KIT PORTFOLIO INTELLIGENCE:
THE QUALITY CONTROL IN ACADEMIC ADVISING AS WELL AS FD IS A PART OF E-PORTFOLIO ENTERPRISE

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Graduate education in professional school is highly expected to offer professional courses for the state-of-art knowledge and skills of fast developing fields. Because of the demand-supply gap of high professionals who can teach in school, we proposed and developed course management procedures based on portfolio system, KIT Portfolio Intelligence System, when we started a new program, Graduated Program in Intellectual Creation System in 2004. KIT Portfolio Intelligence System is described in details in the paper. Several years practice of the system at our graduate program and evaluation made by students used in the course suggests effectiveness in developing professional skills in short term.
Portfolio evaluation procedure in academia

- Demand-supply gap in professional education
  - Experience shortage of teaching staff in the fields.
  - Many professional in business or R&D front of industry

- Provide an effective support mechanism to teach in school
  - Module-based education
  - The process of experimental learning that refers to Kolb model is used with the experience.
  - The report and the reflection journal in course works and extracurricular activities
Portfolio Situation in Higher Education in Japan

- e-Portfolio:: 3 types and 6 functions

- 6 functions:
  - 1. Design Educational Programs
  - 2. Recording knowledge, skills, abilities, what is learned
  - 3. Tracking developmental progress in the program
  - 4. Career development
  - 5. Course evaluation
  - 6. Performance Monitor and Evaluation
Target of KIT Portfolio Intelligence

Graduated Program in Intellectual Creation System (KIT Tokyo Campus)

Integration of knowledge

Graduate Education

Professors

Mutual verification of Their learning process and results

Academia (Kanazawa Institute of Technology)

Business Person Skilled Engineers

Module based Education

Business Society

Share and Execute Knowledge

Business experts as visiting professors.
Feature: Portfolio Intelligence

Traditional

- Importance Grades: research activity
- Letter Grades: A B+ B B- ...
- X-many credits are required to graduate. (e.g. graduate Program 40 credits)
- For faculty: Summative assessment

KIT Portfolio Intelligence

- Goal: Quality evaluate the process of understanding and gaining knowledge
- For faculty:
  - Visualization of each student's strong points as well as weak points
  - Levels of graduate students' understanding can be grasped.
  - Achievement to the educational goal of graduate program can be clarified.
- For Graduate Student:
  - Objective overall evaluations of students, including both their course works and extracurricular activities.
  - Important information is obtained to confirm and recognize content of knowledge mastered
The KIT Portfolio Intelligence allows students not only to engage fully in research activities for one year but also to obtain the following information:

- Systemizing process evaluation
- Acquiring business practice knowledge
- Sharing Knowledge
- Systemizing Knowledge

The practices in our graduate program suggest that the questions:

- How should students study?
- How can graduate courses achieve their educational goal?
Feature of KIT Toranomon Campus

- Target: Adult Graduate Students
- Establishing an education method for business persons (5 to 20 years of employment)
- The major areas: MOT (MBA with Technology Emphasis) & building and sharing intellectual property (work knowledge and experience).
- Focus: advanced and practice based education
  Only through a construction of tailor-made curriculum, can e-Portfolio serve adult graduate students to accomplish goals in terms of the self-evaluation method for their learning outcome.
- Educational Program: Curriculum with 70 courses covering advanced and wide-ranged technology and business areas.
- Systematic approach to e-Portfolio: competency-based program that supports carrier design.

KIT introduced "Portfolio intelligence system", and it built a framework to clarify the outcome of the graduate education.
Current Status of Portfolio Intelligence

- The portfolio intelligence system not only clarifies graduate student's learning objectives but also develops further motivation to learn and “awareness” to excel in learning.

- The portfolio intelligence file becomes an evidence as the process of study and a clearly barometer of achievement for graduate student.

- The portfolio intelligence file becomes professor and graduate student's communications tools, and uses for the graduate education with the upgrade and accountability.

We aim at a further improvement based on current condition, and are constructing the model system that contributes to accountability of graduate education.
Purpose: Cultivation of human resource development

1. The areas to be focused in the curriculum:
   - Power to create intellectual contents
   - Power to visualize and communicate ideas effectively
   - Power to manage and secure intellectual contents (artifacts)

2. Outcome of Portfolio Intelligence System: work-ready graduates with competence for life-long active learning in various business fields
### Ingenuity of Education

| 1. Teaching along educational targets | ● To build registration models for competency  
|                                         | ● To select and receive lectures in Tokyo Campus  |
| 2. Preparing a variety of syllabuses cooperatively created by professional faculty who collected widely from business world, academia and officialdom | ● Full-time professors who have expertise in specific field  
|                                         | ● Active visiting professors from business and legal communities  
|                                         | ● Periodical adjustment that aims to blend business practice into learned knowledge  |
| 3. Training of human power requested by intellectual creation society | ● Self-analysis by using EQ test  
|                                         | ● Practice of action learning  
|                                         | ● Evaluation of learning results using Portfolio intelligence file  |
| 4. Enough support through communication tools | ● Full access to lectures by video on demand  
|                                         | ● Feedback communication systems  |
Portfolio Intelligence File: Structure

**Motivation**
- Diagnosis of self-awareness
  - aptitude for inter-person
  - aptitude for job

**Plan**
- Academic Planning Sheet
  - Competency of target
  - Knowledge, Intellation, Human power

**Do**
- Evidence
  - outcome about practice power
  - Interaction history

**Check**
- Goal Sheet
  - Concrete Experience
  - Reflective Observation
  - Abstract Conceptualization
  - Active Experimentation

**Grow**
- Portfolio Summary

**Research**
- Research Paper

**Research Activity**
- Master's seminar
- Subjects (Electives)

**Grow-up Cycle**
- M (Motivation)
- P (Plan)
- C (Check)
- D (Do)

**Reflection by study**

Outcome about master's course
Relation between portfolio and learning

Full-time professors at KIT
- Designing to the cultivation of Human Resources
- Planning and improvement of curriculum and education method

Business persons as graduate students
- Establishment of fundamental competence

Business experts as visiting professors
- Professional territory
- Business case study

1. Designing of competency model
   - Competency-based study program
   - Academic Planning Sheet

2. Educational adjustment
   - Joint syllabus
   - Check on content of subject

3. Lecture
   - Action Learning
   - Evaluation of learning output

4. Making of portfolio (Summary, Goal Sheet)

5. Evaluation of research paper and portfolio summary

6. Practicum to enhance competency
Portfolio Support Desk

Full-time professors in KIT
- Designing to the cultivation of Human Resources
- Planning and improvement of curriculum and education method

Business experts as visiting professors
- Professional territory
- Business case study

Business persons as graduate students
- Establishment of core competence

Consultation of making a portfolio
- Portfolio education seminar
- Analysis of class questionnaire
- System improvement and management
**Action Learning Process**

**Key Events**
- Experience
- Practicum
- Report

**The Process of ELM**
- Concrete Experience
- Active Experimentation
- Abstract Conceptualization
- Reflective Observation

**Education methodology**
- Research Activity
- Simulation
- Teaching
- Practice
- Game
- Discussion
- Case Study
- Presentation
- Survey

**Material**
- Environment

**Portfolio Intelligence File**

**Goal Sheet**

**Evidence (Report...)**
Pl: Process of Evaluation

Graduate Student
Academic Planning Sheet

Professor
Syllabus

Action Learning Process

Portfolio Intelligence File

Public Hearing, Interview

Professors
Portfolio evaluation sheet

Portfolio Summary
Academic Planning Sheet
Goal Sheet
Evidence (Report…)
Research Paper
EQ Test
Reference ①: 
Incorporating accountability in education using Portfolio

- **Time**
  - Curriculum organization and its schedule management along cultivation of human resources
    - Support and consult for self-realization by career design
    - Syllabus for portfolio Intelligence

- **Contents**
  - Synchronization of syllabus and sheet for target planning
    - Decision of the model of individual competency curriculum
    - Practice of action learning

- **Evidence**
  - Portfolio intelligence file creation and accumulation of the summary
Reference②: Syllabus (an excerpt)

<table>
<thead>
<tr>
<th>Knowledge Domain</th>
<th>Human Power</th>
<th>Idea Process</th>
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<tbody>
<tr>
<td>Y 1: Infrastructure Tech.</td>
<td>Z 1: Find Program</td>
<td>X1: Concept</td>
</tr>
<tr>
<td>Y 2: Application Service</td>
<td>Z 2: Creativity</td>
<td>X2: Planning</td>
</tr>
<tr>
<td>Y 3: Business Process</td>
<td>Z 3: Solution</td>
<td>X3: Analysis</td>
</tr>
<tr>
<td>Y 4: Business Model</td>
<td>Z 4: Presentation</td>
<td>X4: Design/Development</td>
</tr>
<tr>
<td>Y 5: Business Management</td>
<td>Z 5: Revolution</td>
<td>X5: Revolution</td>
</tr>
<tr>
<td></td>
<td>Z 6: Communication</td>
<td>X6: Operation</td>
</tr>
<tr>
<td></td>
<td>Z 7: Leader–Ship</td>
<td>X7: Evaluation/Verification</td>
</tr>
<tr>
<td></td>
<td>Z 8: Owner–Ship</td>
<td>X8: Life cycle</td>
</tr>
</tbody>
</table>

### Practicum

<table>
<thead>
<tr>
<th>Event</th>
<th>Education methodology</th>
<th>Environment</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set up Linux Server (DNS/DHCP server)</td>
<td>Practice</td>
<td>Internet/ Laptop–PC</td>
<td>● Intranet / DNS Server/ DHCP</td>
</tr>
<tr>
<td>Set up Linux Server (Network Management Server)</td>
<td>Practice</td>
<td>Internet/ Laptop–PC</td>
<td>● Security/ Mac Address/ IP Address</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>● Intranet / SNMP / VPN(Virtual Private Network)</td>
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Reference ③: Academic Planning Sheet (an excerpt)

<table>
<thead>
<tr>
<th>NAME</th>
<th>Taro Kanazawa</th>
<th>NAME (kana)</th>
<th>Business Architect</th>
</tr>
</thead>
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<tr>
<td>STUDENT ID</td>
<td>1001</td>
<td>Course</td>
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<tr>
<td>Registered Year</td>
<td>April, 2008</td>
<td>Planned Grad. Date</td>
<td>March, 2009</td>
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</table>

<table>
<thead>
<tr>
<th>GOAL</th>
<th>SUBJECT</th>
<th>Credit</th>
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<tbody>
<tr>
<td>①</td>
<td>Learning of the discovering the problem solved power by an investigation decides about a research task or an investigation theme in accordance with that, and an investigation and a study are executed independently, and announcing an outcome to the useful research paper I win newly or the research report put in order systematically together.</td>
<td>Subject of Study</td>
</tr>
<tr>
<td>②</td>
<td>Practicing knowledge and learning of the operation ability of foundation IT necessary for intellectual creation society</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Learning of basic modal knowledge of intellectual properties</td>
<td></td>
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<tr>
<td>④</td>
<td>Learning of the ability to contrive a new business, understanding a basis of management</td>
<td></td>
</tr>
<tr>
<td>⑤</td>
<td>Learning of the ability to do own inspection of the human power</td>
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<tr>
<td>⑥</td>
<td>Learning of the ability to do an external environment and an internal environment analysis by using a case study and the organization to which a graduate student belongs as a base material, specification--ize a basic strategy and develop a business plan and a marketing plan</td>
<td></td>
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<tr>
<td>⑦</td>
<td>Organization management of an enterprise, promotion of collaboration of a group work and a different group and learning of the skill ability of the project implementation or the organization reformation</td>
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<tr>
<td>⑧</td>
<td>Learning of the ability to understand a basis of a business process and do choice of a process and a design according to the business model</td>
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<tr>
<td>⑨</td>
<td></td>
<td></td>
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</tbody>
</table>
Reference④:
Portfolio Evaluation Sheet (an excerpt)

(論文題目) 自律的多段 DB 複製方法の検討および評価

(申請者) ■■■■■■■■■ 専攻 知的創造システム専攻
指導教授 ■■■■■■■■

（審査要旨）

共通ゴール コースゴール※ゴール⑫は必須、その他⑨〜⑫のうち2つ以上選択

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</tbody>
</table>

ポートフォリオ審査要旨

インターネットワーキング特論やオープンソース設計特論に重点を置いたことで、今後必要となる IT スキルの充実を図っている。主に TCP/IP アーキテクチャ、DNS、IPv6 等に関する講義及び操作方法、および、オープンソースに関する設計や開発手法についての講義及びレポートというプラクティスを通じて、スキルを修得している。e-Business 分野や、知的財産分野においても、必須科目を中心に共通ゴールの修得を行っている。特に、特許の要件・必要な書類や書式及び特許を受ける権利等、発明から特許取得・管理までの一連の流れを理解するに至っており、十分な知識を備えたといえよう。コースゴールについても、バランスの取れた知識の習得状況である。このように、全般的に要領よくまとめられている、特に専修科目に関する IT 技術の修得に相当のエネルギーギャップを数トしたところから比較的良い結果が得られている。

研究論文審査要旨

一般に災害の時期、発生場所および影響範囲は予測できない。IT に依存した現代社会では、IT システムが保存が重要であるという事実に直面し、社会に混乱をきたしてしまう。データベースを活用することには、データの同時性と一貫性の問題があるために性能とデータ保証がトレードオフの関係となっている。データの一貫性を確保しながらデータベースを複数サイトに複製する方法が求められている。そこで本論文では DB クライアントと DBMS の間にゲートウェイを設けることで、ゲートウェ
The computerization of the portfolio intelligence.

- **Common**
  - Information function
  - Range setting for the public
- **Self-awareness**
  - EQ test registration
- **Competency model**
  - Selection of major course
  - Make an academic Planning Sheet
- **Action Learning**
  - Registration facility of evidence
- **Making of goal sheet**
  - Registration of goal sheet
  - Selection for best practicum
- **Communication Portfolio**
  - Social Communication Function
  - Social Tag Function
- **Portfolio**
  - Search/Refer Function
  - Download of Portfolio
- **Management**
  - Master Maintenance
  - Correction deadline setting
  - Information Maintenance
  - System Logging
- **Help**
The method of EQ-Examination’s Registration and Maintenance
The result of the EQ test is not opened among graduate students.
The teacher and the staff can refer.
Two or more EQ test results can be registered.
Competency Model

- **Select:** Study target that full-time teacher constructed / Subject to be studied recommended to acquire them
- The graduate student puts the check on the setting as study target, and selects the subject to be studied.
- The graduate student can add other subjects.
Action Learning (Registration of Evidence)

- Evidences of the result of the experiment and the report, etc. can be registered.
- The subject to the study target and the composition of the evidence can be confirmed.
Making a goal sheet

- The goal seat can be registered to the selected study target.
- There are two kinds of a goal seat. (Review and Final)
- Review: A subjective evaluation is opened, and others' opinions are gotten.
- Final: Material that described view in objective evaluation, down shot result, and the future
目標達成シート作成
ベストプラクティカムシート登録

- 修学目標に対するベストプラクティカムシートの登録を行う。
- エビデンス登録時点で行ったシート群を表示し、選択することで登録を可能としている。
- 登録されたベストプラクティカムシートのみが、ポートフォリオインテリジェンスファイルにまとめられる。
- 登録時に、既に一度選択されているものは、■となっており、選択されないようにしている。
• Study Target, Goal Sheet, Best Practicum, Research Article, EQ-TEST
• Ingenuity of display: don’t feel volume about visual
共通機能 公開範囲設定機能

- 目標達成シート等に関する公開対象者(教員，院生)の検索・設定機能
- 目標達成シートとベストプラクティスシート(エビデンス)の公開範囲の同期機能
- 他の公開範囲設定のコピー機能
Communication Portfolio

- Substanical of Communication Method
  - Mail & BBS based Community
  - Social BookMard based Community

Portfolio Owner

Portfolio Reviewer

コメント
A: この方式では
B: 良い方法だけどもっと
C: これでもよいと思うけど
D: 変更してこのように作りし
電子化プロジェクト

電子化への取組(大学院GP)

- セキュリティ重視（学生の個人情報そのもの）
- オープンソース（Moodle, SAKAI, OSP）利用の限界
- KIT東京虎ノ門キャンパス専用サーバ（学生:80名，教職員:100名）
- 金沢キャンパスは，7000人（学生，教職員）
- 学外からのアクセスを可能にしている。

動作環境

Web/Applicationサーバ
PRIMERGY RX300 S3
Xeon5110 (1.60GHz) / メモリ 4GB
73GBディスク x2(RAID1)
OS : Red Hat Enterprise Linux 5
Webソフトウェア：Interstage Web Server V9
アプリケーション：ポートフォリオインテリジェンスシステム

DB/Fileサーバ
PRIMERGY RX300 S3
Xeon5110 (1.60GHz) / メモリ 4GB
300GBディスク x2(RAID0+1)
OS : Red Hat Enterprise Linux 5
DBソフトウェア：Oracle 10g

学内およびインターネット経由でのアクセス

DMZネットワーク

学外からのアクセスを可能にしている。
Evaluation for Portfolio Intelligence File

- **Evaluation baselines for portfolio intelligence files**
  - **A)** The portfolio intelligence file can explain consistency about graduate student’s target, process of its acquisition and the coverage of goal sheet.
  - **B)** Accumulation of evidence which is result of learning process, and research paper which is result of master research show the depth and the value of the study of the master-level.
  - **C)** There is not much “awareness” to a further upgrade and the extension of the self-realization in some goal sheets.

- About (A) and (B), an integrated evaluation is done by the result of the portfolio intelligence file and the open hearing. Especially, “How did you study in the graduate school?”, “What did you acquire from the outcome?”

- About (C), its “Awareness”, it is an important factor with an influence in further growth after the graduate school is completed, and the motivation for the self-improvement is confirmed and it refers to the evaluation about study.
Planning of this educational program

Online Portfolio Intelligence System

Operation forms:
- 2007: Trial Operation
- 2008: Formal operation (Promote to another)
- 2009: Publishing platform

Implementation:
- 2007: • Verifi. of real edu. • Feedback
- 2008: • Knowledge Sharing • Process Sharing
- 2009: • WEB service (SaaS or PaaS)

Archives:
- 2007: Digital archives for lecture
- 2008: Digital archives for lecture
- 2009: Digital archives for lecture

Evaluation System:
- 2007: System for stringent Achievement evaluation
- 2008: System for educational adjustment
- 2009: System for outcomes assessment
Feedback from KIT’s Graduate Students

- **A prior explanation was enough**
  - I strongly agree: 15.4%
  - I agree: 38.5%
  - I weakly agree: 35.9%
  - I disagree: 10.3%
  - No response: 1.8%

- **The staff's support was enough**
  - I strongly agree: 41%
  - I agree: 43.6%
  - I weakly agree: 10.3%
  - I disagree: 3.5%
  - No response: 1.8%

- **The teacher's support was enough**
  - I strongly agree: 28.2%
  - I agree: 41%
  - I weakly agree: 23.1%
  - I disagree: 8.6%
  - No response: 3.5%

- **The portfolio was effective**
  - I strongly agree: 30.8%
  - I agree: 38.5%
  - I weakly agree: 17.9%
  - I disagree: 7%
  - No response: 3.5%
Conclusions

- Introduced: an educational portfolio system (KIT Portfolio Intelligence) of course management system
- This mechanism has been successful under close collaboration among graduate student, professor and staff
- It has been successful in getting objective evaluation and positive feedback from the graduate students as to the educational accountability

- Next Step: Collaboration with other universities
  - Dissemination of portfolio in graduate education