final goal of learning by which the learners summarize what they learned in the class and relate this to their daily problem solving, as well as to their future learning goals.

In order to help students achieve these goals, the established case has three conspicuous features in their curriculum. They deal with many learning materials in parallel, divided among the class members so that each member becomes responsible for a particular part of it. They use a modified jigsaw to coordinate the collaborative learning. They also use an IT supported concept mapping tool, Reflective Collaboration Note, for easy externalization of their ideas as well as for collaborative reflection on the sharable notes.

The learning goals listed above would be regarded as a guideline for transferring this case to a new site; such guidelines are often too abstract to be implemented straightforwardly. For successful transferring it is desirable to search for and extract more practice-oriented, activity based conditions.

Extraction of conditions for transferring from process data analysis
The author participated in the above mentioned established case from 1997 to 2003 and has moved to a new university in year 2004, creating a chance to transferring the established case to a new site. In order to make the transferring successful, he has analyzed the learning and teaching process data of two selected classes and searched for conditions for transferring, not on the abstract guideline level but on more practical, learning-activity level. To determine the relationship between learning activities and how the three learning goals had been reached, the log-data in the collaborative concept mapping tool and the contents of their term-papers were analyzed. As a result, it was found that the following conditions for transferring were indispensable.

1. Sufficient time is given to externalize an initial hypothesis for each member, from careful reading, concept mapping, preparing and practicing explanations to delivering and exchanging the d’explanations with others.
2. To cause collaborative reflection, relation-making activities are repeatedly conducted between each set of materials.
3. To ensure knowledge integration, the students explicitly encouraged to integrate all learning materials among them, as well as to relate what they learned to their daily practices.

Adaptive diversion to another university
I designed a class for a teacher training course at Shizuoka University based on the conditions for transferring described above. This class was intended for 3rd graders in 2004. Table 1 contrasts the differences in the class environment. The curriculum for the Shizuoka class was composed on the constraints in Table 1, to fulfill the extracted conditions for transferring.

Table 1: Differences in situations of each class

<table>
<thead>
<tr>
<th>Site</th>
<th>Established case</th>
<th>Shizuoka University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics of class</td>
<td>Cognitive sciences of problem solving etc.</td>
<td>Learning science and its application</td>
</tr>
<tr>
<td>Participants</td>
<td>Sophomores and juniors of cognitive science major</td>
<td>3rd year students in teacher training</td>
</tr>
<tr>
<td>Class size</td>
<td>40 – 70 participants,</td>
<td>8 participants,</td>
</tr>
<tr>
<td>IT supports</td>
<td>Hi speed computers with specified software</td>
<td>Older computers with Internet access only</td>
</tr>
</tbody>
</table>
1. In order to cover a lot of materials with a fewer number of students, the learning materials were grouped into two kinds (12 basic cognitive experiments, 2 design researches), and their own teaching practices were treated as “learning materials.” In order to secure the sufficient time for the initial hypothesis formation, the initial hypothesis phase and the collaborative reflection phase were repeated.

2. In order to support active collaborative reflection with only the Internet facilities running on older computers, the support system was devised using a free-software (based on wiki), “ReCoWeb” and used.

3. To strengthen the knowledge integration of learning materials and their daily cognitive practices, the students’ teaching practice experiences were included as one of the materials.

The curriculum at Shizuoka University
Table 2 explains the flow of class activities at Shizuoka University.

| a. Understanding 12 basic cognitive researches | The students were divided into groups of three. Each group studied one of the 12 materials carefully, wrote summaries on ReCoWeb. They exchanged explanations to think about the relations among them. |
| b. Practice teaching at elementary and junior high schools | Five week practice teaching at assigned schools. They summarized their experiences on ReCoWeb. |
| c. Understanding 2 design researches | The students formed couples to study WISE and LBD, summarized them on ReCoWeb. In Jigsaw they related them. |
| d. Relation making | Integration of all the learned materials. |
| e. Summary writing | Write a term paper on “how people learn well: a learning scientific view.” |

Outcome evaluation
To evaluate the transferring, the achievement of the three learning goals was evaluated from the learner's activity process data.

1. Initial hypothesis making
Comparing the time-wise breakdown of activity time assigned to the formation of initial hypothesis (Figure 1), the Shizuoka students spent the equivalent time to the established case (referred as Chukyo in the figure), prepare the material to explain on ReCoWeb.

2. Relation making phase.
The students were encouraged to relate the learning materials and to extract the "conditions for people to learn well". A total of 122 links between materials were created on ReCoWeb during this collaborative reflection. As shown in Table 3, content at a deeper level appeared as the relation activity advanced. Comments written toward the end included detailed explanations of the constructs that appeared in the learning materials in their own words.

<table>
<thead>
<tr>
<th>Features found as “common”</th>
<th>Opening</th>
<th>Middle</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial features only</td>
<td>15</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Concrete, procedural features</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Common features at conceptual level</td>
<td>6</td>
<td>9</td>
<td>17</td>
</tr>
</tbody>
</table>

In the final report, it was requested that all learning materials be integrated. The final reports were submitted by six students. They were evaluated from two perspectives, whether they included specific examples from the learning materials and whether they integrated them into their explanations. All six students were able to quote teaching practice experiences and two design studies and to describe them. Five students were able to describe relationships among two or more content items when explaining a certain concept. However, basic cognitive experiments were quoted only by one student. One student picked out the concept of “learner centered” in his term-paper, utilizing four relations he had created on ReCoWeb. He also referred to both WISE and LBD and related his comment to these to his own practice teaching experiences.

Conclusion
This paper reported a transferring of an already established case to a new site through a set of learning activity oriented transfer conditions. The transferring was relatively successful. The cause of this success was the ability to use detailed processes of learning and teaching in the diverse origin. More detailed data needs to be collected and analyzed to generalize this, to aim at extracting the effective conditions for transferring for wider possibilities.

References