Integration of ICT & Pedagogy

Theoretical Framework
& Practical Methods

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2-Dimension Category of Pedagogy

- Inquiry
- Receiving
- Individual
- Group/Community
ICT-Pedagogy Integration

How to Use ICT to Facilitate:

- Expository-based Learning
- Inquiry-based Learning
- Individual Learning
- Cooperative Learning
Training Module Framework for ICT-Pedagogy Integration

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**Expository**
- PBL on Pedagogy:
  - Learning theory background;
  - Key concepts;
  - Key features
- Practical knowledge:
  - General procedure
  - Typical Issues & coping strategies
- Further quest:
  - Key problems or key concepts
  - Resources

**Inquiry**
- General principles and showcases
  - Key points showing relative advantage ICT for pedagogy
  - Suggestions and principles
  - Scenarios to read and analyze
  - Analyze their appropriateness, effectiveness, and efficiency
  - Connected to real context

**Individual**
- Put them all together!
- For what?
- Content and objectives
- To whom?
- Student Ana.
- Match of ICT & pedagogy:
  - ICT-amplified existing ones & ICT-empowered emerging ones.
  - Design and provision of ICT
  - Select; combine compile; create

**Cooperative**
Using ICT to Facilitate

- Expository-based Learning
- Inquiry-based Learning
- Cooperative Learning
- Individual Learning
Problems to analyze and solve

1. How to attract attention? How to keep attention?
2. What are advance organizers? Share your experience.
3. Does expository teaching necessarily mean passive learning? How can we use expository to guide students meaning-making (Inquiry)? (PPT: copy of blackboard → introductory → outline/schema → eliciting Qs/ heuristic)
4. What is concept maps? Share your experience or your ideas on that. Do you know some concept mapping software?

Discuss the problems, share ideas and experience → E-Portfolio, WebQuest, Blog
Any more key features?
Using ICT to create/present authentic context to attract learners’ attention: (Free/open-source) Pictures & Sound/Music, Video; Animation; Virtual reality
Any experience or any more ideas to share?
Using ICT to facilitate information transmission and understanding:

- **Tutorial**: Presents instruction in a more **visual, self-paced, motivating** way than teacher-delivered presentations → **Example**

- **Simulation**: makes demonstration **interactive**; allows safe experimentation; demonstrate process that are not possible in real life; allows experiments to be repeated with variations; makes situations controllable so they can be studied → **Virtual Lab; meaning-making tools**
Using ICT to present practice/drill and to facilitate transfer:

- **Drill and Practice**: Immediate feedback; Engage students
- **Instructional games**: Provide highly motivating format for practice → **Practice/game for English**
- **Problem solving**: Focuses attention on required problem solving skills; Connected to inquiry-based learning – improve cognitive flexibility → **Games for probability**; **Lesson plan**
Using ICT to facilitate assessment:

- Computer-assisted Test: Design tests, administer tests, collect response, analyze result, present feedback.
- Spreadsheets/Databases: multidimensional statistics and data search → supporting deeper research: SPSS
- Computer-based **self-adapted tests**
Using ICT to Facilitate

Expository-based Learning

Inquiry-based Learning

Cooperative Learning

Individual Learning
Inquiry-based Learning

General Circle

- Investigate
- Ask
- Create
- Reflect
- Discuss

Inquiry

Individual

Receiving

Group
P.2.1 What is inquiry? What ARE and NOT “inquiry” in classroom?
P.2.2 In order to elicit students to conduct real inquiry or higher order thinking, HOW should we “ASK”?
P.2.3 How should we group students? How should we assign tasks to them to produce real cooperation and interaction? (cooperative learning)?
P.2.4 How to help students to prepare necessary investigation skills and creation skills?
P.2.5 How to facilitate real reflection?

Discuss the problems, share ideas and experience → E-Portfolio; Blog; WebQuest
Any more key features?
Using ICT to facilitate...

- Investigate
- Ask
- Create
- Reflect
- Discuss

Using ICT to create/present authentic task context
→ Scenario with cognitive conflict
Using ICT as tools to facilitate experiments, exploration/inquiry → **online/off-line** tools on science/math topics

Using ICT to search information: **social study**; CD-ROM/tool
Electronic Map
Inquiry-based Learning

Using ICT to facilitate...

- Ask
- Investigate...
- Create
- Reflect
- Discuss

Using ICT to create presentation to demonstrate the results: **Paper; Pictures; Music**
Inquiry-based Learning

Using ICT to facilitate…

- Ask
- Investigate...
- Create
- Reflect
- Discuss

- Using ICT to present to demonstrate works/results, and facilitate discussion → Synchronous/ Asynchronous
Inquiry-based Learning

More projects empowered by Internet

- WebQuest → Example; Investigating PBL: A WebQuest
  → http://webquest.sdsu.edu/webquest.html
- CyberGuides: e.g., http://www.cyberbee.com/guides.html
- Webbytes: www.rightinclass.com/create/iwbytes.htm
- Filamentality: http://www.kn.pacbell.com
- Scavenger hunts:
  → http://www.spa3.k12.sc.us/Scavenger.html

And what’s more? Share your knowledge or ideas:
Using ICT to Facilitate

- Expository-based Learning
- Inquiry-based Learning
- Cooperative Learning
- Individual Learning
Cooperative Learning

General Circle

Group work

Question /Task

Teams-Games-Tournaments (TGT)
Group Investigation
Constructive Controversy
Jigsaw Procedure
Student Teams Achievement Divisions (STAD)
Team Accelerated Instruction (TAI)
Cooperative Integrated Reading & Composition (CIRC)

... ...

Investigation /Discuss/Create/
Conclusion & Reflection
P.3.1 How do you do to ensure students cooperate effectively?
- Positive Interdependence
- Face-to-Face Promotive Interaction
- Individual Accountability/Personal Responsibility
- Teamwork Skills
- Group Processing

Discuss the problems, share ideas and experience ➔ E-Portfolio; Blog; WebQuest
Any more key features?
Using ICT to facilitate...

- Question / Task
- Group work
- BBS/Chatroom
- Video Conference
- Audio Conference
- Interactive Board
- Shareware

Cooperative Learning

- Conclusion & Reflection
- Cooperative Integrated Reading & Composition (CIRC)
Using ICT to Facilitate

Expository-based Learning

Inquiry-based Learning

Cooperative Learning

Individual Learning
Individual learning empowered by structured software or off-line/closed computer networks – CAI
- Drill and Practice
- Simulations
- Tutorials
- Instructional Games
- Problem-solving Programs
- Integrated Learning System → eclass

Resources-Based Learning — online
During resource-based learning, students are motivated to learn about a topic by trying to find information on it in as many ways and places as possible (books, journals, newspapers, multi-media, Web, community, people).

- Student-centered: a sense of ownership of learning, self-confidence, and reinforcement
- Learn by doing: students making meaning themselves
- Students as information hunter & interpreter: this learning experience mimics real life to construct knowledge by problem solving with information tools.

P.4.1 How do you do to avoid Plagiarism in the Digital Age and ensure students’ higher order thinking?

Discuss the problems, share ideas and experience → E-Portfolio; Blog; WebQuest

Any more key features?
Using ICT to Facilitate

Expository-based Learning
Inquiry-based Learning
Cooperative Learning
Individual Learning

Nature of Learning and its meaning for teaching
A Shared Story:
The Constructive nature of learning and its meaning for teaching
Birds ...

Fish-Bird
Cows ...

Fish-Cow
ICT-Pedagogy Integration: Framework

Introduction

**Expository**
- **PBL on Pedagogy:**
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**Hands-on ID**
- Put them all together!
  - For what?
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  - Match of ICT & pedagogy:
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Professional Development Model for ICT Integration

Teachers’ School-Based Practice and Action Study: A Professional Development Model for ICT Integration
Rationale

Transformation of Professional Development approach—from top-down approach to bottom-up approach

1. From “teachers receive training passively”, to “teachers conduct learning actively”

2. From mere “skill-based” or “theory-based” training to “task-based” learning - Teachers cannot be trained in ICT unless that professional development can meet curriculum needs.
So, teachers’ Professional Development is a learning process

- Teachers’ learning process should be teacher-centered, not trainer-centered

- Teachers’ learning process on ICT integration is a learning process about “complex concepts”, which requires teachers’ learning process should have cognitive flexibility to meet complex curriculum needs

- Teachers’ learning process should be a curriculum-situated learning process
Rationale

Why “School-Based”

There is great diversity, disparity, and irregularity among different schools' ICT integration, so teacher's professional development should be school-based, to get practical theories and innovative practice.
Key Steps

Discussion or Evaluation on Lesson Plans

School-based practice & action study

Self-reflection on Design & Practice

Professional Direction & Support

Evaluation & Sharing of Typical Practice

Reconstruction

Teachers' Systemic Instructional Design

Professional Direction & Support

Self-reflection on Design & Practice

Discussion or Evaluation on Lesson Plans

School-based practice & action study
We believe that
ID is a higher-order thinking process
ID is a learning process
and a constructive process

The really **valuable** ID is to identify teaching and learning problems
The **effective** ID is to solve the problems

Systemic ID is crucial for teachers to conduct innovative practice of higher relevance, and also, the starting point of teachers’ continuous thinking, learning and developing process
Teachers’ Systemic Instructional Design

- Trainee teacher-centred
- Context-indexed understanding of the pedagogy, ICT’s potential, and ICT-Pedagogy Integration methods
- With **Instructional design template** as guiding tools and scaffolding
- **Group work**: 5-10 teachers with a facilitator; brainstorming and identify topics → analyze content and target students → design instructional strategies → select appropriate ICT & design ICT-based learning environment to solve the T-L problems
Curriculum Standard for content

Based on prior knowledge of subject, pedagogy & experience

According to ICT available

Investigating students' ability, needs & learning styles

To visualize inside thinking process underlying ID

To plan and to

Identify learning outcomes

Analyze target content

Design teaching methods

Teaching activity

Learning activity

Use of ICT

Observation on learning process

Lesson video

Key steps & key features

Instructional Design

Lesson case

Offer / create

T/L consequences on specific content themes; Scenarios using pedagogy concepts

Multiple-perspective case study, dialogue, social construction

Teachers' self-reflection

Focusing on Deeper understanding; construction & transfer of theory

Peers' Review

Focusing on specific teaching methods, sharing practical experience

Course Managers' Review

Focusing on feasibility & appropriateness in terms of time & ICT available;

Experts' Review

Focusing on Understanding & using of key PCK concept/problem

Learning community
Teachers’ Systemic Instructional Design
Key Steps

- Discussion or Evaluation on Lesson Plans
- School-based practice & action study
- Professional Direction & Support
- Self-reflection on Design & Practice
- Evaluation & Sharing of Typical Practice
- Reconstruction
- Teachers' Systemic Instructional Design
Demo, discussion & evaluation on the designed lesson plans

- Share understanding and experience on a same topic

- Social construction: multi-perspective understanding
  → To form “Crisscross Landscape” about one teaching/learning problem.
Key Steps

Discussion or Evaluation on Lesson Plans

Teachers' Systemic Instructional Design

Professional Direction & Support

School-based practice & action study

Self-reflection on Design & Practice

Evaluation & Sharing of Typical Practice

Reconstruction
More than thousands of lessons or learning activities have been designed and carried out in all subjects and in different regions all over China.
Key Steps

- Discussion or Evaluation on Lesson Plans
- Self-reflection on Design & Practice
- Evaluation & Sharing of Typical Practice
- Professional Direction & Support
- Reconstruction
- Teachers' Systemic Instructional Design
- School-based practice & action study

School-based practice & action study -> Professional Direction & Support
Professional Direction & Support -> Evaluation & Sharing of Typical Practice
Evaluation & Sharing of Typical Practice -> Self-reflection on Design & Practice
Self-reflection on Design & Practice -> Reconstruction
Reconstruction -> Teachers' Systemic Instructional Design
Teachers' Systemic Instructional Design -> Discussion or Evaluation on Lesson Plans
Discussion or Evaluation on Lesson Plans -> School-based practice & action study
Teachers’ Self-Reflection

To require and help teachers to carry out self-reflection on their instructional design and practice.

Teachers’ portfolio → View the folders
Evaluation & Sharing of Typical Practice

Face-to-face

Video conference
Online case demo, discussion, and reconstruction

A sample lesson package

Curriculum Standards

Lesson plan (ID) Text

Teaching process: Video

Learning Process: Portfolio

Teachers' Self-reflection

Peers' Comments

Experts' comments

Online Case Study

Reconstruction of the lessons; adapt pedagogy to the content

Deeper understanding & school-based practice of pedagogy skills

Online collaborative ID on related content themes

Action study on pedagogy themes

Related resources

Reuse of learning objects

Put ICT, pedagogy, content, and local context together; Connect theory and practice

Based on the lesson package and discussion

BBS

Ask an expert
Key Steps

Discussion or Evaluation on Lesson Plans

Teachers’ Systemic Instructional Design

Professional Direction & Support

School-based practice & action study

Reconstruction

Evaluation & Sharing of Typical Practice

Self-reflection on Design & Practice
Key Features

- Helping teachers construct understanding on ICT integration based on their own practice;
- Aiming to improving teachers’ ICT integration capacity;
- Encourage and help teachers to conduct self-reflection;
- Learning communities were formed, and peer’s assistance was encouraged;
- Emphasizing on experts’ all-process participation.