

第 III 部

e ポートフォリオにおけるアセスメント手法について

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e-Portfolio Assessment for the PBL Course: Analytics of Reflection as the Evidence of Active Learning




Tosh Yamamoto & Chiaki Iwasaki, Kansai University
Maki Okunuki, Kobe Shnwa Women's Univeristy
Masahiko Funakawa & MinoruNakazawa, Kanazawa Inst. of Tech

What is e-Portfolio?

- What is e-Portfolio?
- The position we take here.
- The basic concepts of e-Portfolio.
- Proposing Assessment Strategies

e-Portfolio

- No culture to make use of portfolio system in education in Asia

Portfolios turned in by the medical degree candidates



Evaluation of Portfolios: two examiners read Portfolios individually

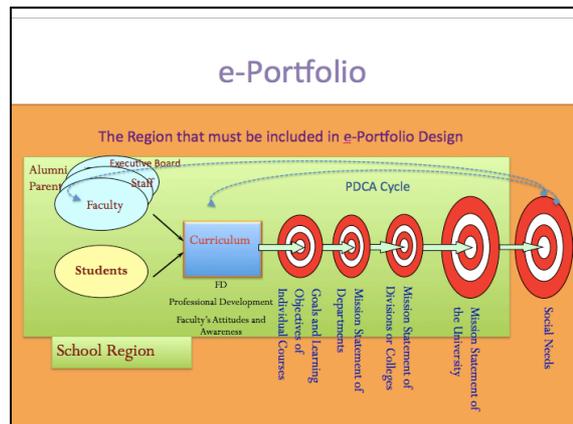


- Two examiners independently read student portfolio
- Independently grade the student in terms of the 12 outcomes
- Before portfolio review: Examiners meet and reach agreement on strengths and weaknesses to be explored during portfolio review

Prep-meeting by all examiners: agreement formation for standardizing the evaluation measures



Source: Portfolio System by Emit Japan



What is e-Portfolio?

- e-Portfolio is characterized by:
 - Constructivism in Education
 - Learning Effectiveness rather than Teaching Effectiveness
 - Active Learning by the Problem Identifying/Solving Strategies
 - Collaborative Group Learning (Team-Based Learning)
 - Learning Outcome from Team Work and Leadership
 - Social Aspects in Classroom ...
 - Discussion -> Sharing Information -> Identifying the Problem -> Decision-Making for the Next Step (Project Design) -> Project Management -> Reflection (i.e., Plan-Do-Check-Action Cycle)
 - Course Offered by Clear Goals, Objectives, and Planning in terms of Syllabus
 - Clearly Stated Institutional Mission and Goal Statements:

Types and Purposes:

- Types of e-Portfolio

e-Portfolio:: 3 Types:

- 1. Student e-Portfolio
 - Show cases for proofs of achievements
 - Purpose: career development, course accomplishment
 - Collection of artifacts
 - Place to share representations, reflections, improvement processes.
- 2. Faculty Development e-Portfolio
 - Show cases for proofs of academic achievements by professors
 - Teaching strategies to be shared with other colleagues
 - Purpose: professional development as educators
- 3. Institutional e-Portfolio
 - Collections of student e-Portfolio and faculty development e-Portfolio
 - Evidence for learning and accreditation

What we focus on here

- We choose the Learning e-Portfolio
- And why?

Challenges must be made!

Not taught in the Curriculum !

Higher Ed is NOT meeting the society's needs for college graduates 3 years after graduation (n=1732)

What skills are required as you work ?

| Skill | Not taught in the curriculum | Not taught in the curriculum | Not taught in the curriculum |
|--|------------------------------|------------------------------|------------------------------|
| Problem Solving Skill (Data Collection, Analysis, Problem Solving) | 31.5 | 36.9 | 27.1 |
| Continuous Learning (Intellectual Curiosity & Active Learning) | 31.3 | 35.3 | 28.3 |
| Independence (Exercise Independence and display leadership in projects) | 27.8 | 32.1 | 31.2 |
| Teamwork (Collaborative attitudes & perform one's duties and responsibility in projects) | 28.8 | 35.0 | 30.4 |
| Self-Management (Set goals, plan well, and work accordingly) | 28.2 | 38.7 | 33.9 |
| Problem Setting and Solving (Analyzing the situation to identify the problem and prepare to be solved) | 25.6 | 35.6 | 32.2 |
| | 25.5 | 34.9 | 33.7 |

Positive Replies Neg.

From VIEW 21, 2011. Benesse Center for Research and Development in Education

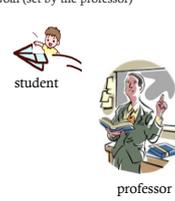
Concepts of Learning Portfolio

- Learner as a pilot
- Prof as a copilot

Traditional vs. e-Portfolio Way

Traditional Education

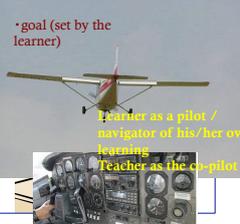
- Goal (set by the professor)



student
professor

e-Portfolio Way

- goal (set by the learner)



Teacher as a pilot /
navigator of his/her own learning
Teacher as the copilot

Traditional vs. e-Portfolio Way

- Evaluation vs. Assessment
- Traditional Education vs. e-Portfolio Way

Traditional vs. e-Portfolio Way

- Evaluation vs. Assessment
- Evaluation: Accomplished Results are the target
- Assessment: Academic Advising and Consultation in the process of learning (= e-Portfolio Way)

Traditional vs. e-Portfolio Way

| Traditional | e-Portfolio |
|---|--|
| <ul style="list-style-type: none"> ■ Goal: Letter Grades: A B+ B B- ... listing students in order ■ For students: X-many credits are required to graduate. (e.g. 130 credits) ■ For faculty: Summative assessment (grade reports) ■ For hiring companies: chance to know applicants through resumes. Requires personnel specialists to hire high-caliber students | <ul style="list-style-type: none"> ■ Goal: Human Development: the future members for the society ■ For students: Develop attitude for life-long active learning in order to perform well in the society in the future ■ For faculty: Visualization of each student's strong points as well as weak points through the learning process ■ For hiring companies: chance to know applicants better and to be able to hire applicants with higher quality that is guaranteed by e-Portfolio |

e-Portfolio Way

- We will discuss "assessment".

e-Portfolio Way

- Assessment (e-Portfolio Way)
 - Students set their own goal of learning
 - Teacher as copilot of student's learning

e-Portfolio Way

- Crucial Features of e-Portfolio (1/2)
 - Foundation: Kolb's **Experimental Learning Model** & H. Gardner's **Multiple Intelligence**.
 - Each student sets up their own **learning goals** based on their career background.
 - Each student maps their own **curriculum** through advisory sessions with the mentor professor.
 - A mentor professor works together with the student to **confirm that the initial goals are reached**.
 - Each student's **learning experiences**: reported in reports artifacts, reflection journals throughout the courses on e-Portfolio

e-Portfolio Way

- Crucial Features of e-Portfolio (2/2)
 - Entire course activities:
 - Assessed from **learning processes** throughout the courses from various angles
 - **Adopted Model** for all activities: **Improvement Cycle Model** (Plan-Do-Check-Action Model)
 - Final Evaluation:
 - **Quality Evaluation** of how much each student achieved in each course
 - **Quality Evaluation** of how much knowledge and skills each student gained through the learning process and reflection
 - **Entire components of e-Portfolio** are assessed

e-Portfolio Way

- e-Portfolio offers students:
 - Opportunity to set up the customized **academic goals** to meet professional needs.
 - **Evaluation** as well as **feedback to all course work**
 - **Evaluation** as well as **feedback throughout the curriculum** until completion of the program
 - **Academic Advising** by the mentor professor/ teaching staff
 - **Visualization** of the student's achievements
 - **Visualization** of how much the student has achieved toward the educational goals

- Assess what?
 - MI eight categories.
 - Sources for the assessment

Qualitative, rather than Quantitative

- Sources for assessment:
 - Students' reflections of learning activities in the course of learning
 - The mirror of the curious mind
 - Using probe questions to extract what students accomplished/learned/mastered/.../ in the course
- Competency based assessment – rubrics
- MGTA
- NMF

Qualitative, rather than Quantitative

- Competency based assessment – rubrics
- Visualizing accomplishments in learning (components)

Qualitative, rather than Quantitative

- Competency-based assessment – rubrics

Qualitative, rather than Quantitative

- Competency based assessment – rubrics
- Visualizes:
 - Where am I, as a learner, going?
 - **How do I, as a learner, know when I get there?**
 - How do I, as a learner, get there? (Robert F. Mager)
- Professors or teachers need to evaluate and visualize students' learning outcomes. (still traditional in a way).

Qualitative, rather than Quantitative

- It is important to clarify the correlation of objectives, activities and assessment.
- Professors or teachers need to select the optimal way to assess the learner's activities.

the acceptance policies (Suzuki, 2004)

Competency Matrix

Example

Image source: www.nps.gov/training/nps/images/competencies_matrix.png

Rubric-Based Evaluation

image source: www.2020mds.com/grfx/1.4programs_grfx/compmatrix_wg.jpg

- End of Rubrics

- M-GTA

How to Assess Students' Growth and Visualize the Learning Effect in M-GTA

- M-GTA(Modified Grounded Theory Approach)

M-GTA is ...

- originally proposed by Barney Glaser and Anselm Strauss, which is the way of qualitative analysis grounded-on-data.
- useful for the qualitative assessment for PBL of the social fundamental skills targeting the students of the liberal arts majors.
- based on the theory that the major conceptual components are buried in the written data and that such conceptual components are minable through a certain procedure.

Qualitative assessment for PBL in M-GTA

■ PBL (Field Study at Kobe-Shinwa Women's University)
 Students in groups work collaboratively with the people in local communities or companies in order to solve problems that they face daily.
 ex. Revitalizing local areas, development new products with companies

■ Assessing Students' Growth and the Learning Effect in M-GTA
 Self-actualization and self-identification / Desire to interact with role models as adult

Problem identifying/solving skills, meta cognition skill, team work skill, collaborative communication skill

Procedure of analysis in M-GTA

- (1) Analyzing the written data in the e-Portfolio and the interview results.
- (2) Creating conceptual categories by considering and interpreting meanings of data, and linking categories of similar concepts which are closely related.
- (3) Analyzing relevance (correlation) among all conceptual components.
- (4) Mapping the all conceptual components on a sheet for the holistic view.
- (5) Visualizing the learning process and effect of PBL.

Procedure of analysis in M-GTA

(1) Analyze the written data in the e-Portfolio and the survey by interviewing.

Self-set learning objectives

Self-assessment

Reflection Report

Identification through the meta cognition in learning activities

Life-long Career Planning

Procedure of analysis in M-GTA

(2) Creating concepts by considering and interpreting meanings of data, and categories of several concepts that are closely linked.

Worksheet for Analysis

Procedure of analysis in M-GTA

(3) Analyzing relevance among conceptual components.

Concepts and categories

Procedure of analysis in M-GTA

(4) Mapping the all conceptual components on a sheet for the holistic view.

(5) Visualizing the Process and effectiveness of PBL e.g. in the Field Study at Kobe-Shinwa University.

Mapping the Learning Process of PBL

Summary : Learning Outcome

In the Field Study at Kobe-Shinwa University using of e-Portfolio

Our analysis proved that the student's motivation is increased by realizing

- the status of the university student being different from the full-fledged members in the society, i.e., self-actualization and self-identification
- the desire to interact with them, i.e., finding a role model as a adult

↓

1. Students develop their meta-cognition and self-actualization skills effectively — the fundamental survival skills as an adult.
2. The course e-Portfolio for academic fundamental skills and the career e-Portfolio, which are independently operated on campus, can be united with the newly educational goal or the school-wide mission and its vision.

- End of M-GTA.

- End of M-GTA

Qualitative, rather than Quantitative

- Non-negative Matrix Factorization (NMF)
 - A method of text mining : Extracting key attributes/cues of learners in the learning process.
 - Basic idea: The choice of words in writing crucially vary in the course of learning. Peculiar characteristics may appear when the learner shift to a higher strata of learning.

Qualitative, rather than Quantitative

- Non-negative Matrix Factorization (NMF) 非負値行列因子分解
 - A method of clustering : i.e., Principal Component Analysis for Qualitative Analysis
 - Take any data as matrix: students' reflection reports (free writing)
 - Concept: what is not in mind will not appear in words in reflection
- e.g. Bag-of-words in reflection

| MI items list_Grp A | 文書 |
|---------------------|--------------------------|
| MI items list_Grp B | サッカー 0 1 0 0 0 0 0 0 1 2 |
| MI items list_Grp C | ゲーム 0 2 1 0 0 0 0 0 0 1 |
| | 音楽 1 1 0 0 1 0 0 0 0 1 0 |
| | 読書 0 0 1 0 2 2 0 0 0 0 0 |
| | 映画 0 0 0 1 0 1 0 0 0 0 0 |
| | 漫画 0 0 0 0 2 0 0 1 0 0 |
| | アニメ 0 0 0 0 0 1 2 1 1 2 |
| | 自然 0 0 0 0 0 0 1 1 0 0 |
| | 音楽 0 0 0 0 0 0 1 1 2 0 0 |

- Example Data set taken from 20 Newsgroups threads

From: xxx@yyy.zzz.edu
Subject: Re: Windows prp...

> There's one thing about Windows that really irks me.
I have 2GB of RAM installed in my system. I use a 3GB (2 GB
under Windows) disk-cache, and a 4GB permanent swap file.

> While I can never fill the memory up, I still have problems
repeatedly because I run out of CD resources. What gives?
I think Windows could manage these resources a little better.

Are you using Windows 3.0 or 3.11? If you're still on 3.0, 3.1 devotes about
half as much memory to these and only set much less frequency of 3.1.
You might use one of the resource monitors (such as the one that comes with
the Windows 3.1 Resource Kit or one of the many shareware ones available)
to see which programs are hogging the resources (every soon, internal
graphics driver, etc. in every program running uses a certain amount of
this limited memory area. Alas, some don't give it back when they're
finished).

comp.graphics
comp.os.ms-windows.misc
comp.sys.ibm.pc.hardware
comp.sys.mac.hardware
comp.windows.x
rec.autos
rec.motorcycles
rec.sport.baseball
rec.sport.hockey
sci.crypt
sci.electronics
sci.med
sci.space
misc.forealle
talk.politics.misc
talk.politics.guns
talk.politics.mideast
talk.religion.misc
alt.atheism
soc.religion.christian

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| | 文書 | | | | | | | | | | | | | | | | | | | | |
|------|----|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|
| サッカー | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | | | | | | | | | | | |
| ゴール | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | | | | | | | | | |
| ゴール | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | | | | | | | | | | | | |
| 経路 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| 河 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| 産業 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 1 | 0 | 0 | | | | | | | | | | | |
| アプリカ | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | | | | | | | | | | | |
| 人数 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | | | | | | | | | | | | |
| 資源 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | | | | | | | | | | | | |

example

20 Newsgroups data set の解析

• 20個のNewsgroupに投稿された文書集合

```

From: wend@eyj.su.se
Subject: Re: Windows 95...

> There's one thing about Windows that really irks me:
> when 20MB of RAM is installed in the system, I use 10MB (2.2MB
> under Windows) disk cache, and a 4MB permanent swap file.

> I wish you could fix the memory problem. I don't mean problems
> sometimes because I'm out of CD-ROM space. What gives?
> If the Windows could do things like Windows 3.11, I'd be
> glad.

Any one using Windows 3.0 or 3.11? you're still on 3.0, 3.1 depends about
you might use one of the resource monitors built in the one that comes with
the Windows 3.1. I'd like to see if any of the memory monitors can be used
to see which programs are hogging the resources every day, internal
graphics work, etc. in every program working, use a certain amount of
this limited memory area. Also, some don't give it back when they're
finished.

comp.graphics
comp.os.ms-windows.misc
comp.sys.ibm.pc.hardware
comp.sys.mac.hardware
rec.audio
rec.autos
rec.photo
rec.sport.baseball
rec.sport.hockey
sci.crypt
sci.electronics
sci.fish
sci.space
sci.sports
sci.titles
sci.windows.misc
talk.politics.misc
talk.politics.guns
talk.politics.mideast
talk.politics.russia
soc.humanities
soc.humanities.christian
    
```

To Sum up . . .

- Learner-Centered Learning and Assessment Strategies
- E-Portfolio Way
- Constructivism
- Assessment Strategies
 - Competency-Based
 - NMF
 - M-GTA

- Detailed Discussion for the selected options for assessment will be in one of the workshop sessions at ISGC 2015 (March) in Taipei.

Thank you for your participation!

e-Portfolio Assessment for the PBL Course: Analytics of Reflection as the Evidence of Active Learning

e-Portfolio
Path to Scholarship, Career,
College, & Life-Long Learning Planning



Tosh Yamamoto & Chiaki Iwasaki, Kansai University
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(4) Session 4 :
Assessment Methodology for Big Data : Learners' Reflection Reports as corpus for Non-Negative Matrix Factorization (NMF)

e-Portfolio
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Assessment in e-Portfolio

- Proposing Assessment Strategies

Assessment in e-Portfolio

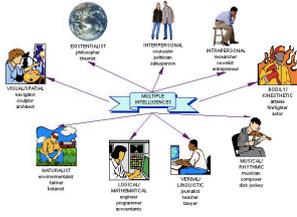
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Assessment in e-Portfolio

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 - Students set their own goal of learning
 - Teacher as copilot of student's learning

Assessment in e-Portfolio

- Assess what?
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<http://intellman.seneca.edu/156/learning/156a/mi/mi.html>

Assessment in e-Portfolio

<http://www.tecweb.org/styles/gardner.html>

Visual-Spatial - think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Bodily-kinesthetic - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching. They communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing. Tools include equipment and real objects.

Musical - show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

Assessment in e-Portfolio

<http://www.tecweb.org/styles/gardner.html>

Interpersonal - understanding, interacting with others. These students learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail. **Intrapersonal** - understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners. **Linguistic** - using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture. **Logical-Mathematical** - reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, ask cosmic questions. They can be taught through logic games.

Qualitative, rather than Quantitative

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 - **The mirror of the curious mind**
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| | | 文書 | | | | | | | | | | | |
|---------------------|---|------|-----|----|---|----|------|----|----|-----|-----|-----|-----|
| | | サッカー | ゴール | 経済 | 月 | 産業 | アフリカ | 天候 | 資源 | ... | ... | ... | ... |
| MI items list Grp A | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | | | |
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| MI items list Grp C | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | | | | |
| | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | | | | |
| | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | | |
| | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 1 | 0 | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | | | |

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comp.sys.mac.hardware
comp.windows.x
rec.autism
rec.motocycles
rec.sport.baseball
rec.sport.hockey
sci.crypt
sci.electronics
sci.med
sci.space
misc.forsale
talk.politics.mec
talk.politics.guns
talk.politics.mideast
talk.politics.misc
alt.sheism
soc.religion.christian 25

To Wrap up . . .

- Learner-Centered Learning and Assessment Strategies
- E-Portfolio Way
- PBL thru TBL: Constructivism
- Assessment Strategies
 - Competency-Based
 - NMF
 - M-GTA



Thank you for your participation!



(4) Session 4 :
Assessment Methodology for Big Data : Learners' Reflection Reports as corpus for Non-Negative Matrix Factorization (NMF)




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Qualitative,
rather than Quantitative

■ **MGTA**



How to Assess Students' Growth and Visualize the Learning Effect in M-GTA

- M-GTA(Modified Grounded Theory Approach)

M-GTA is ...

- originally proposed by Barney Glaser and Anselm Strauss, which is the way of qualitative analysis grounded-on-data.
- useful for the qualitative assessment for PBL of the social fundamental skills targeting the students of the liberal arts majors.
- based on the theory that the major conceptual components are buried in the written data and that such conceptual components are minable through a certain procedure.

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Self-actualization and self-identification /Desire to interact with role models as adult

Problem identifying/solving skills, meta cognition skill, team work skill, collaborative communication skill

Procedure of analysis in M-GTA

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Identification through the meta cognition in learning activities

Life-long Career Planning

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Worksheet for Analysis

Procedure of analysis in M-GTA

(3) Analyzing relevance among conceptual components.

Concepts and categories

Procedure of analysis in M-GTA

(4) Mapping the all conceptual components on a sheet for the holistic view.

(5) Visualizing the Process and effectiveness of PBL e.g. in the Field Study at Kobe-Shinwa University.

Mapping the Learning Process of PBL

