NSS Information and Communication Technology (ICT) Interface with Junior Secondary Computer Curriculum

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Problems faced

- Unknown Prior computer knowledge of students in primary education
- Learners' diversity
- Teachers' efforts ≠ Students' achievements
- Skill-based learning is difficult to develop generic skills like communication, creativity, collaboration, self-management, problem solving and study skills.

JS Computer Curriculum

- In 2003/04, the S1 CL curriculum was refined to cater for the needs of different subject panels. All basic ICT and PBL skills would be taught like the use of school intranet, word processing, collecting & processing information,.. etc. Students were required to apply the skills in order to complete a project in PBL.

JS Computer Curriculum

- In 2003/04, the new S2 CL curriculum was developed: Problem-based Learning.
- As technology is changing very fast nowadays, it is beneficial to acquire the ability of learning to learn.
- Written instructions, reading materials or reference Web sites would be provided to help students complete six projects on rotational basis throughout the year.

Selection of topics in Computer Curriculum

Learning Elements	Descriptions
Information Processing & Presentation	Super Star Manager (curriculum provided by Microsoft)
Design & Applications	PhotoImpact, ProDesktop
Programming Concepts	JavaScript, LOGO, LEGO & GAME FACTORY
Control & Automation	LEGO (Intelligence House or Amusement Park) & Robotics

S2 CL Curriculum

- Teacher-led mode => Students self-learning mode
- Projects done in groups with each group consisting of 2-3 students.
- Each project should be completed in four cycles.
- No test, No homework and No exam
- Classroom Performance (30%)
- Projects (70%): 6 projects done
- A grade will be given in the whole year

S2 CL Curriculum

- Rationale
- **Equip students with sound knowledge in different areas**
- **Information and Communication Technology through problem-based learning**
- **Help students develop higher order thinking skills and creativity**
- **Enhance students' collaborative skills and communication skills as well as problem solving skills**
- **Less stressed and more enjoyable in ICT**

Resources allocation

Budget	Min. no. of licensed software required: 8
Files sharing	Common location for files sharing
Coordinator	Allocation of teacher-in-charge
Schedule of rotation	Well-planned schedule for seating plan and rotation
Grouping	Free grouping vs mixed abilities

Difficulties

- **Limited software license**
  - Solution: Rotational basis
- **Suckers/ free riders effect**
  - Solution: Role assigned
    - Project manager, Quality controller, producer…
- **Slow development process**
  - Solution: Demonstration, Division of labour, planning
- **Learners' diversity**
  - Solution: Setting up minimum requirements of the product
  - Solution: Demonstrating product with Grade A

Projects

- S – Superstar manager
- D – ProDesktop
- G – Game Factory
- I – LEGO : Intelligent House
- A – LEGO : Amusement Park
- P – PhotoImpact
- L - Logo
- E – Extension project (millionaire)

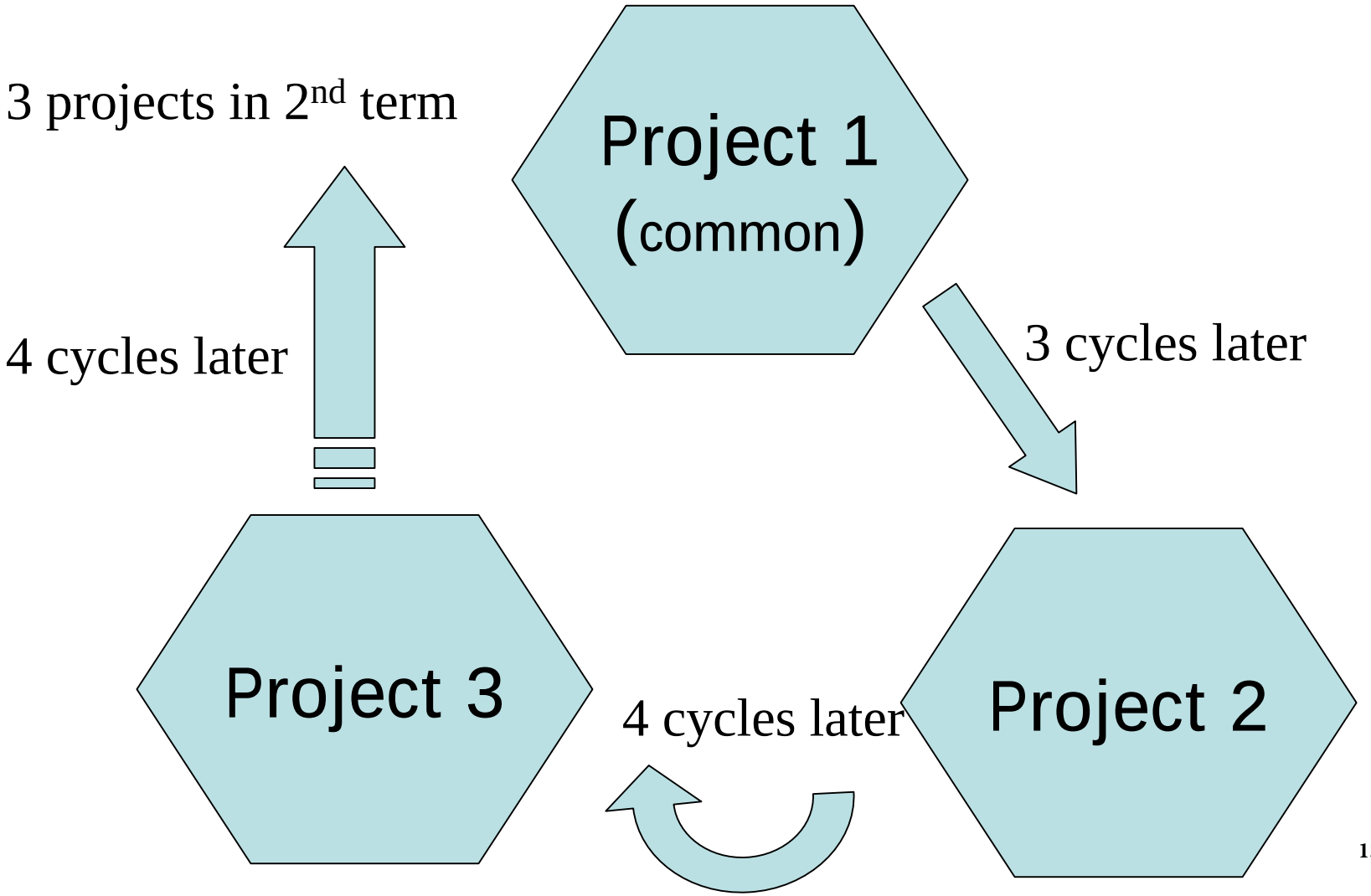
Rotation

Gp1	Gp2	Gp3	Gp4	Gp5	Gp6	Gp7
P	P	P	P	P	P	P
I	D	L	D	S	D	D
S	G	S	S	G	A	I
L	S	I	A	D	S	G
D	A	D	L	L	G	L
G	L	G	G	I	L	S
E	E	E	E	E	E	E

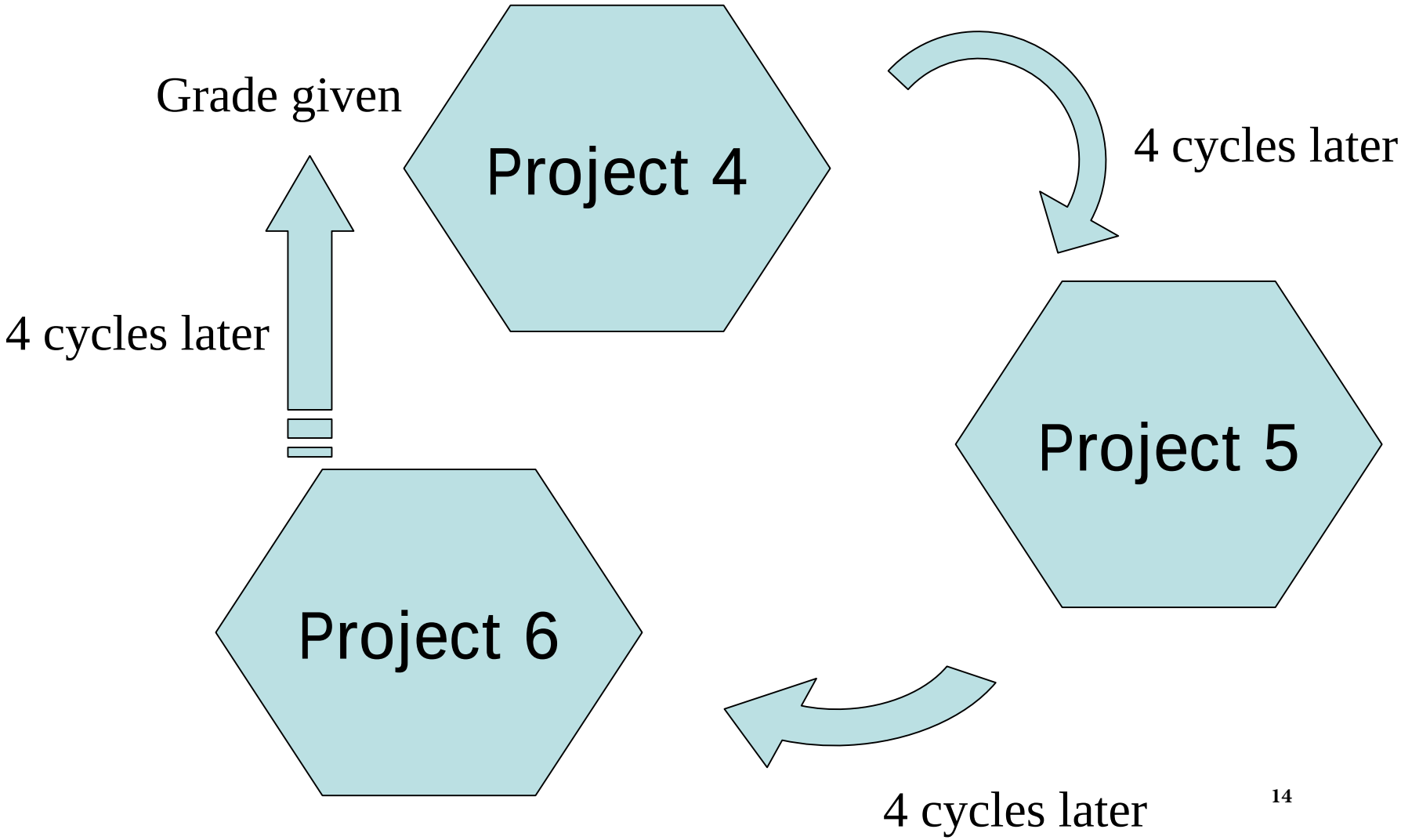
Rotation

Gp8	Gp9	Gp10	Gp11	Gp12	Gp13	Gp14
P	P	P	P	P	P	P
A	S	L	D	S	D	A
G	G	G	S	G	A	G
L	A	S	L	D	L	L
D	L	A	I	L	G	D
S	D	D	G	A	S	S
E	E	E	E	E	E	E

Rotation of project in 1st term



Rotation of project in 2nd term



Interface with Senior Secondary Computer Curricula

- In 2005/06, S3 CL was first introduced in developing students' interest in different ICT modules.
- WebQuest was being used.
- An inquiry-oriented activity in which some or all of the information that students interact with comes from resources on the Internet
- Students were allowed to decide how their products being presented.

Interface with Senior Secondary Computer Curricula

- In S2 CL, the no. of projects done was reduced to 4 in order to equip students with the skills required in S3.
- Projects interfaced with NSS ICT were introduced:
- Module A: Programming
  - GAME FACTORY, Robotics
- Module D: Multimedia Production & Web Authoring
  - Video Editing (Limited Budget provided by Microsoft)

Future Plan

- Collaboration with other subjects:
  - Geography: GIS and Mapping software
- Exploration of challenging tasks:
  - Robotic Kits provided by CUHK
  - iClone
- Make a balance between challenging tasks and WebQuest catering for the students with different learning styles

S2 Computer Literacy (Case Studies)

Mode: small groups

Time: 40 mins / lesson

1 lesson per cycle

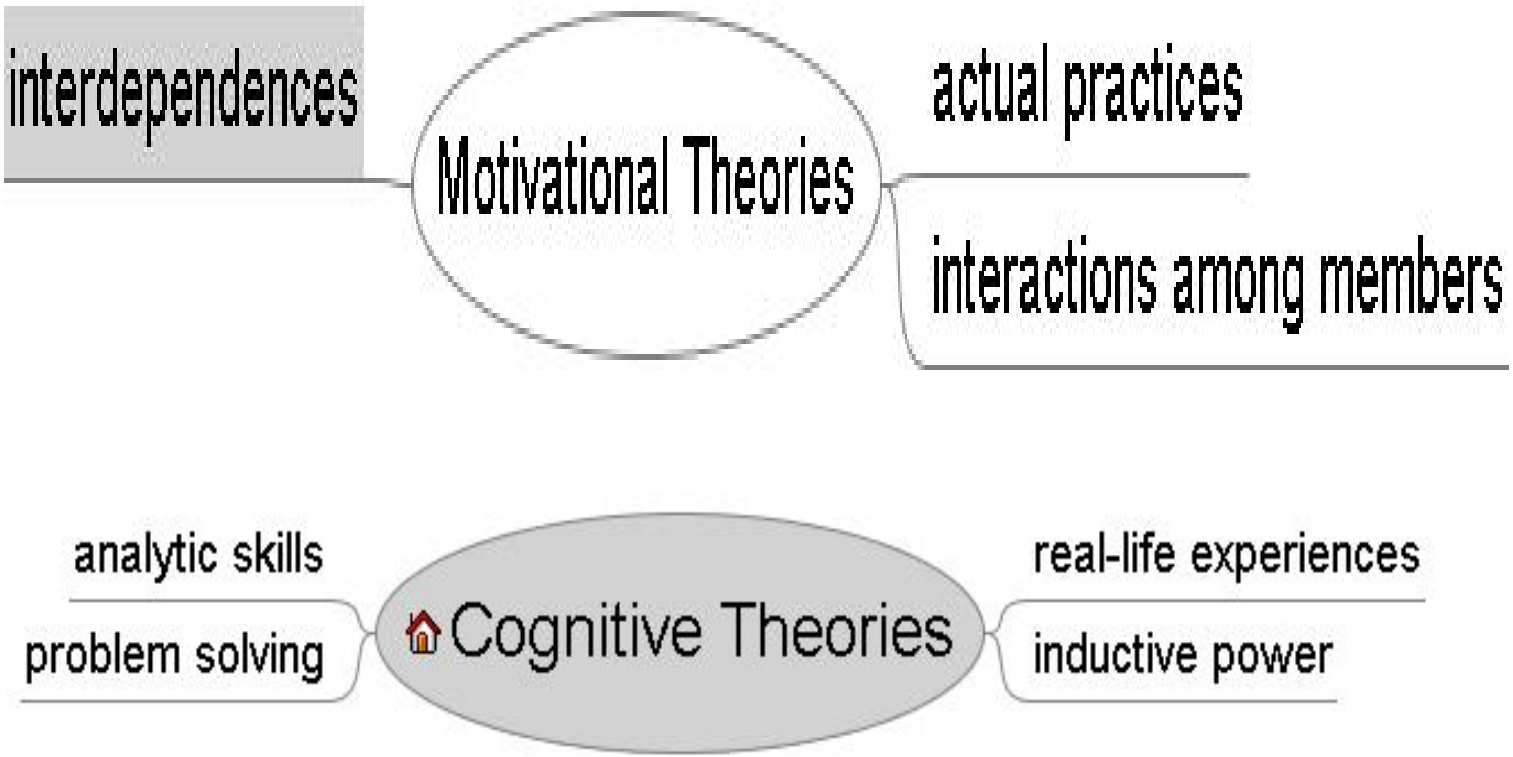
Objective:

Equip students with sound knowledge in different areas of Information Technologies through project-based learning with role assignments.

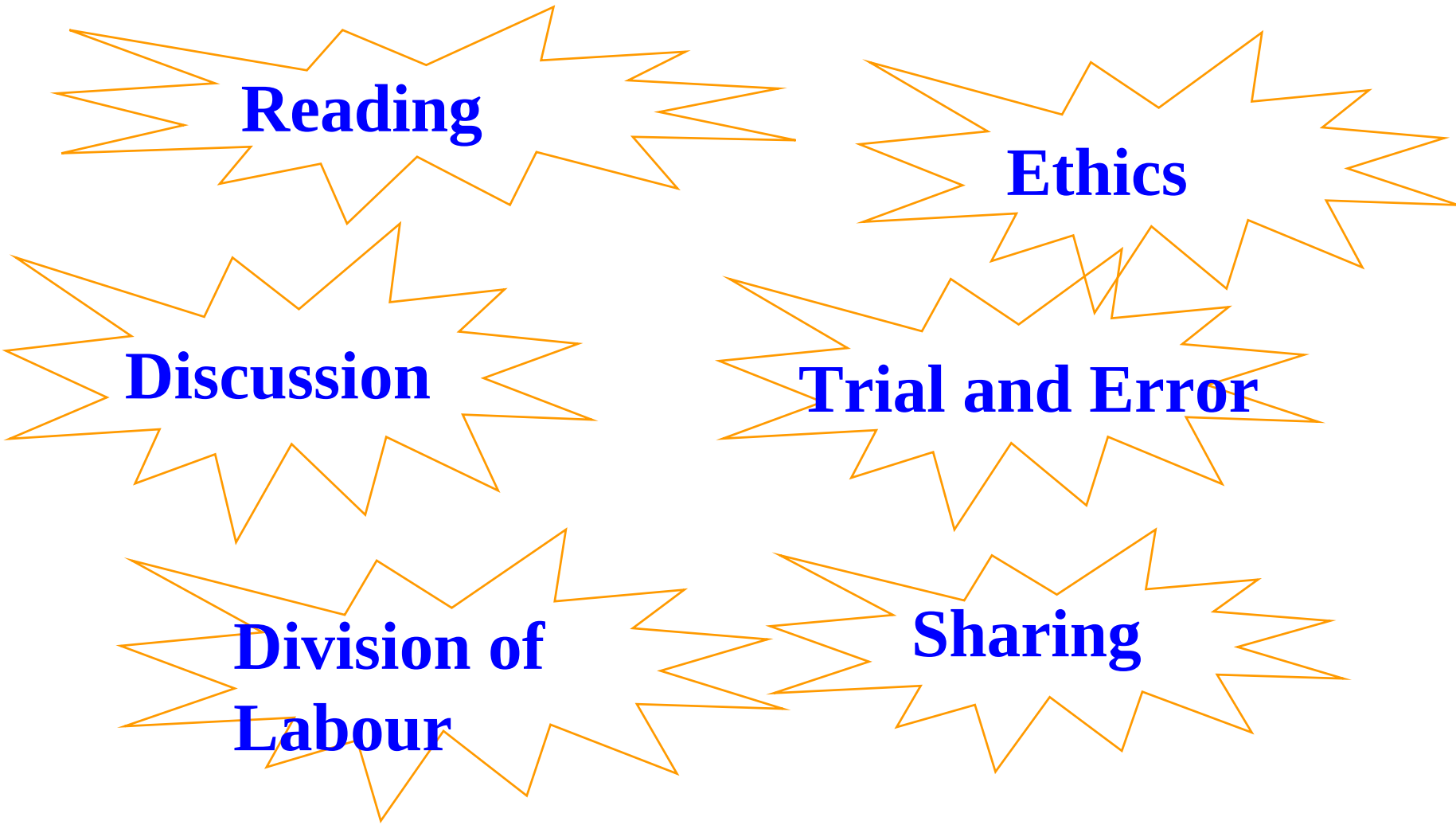
- **Help students develop higher order thinking skills and creativity**
- **Enhance students' collaborative skills and communication skills**

(Cooperative Learning)

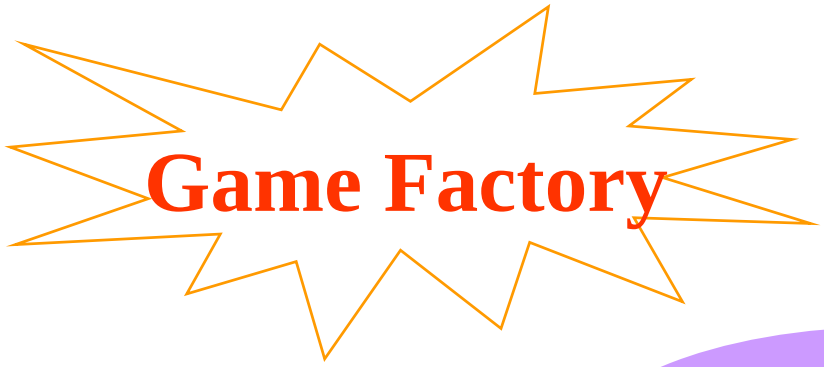
Johnson and Johnson (1994)



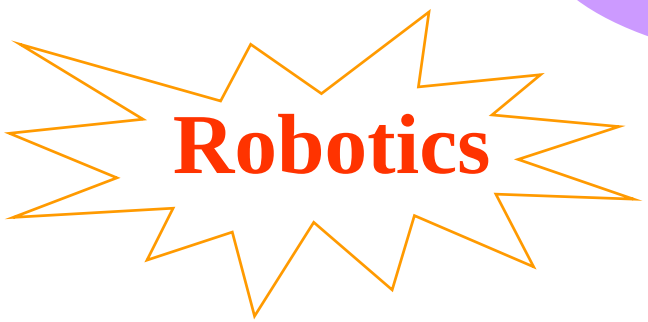
Learning Activities



Learning Activities

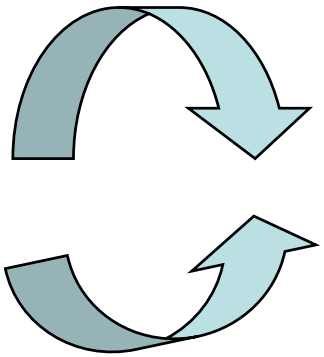


Projects



Lesson 1

- Group division (free choices)
- *Role Assignment
  - ☑Project Manager
  - ☑Quality Controller
  - ☑Producer
  - ☑System Analyst



- Demonstration (key concepts only)

Lessons 2-5

Start doing the project:

- Face to Face Interaction
- Division of Labour
- Work out the product
- Fill in the job allocation form of different roles

Peer assessment:

- Accountability
- Appreciation from others' work

Case Studies (Game Factory)

The game ‘Pong’ serves as an example demonstrating the following key techniques:

- Creating storyboard
- Setting workflows

Students read the lab manuals and are expected to discover other side-track skills themselves.

Case Studies (Game Factory)

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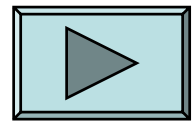
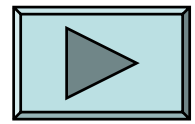


Case Studies (Game Factory)



Case Studies (Robot)

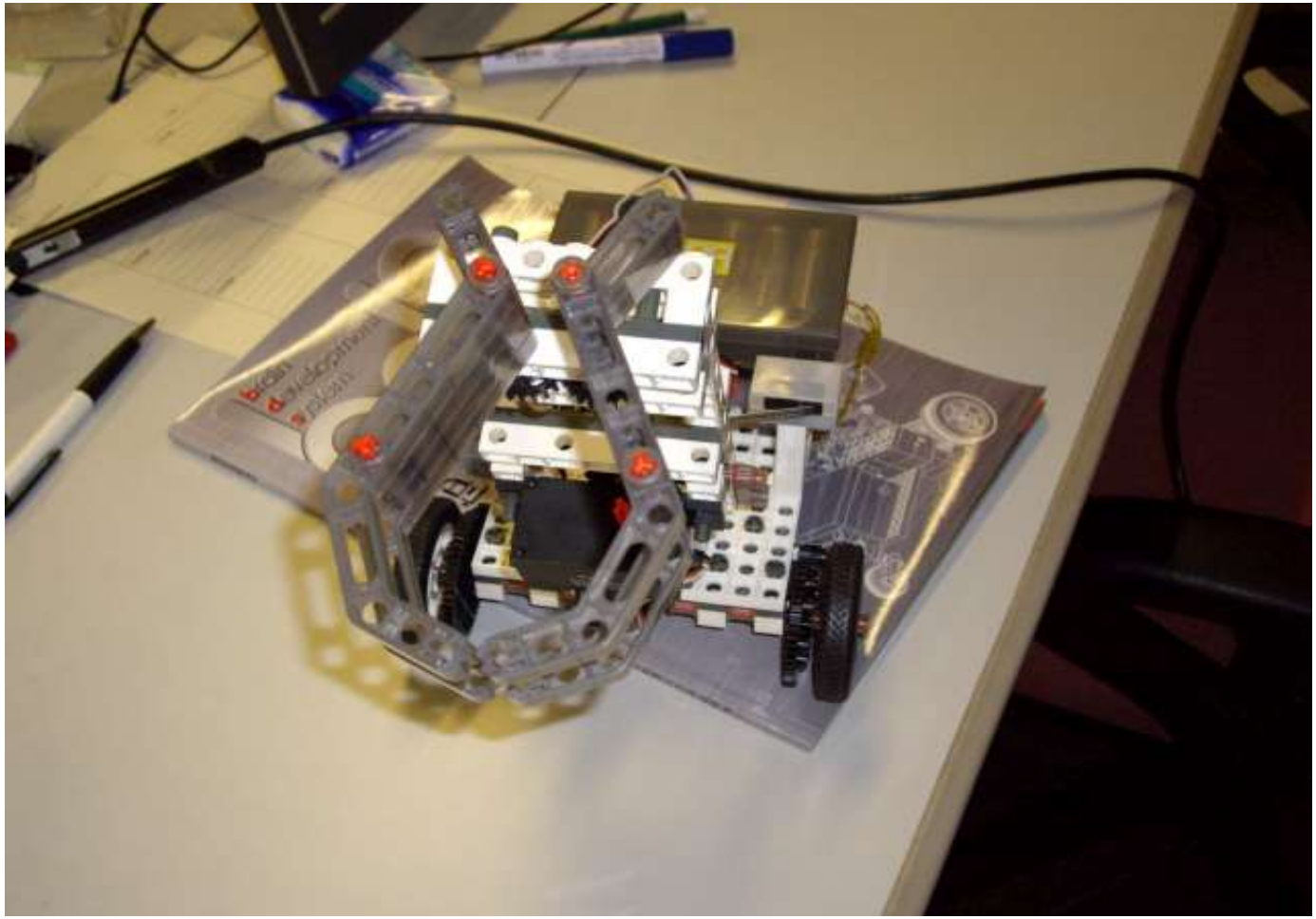
A robot with movable arm serves as an example of the robotic box-set:

- A movie with different robots are shown
- The one created by teachers are displayed
- The use of remote-control for performing a task is demonstrated

Students read the lab manuals and are expected to create ANY robots they like.

Joint effort among different classes is encouraged. ☺

Case Studies (Robot)



Observations

- Many different kinds of games/robots are produced
- Students are willing to explore and find some other resources to supplement the distributed lab manuals
- Students are eager to present their works to other groups
- Students have great self-satisfactions from their works

Feedbacks from students…

Projects are interesting!

High sounding role assignments encourage them to work together with shared workload.

Brand new projects with spaces for collaboration are desired.

The mode of partial demonstration helped them a lot.

They do spend efforts in searching extra reference from web / books.

Reflections

The following key elements of CL were achieved:

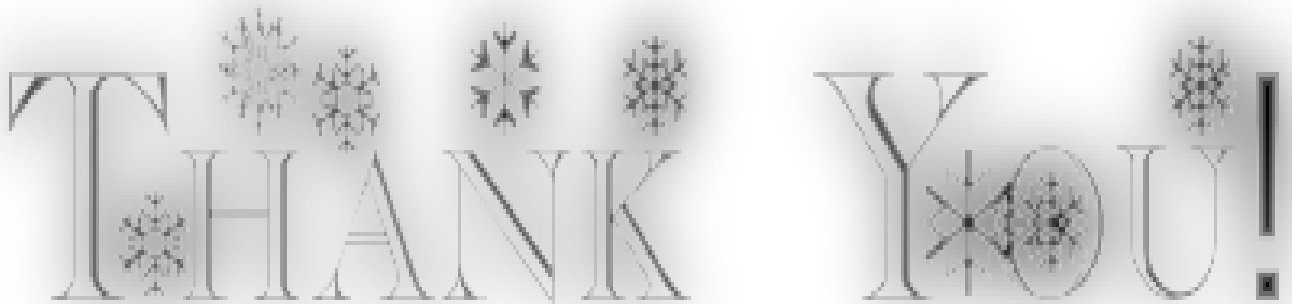
- Positive Goal Interdependence
- Positive Reward-Celebrate Interdependence
- Positive Resource Interdependence
- Positive Role Interdependence

Further Improvement

- ✓Allow forming new groups during the 2nd semester
- ✓Adding more brand new projects that enable collaborative efforts with spaces for creativity

Concluding Remarks

- Students learn faster and more efficiently
- Students feel more positive about their learning experiences
- Role assignments encourage the contribution from everyone
- Higher achievers with strong ICT background are easily identified


THANK YOU!

Q & A