Analysis of Bridge Learning: Focus on the Relationship between Bridge Learning, Approaches to Learning, and the Connection of Present and Future Life*

Toru Kawai*1 and Shinichi Mizokami*2

*1 Institute for Teaching and Learning, Ritsumeikan University, 56-1 Toji-in Kitamachi, Kita-ku, Kyoto 603-8577 Japan
*2 Center for the Promotion of Excellence in Higher Education, Kyoto University, Yoshida Nihonmatsu-cho, Sakyo-ku, Kyoto 606-8501 Japan

Received for publication, April 16, 2013

The purpose of this article is to investigate the structure of Bridge Learning and its relationship to “approach to learning” and “future-present life connection”. In this study, we analyzed a questionnaire survey of 547 students from private universities. The structure of learning bridging includes links between out-of-class activities and in-class studies, between different classes, and between past, present and future studies. Bridge Learning has significant positive correlation with “deep approach to learning” and “daily action connecting future life”. We conclude that there is a complex interrelationship between the three variables (learning bridging, “deep approach to learning” and “daily action connecting future life”) of student learning and so it is important for learning support to consider this relationship.

Key words: Student learning, Bridge Learning, Approach to learning, Connection of present and future life, Learning support

1. THE BACKGROUND AND PURPOSE OF THIS STUDY

Recently, Japanese higher education research has put more and more emphasis on students’ learning and development. Higher education stakeholders think that teaching development, teachers’ reflection and curriculum development should focus on student learning and development in order to prepare them for the increasingly competitive global job market (Entwistle 2009, Ramsden 2003). Accordingly, student learning surveys and research have developed over the last several years.

1.1. Preceding Student Learning Survey and Research

The first student learning surveys and research projects investigated how students spent campus life, targeting campus life as a whole. They revealed that out-of-class learning produced learning outcomes such as acquiring knowledge and skills (Kuh et al., 2006, Mizokami 2009, Pascarella and Terenzini 2005, Yamada et al. 2009, Yamada and Mori 2010). They also found that the students who had concrete goals for their futures and took actions in their daily lives engaged not only in in-class study but also in out-of-class study in their campus life (Mizokami 2010). This connection between present and future life has great impact on student learning.

The second group of student learning surveys and research projects approached students’ in-class study. They made the distinction between the surface Approach to Learning, which leads to rote learning, and the deep approach, which leads to sense-making. These projects also pointed out the importance of encouraging the latter (Biggs and Tang 2011, Entwistle 2009, Prosser and Trigwell 1999).

The third research groups focused on the relationship between out-of-class learning and in-class learning, connecting the results of the first and second groups. This study conceptualizes connecting and integrating different kinds of learning in different contexts as Bridge Learning (BL) using the results from learning science, knowledge transfer research, and research on boundary-crossing (Kawai and Mizokami 2011, 2012).
Kawai 2012a). The analysis of BL concentrated on the bridging between in-class and out-of-class learning. This research suggested that the participation in out-of-class communities of practice and between out-of-class activities and in-class academic learning were important for students’ learning and development because those two resulted in students’ daily satisfaction and acquirement of knowledge and skills.

1.2. Frameworks for the Present Study

1.2.1. The Analysis of BL

This study focuses on BL. BL is a concept based on the idea that student learning requires not only in-class learning but also out-of-class learning [the first survey and research project (Kawai and Mizokami 2011)]. BL connects and integrates different kinds of learning in different contexts when learners cross boundaries between contexts of different activities (Kawai 2012a).

We previously analyzed student learning based on the classification of a questionnaire, which asked whether or not students “use out-of-class experiences in class setting” or, whether or not students “connect in-class study and learning activity in out-of-class activities’ communities of practice” (Kawai and Mizokami 2011; Kawai 2012a). These analyses were limited to the BL between out-of-class study and in-class study.

Theoretically, BL includes the bridging between (1) out-of-class and in-class study; (2) study in one course and in another one; (3) temporally different learning (the past, the present and future learning) (Fig. 1).

1.2.2. The Examination of the Relationship between BL and Approaches to Learning, and between BL and the Connection of Present and Future Life

The third student survey and research project revealed that BL led to student satisfaction in campus life and acquirement of knowledge and skills. However, what remained unclear was the relationship between BL and Approaches to Learning in the first study, and between BL and the Connection of Present and Future Life in the second study.

Previous studies have explored three dimensions: the general and comprehensive aspects of students’ campus life; the specific character of learning in the in-class or out-of-class contexts; the qualities of the relationships between different learning in the specific contexts. Student surveys and research projects must investigate across these dimensions (Kawai 2011). In the next section, we review the relationship of BL to Approaches to Learning and the Connection of Present and Future Life.

1.2.2.1. The Framework for the Examination of the Relationship between BL and Approaches to Learning

Research on Approaches to Learning distinguishes between surface approaches and deep approaches. This distinction derives from Marton and Säljö’s (1976) surface-level and deep-level processing on text reading. Surface-level processing of information focuses on the passages themselves and enables simple reproduction. Deep-level processing of information focuses on the author’s intention, the point of the passages and resulting conclusions and leads to thorough understanding.

The research on Approaches to Learning that is based on Entwistle and Ramsden’s study (1983) sustains the distinction between surface and deep and adapts the term ‘approach’ instead of processing (Marton and Säljö 1997). In the questionnaire survey project entitled “Approaches to Learning and Studying Inventory” (IALSI), the concept of Approaches to Learning refers to the typical and general way of learning and the orientation to learning (Entwistle and McCune 2004).
1.2.2.2. The Framework for the Examination of the Relationship between BL and Connection of Present and Future Life

The previous study on students’ campus life adopted the items “Two Lives” and analyzed Daily Life and Future Life. The results of this study revealed that the students who satisfied the following three conditions learn both in-class and out-of-class and acquire knowledge and skills: having a vision of one’s own future life; specific goals and plans in one’s daily life in order to achieve the vision; actual actions taken in one’s daily life (Mizokami 2009, 2010).

The measurement of Connection of Present and Future Life (Mizokami and Hatano 2011) is based on this “two lives” concept and is assessed in the survey questions. The Connection of Present and Future Life has two distinctions: between future and daily life and between consciousness and behavior.

1.3. The Purpose of the Present Study

This study has four purposes. First, the present study clarifies students’ experience of BL, broadening the analytic range to include the three forms of BL. Second, this study investigates the statistical relationship between BL and Approaches to Learning in order to consider BL in relation to subject matter and ways of learning. Third, this study investigates the statistical relationship between BL and the Connection of Present and Future Life in order to consider how BL relates to the interaction between students’ daily lives and future lives. Fourth, this study advances concluding thoughts on the relationship between BL, Approaches to Learning, and the Connection of Present and Future Life.

Through these analyses and investigations, this student survey and research project can interrelate three dimensions: the general dimensions of students' campus life; the specific dimensions of learning in the in-class or out-of-class contexts; the intermediate dimensions of the relationship between different kinds of learning in the particular and specific contexts.

2. METHOD

2.1. A Preliminary Survey

We interviewed 12 students one by one in order to collect the question items about BL in Figure 1. Referring to Kawai (2012b), we asked them how they connected out-of-class experience and in-class learning, different kinds of learning in different courses, and their past studies, present studies, and future studies. This semi-structured interview produced 21 question items. We discussed the questions to confirm the content validity for BL. The questions we used related to the transition between different activities and related to connection and integration of different kinds of learning. We conducted a preliminary survey in September, 2011, in which 40 students participated, and we examined the contents and expressions of the question items. Finally, we ended with 16 BL question items.

2.2. Participants

We conducted the survey from November to December, 2011. 547 students from humanities and social science faculties in private colleges and universities participated in this survey. There were 230 males, 306 females, and 18 missing values. There were 181 first-year students, 184 second year students, 156 third-year students, 11 fourth year students, and 15 other students. This survey was designed to include students in different years and was not limited to a single year.

2.3. Outline of Survey

2.3.1. BL question items

We used BL question items from the preliminary survey to gather information about the three relationships shown in Figure 1. For example, “In out-of-class activities setting, I use knowledge which I acquire in class” refers to #1; “In one course setting, I use knowledge and experience from another course” refers to #2; “Through college courses, I try to understand deeply what I have learned” refers to #3. They are measured on a 6-point scale from “I do not at all” to “I do so much.”

2.3.2. Approach to Learning question items

Approach to Learning was measured by question items about “Deep Approach to Learning” and “Surface Approach to Learning” from the Learning and Studying Questionnaire (LSQ), which focuses on learning in Approaches to Learning and Studying Inventory (ALSI) [Entwistle et al. 2002 (see in Table 2)]. Participants can choose six responses from “I do not agree at all” to “I agree thoroughly.”
2.3.3. Connection between Present and Future Life question items

The sixteen question items of Connection between Present and Future Life are derived from Mizokami and Hatano (2011). Students responded a 6-point scale from "I do not agree at all" to "I agree thoroughly."

3. RESULTS

3.1. Analysis on BL

Employing the sixteen question items on BL, factor analysis (maximum likelihood method, promax rotations) revealed three factors supported by the scree test. After dropping the items exhibited by a substantial cross loading across factors, the rerunning factor analysis revealed a three factor structure which included ten question items. However, the correlations between factors were so high (.52~.75) that we finally judged BL items to be one factor structure in this research. We conducted factor analysis (maximum likelihood method) to produce one factor and showed the results in Table 1: eigenvalue is 4.86 and factor contribution is 48.6%.

3.2. Analysis on Approaches to Learning

Factor analysis was conducted on these question items using the maximum likelihood method and promax rotation. A two factors solution was supported by the scree test. Some of the items cross loaded on more than one factor, so these items were dropped and the remaining items were analyzed (Table 2).

The factor analysis of these items revealed two factors. The first factor is labeled "Deep Approach to Learning" and consists of relating, understanding meaning, evidence-based inquiry and so on. The second factor consists of fragmental learning with lack of purpose and orientation, and dealing passively with what one

<table>
<thead>
<tr>
<th>Form Number</th>
<th>Question Item</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>In one course setting, I use knowledge and skills from other courses.</td>
<td>.821</td>
</tr>
<tr>
<td>2</td>
<td>To understand certain subject matter, I connect it to knowledge and skills from different courses.</td>
<td>.777</td>
</tr>
<tr>
<td>2</td>
<td>I study investigating different courses.</td>
<td>.741</td>
</tr>
<tr>
<td>2</td>
<td>I apply knowledge from one course to other course contexts.</td>
<td>.703</td>
</tr>
<tr>
<td>3</td>
<td>I make effort to understand course contents by applying the knowledge and skills from other courses.</td>
<td>.689</td>
</tr>
<tr>
<td>3</td>
<td>I engage in advanced courses based on knowledge and skills from the courses in which I earned credits.</td>
<td>.643</td>
</tr>
<tr>
<td>1</td>
<td>In out-of-class activities setting, I use knowledge which I acquire in class.</td>
<td>.573</td>
</tr>
<tr>
<td>1</td>
<td>I seek the meaning of college life experience by making use of knowledge from the courses and reading books.</td>
<td>.492</td>
</tr>
<tr>
<td>1</td>
<td>I engage in out-of-class activities by making use of what I learned in college courses.</td>
<td>.448</td>
</tr>
</tbody>
</table>

Table 1. The results of factor analysis on BL

Table 2. Results of Factor Analysis of Approach to Learning

<table>
<thead>
<tr>
<th>Factor Correlation Column</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-.236</td>
<td></td>
</tr>
</tbody>
</table>
should do, and has been titled “Surface Approach to Learning”. These results are consistent with previous research on Approach to Learning (Entwistle 2009, Entwistle et al. 2002).

Both scales produced higher reliabilities, measured by Cronbach’s alpha coefficient of internal consistency: Deep Approach to Learning .829; Surface Approach to Learning .739. The following analyses used the “Deep Approach” score and the “Surface Approach” score, which are simple averages.

3.3. Analysis on Connection of Present and Future Life

The same method of factor analysis suggested two factors, which we judged by scree test. We conducted the analysis again assuming these factors; some of the items cross-loaded on more than one factor, so these items were dropped and the remaining items were analyzed (Table 3).

This analysis revealed two factors. The first factor labeled “Connecting Mind and Behavior” represents students’ conscious actions in connection with their own future lives including choosing goals about their future and taking daily action to connect the present and future. The second factor, labeled “Unconnected Mind”, consists of the items that show students do not intend to connect to their future lives and are in no relation to their daily actions.

These results are consistent with Mizokami and Hatano’s study (2011). These two factors showed high reliabilities when measured by Cronbach’s alpha coefficient of internal consistency: Connecting Mind and Behavior .803; Unconnected Mind .718. As in the analysis of Approach to Learning, the analysis in section 3.4 used simple averages for the “Connecting Mind and Behavior” scales and “Unconnected Mind” scales.

3.4. Analysis of the relationship between BL, Approach to Learning and Connection of Present and Future Life

Table 4 shows correlations between these concepts and each mean, standard deviation, and alpha coefficient. Correlation analyses revealed that there is strong significant positive correlation between BL and “Deep Approach to Learning” and also significant positive correlation between BL and “Connecting Mind and Behavior” of present and future lives. In addition, analyses found that there is significant positive correlation between “Deep Approach to Learning” and “Connecting Mind and Behavior”.

Table 3. Results of Factor Analysis on Connection between Present and Future Life

<table>
<thead>
<tr>
<th>Connecting Mind and Behavior</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prepare for my future dream and goal.</td>
<td>.809</td>
<td>-.014</td>
</tr>
<tr>
<td>I make effort for my future.</td>
<td>.741</td>
<td>-.123</td>
</tr>
<tr>
<td>I make plans for my daily life.</td>
<td>.694</td>
<td>.180</td>
</tr>
<tr>
<td>I study in college for my future dream and goal.</td>
<td>.613</td>
<td>-.033</td>
</tr>
<tr>
<td>I often think about my future in my daily life.</td>
<td>.504</td>
<td>-.163</td>
</tr>
<tr>
<td>I make a habit of planning my days.</td>
<td>.461</td>
<td>.092</td>
</tr>
</tbody>
</table>

Table 4. The correlation of BL, Approach to Learning, and Connection of Present and Future Life

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean (SD)</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.67</td>
<td>(0.74)</td>
<td>.88</td>
</tr>
<tr>
<td>2. Deep Approach to Learning</td>
<td>-.171***</td>
<td>.371***</td>
<td>-.210***</td>
<td>2.99</td>
<td>(0.58)</td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td>3. Surface Approach to Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Connecting Mind and Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Unconnected Mind</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p < .01, ***p < .001
Fig. 2 The relationship between BL, Approach to Learning, and Connection of Present and Future Life

4. DISCUSSION

4.1. Discussion on BL

The 10 BL items in Table 1 include the three kinds of BL shown in Figure 1: bridging between (1) out-of-class and in-class study, (2) study in one course and in another, and (3) temporally different learning (past, present and future learning). The analysis of the present study revealed that these three forms of bridging learning are the basic components of the concept of BL.

The analyses also revealed that the BL, The Deep Approach to Learning, and Connecting Mind and Behavior of present and future lives were interrelated. Next, we will discuss the meaning of the relationships among them.

4.2. The relationship between BL and Deep Approach to Learning

First, Approach to Learning connects to both the subject matter as the object of learning (and the specific context in which learning takes place) and to the general way of learning, which is consistent across different contexts.

The first character of this concept is the distinction not as to whether one is a surface learner or a deep learner but whether one takes a surface approach or a deep approach (Entwistle 2009). On this point, Approach to Learning depends on the subject matter, teaching and class environments (Biggs and Trigwell 2011, Parpala et al. 2010, Prosser and Trigwell 1999). Actually, students can change their approach to learning in each course, class, and subject matter.

On the other hand, the second character of Approach to Learning aims to make a general distinction in which one takes a surface approach or a deep approach consistently through class, courses and campus life. Approach to Learning connects not only specific knowledge but also broad cognitive function, meta-cognition and self-regulation (Entwistle and McCune 2004). Approach to Learning depends on the learner’s conception of learning and orientation to learning (Entwistle 2009).

Therefore, Approach to Learning relates to specific knowledge and general orientation. We can interpret the results of the factor analysis on Approach to Learning items based on the understanding of these two characteristics. Surface Approach to Learning is a passive orientation to learning: students remain at surface understanding of the subject matter, and do not derive meaning from their studies. Deep Approach to Learning is an active orientation to learning: students understand the course contents by relating, using and investigating evidence, and receive significant meaning for their efforts.

Thus the Deep Approach interrelates with BL closely. Next, let us examine this relationship from the perspective of three kinds of BL. BL between different courses supports Deep Approach to Learning in-class by relating the contents of one course to another and making sense of them. The other types of BL produce personal and multiple understanding of subject matter by connecting what students learn to the out-of-class experience and preceding knowledge or future orientation (Kawai 2012). These forms of personal and multiple understanding constitute meaningful understanding based on Deep Approach to Learning (Entwistle 2009).

The concepts of Approach to Learning and BL have different theoretical origins. The former concept emerged from theoretical concerns regarding how deep learners can understand course contents. The latter emerged from theory on how learners connect and integrate learning from different activities. In other words, Approach to Learning focuses on in-class learning and BL focuses on the relationship between in-class learning and the other kinds of learning. The present study revealed that these two concepts interrelated in student learning even though they have different theoretical origins. BL leads to understanding of course contents through Deep Approach to Learning.
4.3. The relationship between BL and Connecting Mind and Behavior

Second, "Connection of Present and Future life" questions relate to life development. Considering the relationship between present and future life and making life plans are key factors for success in campus life (Mizokami 2010). For students, active engagement in life development affects campus life and their learning. Mizokami (2009) showed that students who engage actively in their life development spend time on out-of-class study and acquire knowledge and skills.

The results of factor analysis on "Connection of Present and Future life" revealed two factors: "Connecting Mind and Behavior" and "Unconnected Mind" (Table 3). We can interpret this result from two perspectives: the distinction between present and future life and between mind and behavior. Unconnected Mind refers to the self-consciousness of students who do not engage actively in the future perspective and do not take daily action toward the future. Connecting Mind and Behavior refers to one’s awareness of the future and active engagement in taking action toward some future goal.

This Connecting Mind and Behavior correlates with BL significantly (Table 4) and relates with its three forms. First, BL between present and future learning is one form of taking daily action toward a future goal, which is the same as Connecting Mind and Behavior. Second, from the analysis of "Future and Daily Lives", Kawai & Mizokami (2011) revealed that many students who participate and study in out-of-class CoPs (communities of practice) and connect them to in-class learning have future perspectives and take daily action toward them. The questions used in "Future and Daily Lives" were the basis for the questions in the "Connection of Present and Future Life" and they relate to BL between in-class and out-of-class. Third, Connecting Mind and Behavior leads to active learning (Mizokami 2011), including BL between courses in which students acquire class knowledge and apply knowledge from other courses. Connecting Mind and Behavior supports BL in this way.

Alternatively, learning leads to the expansion of future plans and daily action in terms of the acquisition of new knowledge, skills and ways of thinking, or the alteration of existing ways of thinking. Learning and BL in campus life are effective factors for students’ life development. Therefore, BL and Connecting Mind and Behavior support and reinforce each other.

Active engagement in one’s own life development relates to the coordination of several activities in campus life. The effective coordination of campus life activities is necessary for learning and developing BL. Students engage in out-of-class learning as well as in-class learning and bridge not only these experiences, but also learning between other classes and between the present and the future. In other words, BL connects active engagement in life development through Connecting Mind and Behavior, which is accompanied by the coordination of several activities.

4.4. Discussion on the relationship between three concepts

Figure 2 sums up the relationship between BL, Approach to Learning, and Connection of Present and Future Life.

BL relates to the organization of learning activities and consists of three forms: between courses, between in-class and out-of-class, and between different times. Approach to Learning relates to the object of learning. BL leads to a meaningful understanding of subject matter through Deep Approach to Learning. Connection of Present and Future Life relates to life development. BL leads to active engagement in life development through Connecting Mind and Behavior. These relationships can be seen on specific (class content), intermediate (bridging experience), and general (whole-life learning) levels.

From the perspective of these relationships, investigations of student learning need to consider not only the quality of learning individually in the specific contexts such as in-class or out-of-class but also the quality of the relationships between different kinds of learning and the overall relations to future life plan and daily life.

In in-class educational practice, understanding of subject matter is the principal goal. In-class learning relates to learning in another class, out-of-class learning and life development. Therefore, BL as well as in-class learning is effective to promote and achieve Deep Approach to Learning.

Learning in out-of-class educational practices relates to bridged in-class learning and coordination of activities for life development. For both practice and research, the essential point is to understand the complexity of learning including the interrelations of BL.
The three levels of student learning are not only interrelated but also work together. Deep approach to learning is the active understanding of meaning; BL is the active organization of different kinds of learning in specific contexts; and active engagement in life development is the coordination of campus life activities. When students show active learning behavior but have a poor understanding of knowledge structure and concepts, they are not able to achieve quality learning (Matsushita 2009). For effective learning, students should improve the quality of learning in all three levels. Research on student learning needs to explore this complex understanding, covering all three levels.

Recently, higher education research is interested in student learning (Entwistle 2009; Ramsden 2003). However, research on student learning should avoid over-simplification and delve into its complexities. Students interrelate in–class learning, out–of–class learning and life development, so faculty and college staff should not only pursue the qualitative improvement of individual classes, co-curricular educational practice and support of students’ career development but also strive for collaboration between these effective educational practices. In this way, higher education must pursue a complex understanding of student learning, and develop effective educational practice focusing “student learning and development”. For educational practice, understanding student learning leads to the opportunity for reflection. This paper is one such step towards understanding student learning.

5. SUMMARIES AND FURTHER RESEARCH

First, this research revealed the composition of BL: between courses, between in–class and out–of–class, and between past, present and future. Second, this research investigated the relationship between BL, approach to learning, and connection of present and future. It was revealed that BL leads to meaningful understanding of class material through Deep Approach to Learning and also promotes active engagement in life development through Connecting Mind and Behavior, which coordinates several activities in campus life. Research on student learning and educational practice should pursue an understanding of the complex interrelationships in student learning.

One remaining issue to be explored is the expansion of the interrelations around student learning towards more comprehensive understanding. For example, future research needs to empirically and conceptually investigate the relationship between student learning, specific teaching–learning environments and course experience from the perspective of research on approach to learning (Biggs and Tang 2011, Parpala et al. 2010, Processer and Trigwell 1999).

Our research has limitations: the method of the questionnaire survey was self-report, so this paper could not examine the specific contents of students’ Deep Approach to Learning and Connecting Mind and Behavior. It remains unclear how students relate BL, Deep Approach to Learning and Connecting Mind and Behavior. To resolve these issues, future research needs to conduct interviews and direct assessments, such as writing assessments and performance assessments.

Another remaining issue is connecting this research to educational practice. Higher education research should make formative relationships between research and practice: envisioning, developing, and understanding practice based on the results of these investigations and investigating student learning based on what happens in practice.

ACKNOWLEDGEMENT

We would like to express our gratitude to Associate Professor M. Murakami at the Research Center for Multimedia Education at Kyoto University of Foreign Studies for his advice on this study. I also would like to thank all of the students that participated in this survey. Finally, this translation was completed with the help of Mr. P. Lindelauf.

REFERENCES


MIZOKAMI, S. and HATANO, K. (2011) Analysis on Two Lives of Undergraduate Students No.2: From the perspective of the balance of the present and future orientation, Paper presented at 33th the Liberal and General Education Society of Japan, Tokyo, 198-199


