



***The Study of Learning Outcomes, Responsibility and Satisfaction
of Students using the “Flipped Classroom”
Combined with Project-Based Learning (PBL)
in the Subject of
Innovation and Scientific Thinking***

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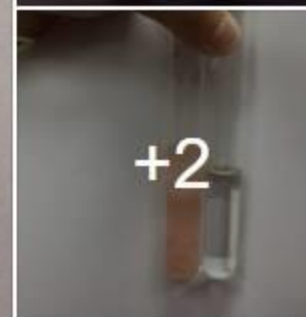
Please send this to all your contacts , it's very important .

Chinese people have started producing corned beef with their dead bodies and...

เอาเนื้อปลาไปแช่น้ำไม่กี่นาที... สีละลายออกมาชัดเจน... เนื้อที่แช่เพียง 5 นาที กลายเป็นซีดขาว!

....ทำไมต้องข้อมสีกันด้วย เป็นอันตรายเปล่าๆ จะมะเร็งหรือแค่ดับไตพังหนอ....

ช่วยกันระวัง ช่วยตรวจสอบด้วยนะคะ เราไม่ได้ตรวจว่าสารอะไร เพราะไม่ใช่โครงการวิจัย... แต่ส่งมาด้วยกันเพื่อความอยู่รอดปลอดภัยของทุกคน....



Corrosive

สุขศาสตร์...มหิตล

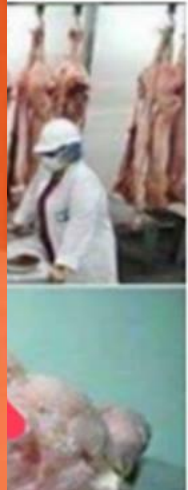
ก้าว

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ที่มา : <http://www.dek-d.com/board/view/2662374/>





The learners could think, analyze, and reflect reasonably on the basis of their thinking as the intellectual or "critical thinking".

(Atchara Chaiwiwat, 2008)



Principle of developing thinking skills, Leonardo Da Vinci

- 1. Curiosity is a human nature,**
- 2. Bringing knowledge to be used,**
- 3. Improvement and development of the senses,**
- 4. Being ready to face with ambiguous changes,**
- 5. Complete body,**
- 6. Use of both hemispheres of brain,**
- 7. Systematic thinking**

(cited in Saeng-roong Poonswan, 2013)

The Flipped Classroom

DURING



Students practice applying key concepts with feedback

IN CLASS

GOAL

GOAL

GOAL

Students prepare to participate in class activities

BEFORE



AFTER

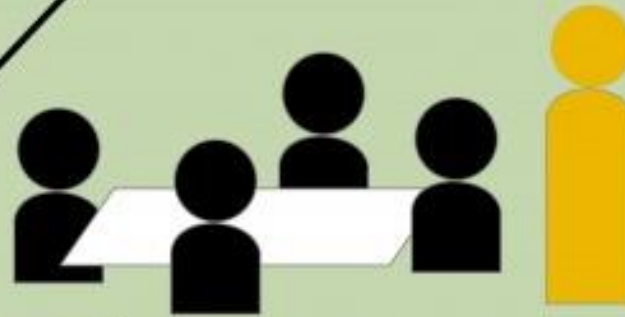
Students check their understanding and extend their learning



OUT OF CLASS

FLIPPED

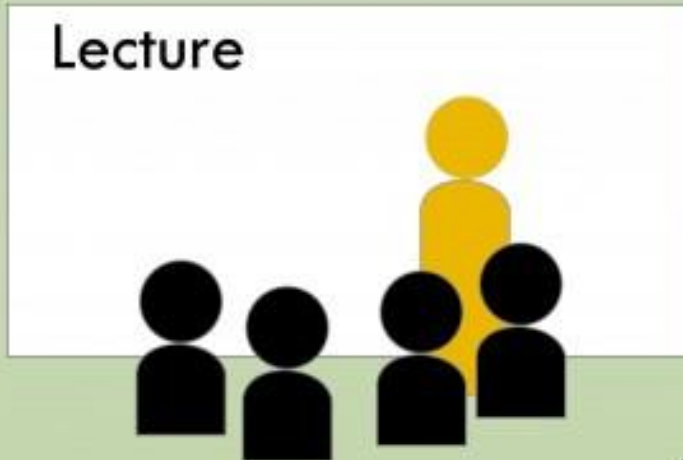
Lecture



Classroom activities

TRADITIONAL

Lecture



Homework activities

Project-based learning : PBL

project kickoff

Conceive, Plan & Launch

Site Coordinator & Staff identify needs and opportunities.



learn by doing

Inquire, Work & Discover

Site Coordinator & Staff Coach

Teachers coach youth and foster relationships.



showtime

Celebrate & Share

Site Coordinator & Staff organize and facilitate.



GE103 Innovation and Scientific Thinking

encourage and develop learners to be creative, think critically, think logically, reasonably, scientifically, having the scientific process skills to make decisions.

Flipped Classroom and PBL management
in module GE 103



1. Learning outcomes of students
2. Responsibility of students
3. Satisfaction of students

Research Framework

Methodology

1. **Sample group : 120 students by purposively selected**
2. **Tools :**
 - 2.1 **Pre-test and Post-test entitled “Scientific process”**
 - 2.2 **Project Evaluation form (evaluate in 3 aspects)**
 - 2.3 **Online questionnaire**

Discussion

Members

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Gecko Switch là chiếc công tắc đèn mà bạn có thể gắn bất kỳ và có thể thay đổi mọi nơi mà bạn muốn. Nguồn: kickstarter.com

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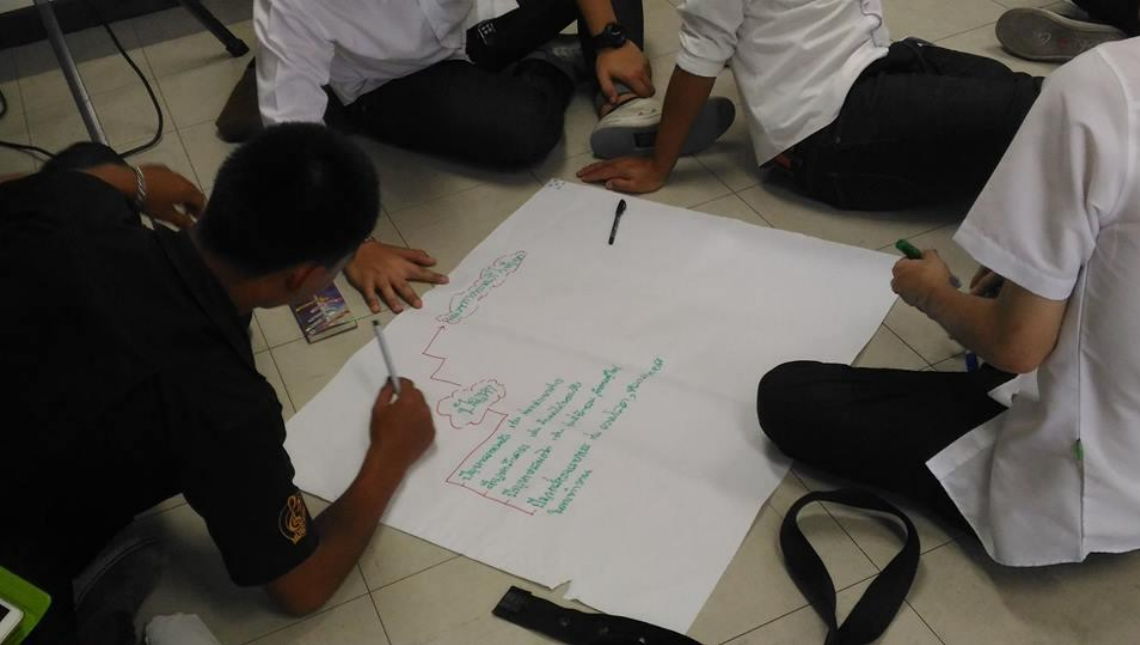
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Learning Outcomes

| Test | \bar{X} (%) | S.D. | t | Sig.(1-tailed) |
|-----------|---------------|------|--------|----------------|
| Pre-test | 50.04 | 8.30 | 14.60* | 0.0000 |
| Post-test | 85.72 | 4.35 | | |

Responsibility skill of students

| criteria | Total score | \bar{X} | S.D. | No. of passed students |
|---|-------------|-----------|------|------------------------|
| respect for variation in team | 10 | 9.0 | 0.48 | 120 |
| flexibility and enthusiasm for team support | 10 | 8.5 | 0.64 | 110 |
| responsibility to work with others | 10 | 8.7 | 0.57 | 110 |
| Total score | 30 | 26.20 | 0.56 | 113.33 |
| Percentage | 100 | 87.33 | - | 94.44 |

Satisfaction of students toward learning management

| Aspect | \bar{X} | S.D. | level |
|-------------|-----------|------|---------|
| Teacher | 4.70 | 0.56 | highest |
| Facilities | 4.59 | 0.68 | highest |
| Both aspect | 4.65 | 0.62 | highest |



the management of critical thinking skills of students using Flipped Classroom combined with project-based learning in GE₁₀₃ module:

is a development way of skills needed, especially the thinking skills, which are the basis of learning and performing various tasks.

