



Project Based Learning Model: Turning Physics Exams to Team Projects

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Date: December 29, 2016

Outline

- Overview
- Forming Teams NOT Groups
- Class Requirements
- Documentation Training
- Results and Achievements
- Conclusions



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Overview

- 以Project Based Learning, 「做中學」
Learning by doing為教育理念
- 課程設計以**培養學生解決「現實工程問題」**之
實務核心能力為主軸



Overview

	Traditional Instruction	Project-Based Instruction
Curriculum focus	Fixed or standard curriculum	Project/driving question
Learning focus	Acquisition of knowledge	Life skills (problem-solving, teamwork, communication) as well as knowledge
Curriculum materials	Textbook, assigned readings	Developed by students through their own discovery process
Role of student	Passive observer; teacher-directed learner	Active problem-solver; self-directed learner
Role of instructor	Expert; source of knowledge	Facilitator
Social Context of classroom	Individual learners	Community of learners who collaborate with one another
Scope of subject	Narrow, focused (usually)	Broad, interdisciplinary

Lipson, Alberta, Ari Epstein, Rafael Bras, and Kip Hodges. 2007. Students' Perceptions of Terrascope, A Project-Based Freshman Learning Community. *Journal of Science Education and Technology* 16, no. 4: 349-364. doi:10.1007/s10956-007-9046-6.



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Forming Teams NOT Groups

1, 11, 21, 31, 41

2, 12, 22, 32, 42

3, 13, 23, 33, 43

4, 14, 24, 34, 44

5, 15, 25, 35, 45

6, 16, 26, 36, 46

7, 17, 27, 37, 47

8, 18, 28, 38, 48

9, 19, 29, 39, 49

10, 20, 30, 40, 50

Max. Ave. : ~81

Low Ave. : ~78

Forming Teams NOT Groups



Forming Teams NOT Groups

	項目	目標
1	當我們團在一起	成員編組
2	團隊政策	規則及運作流程說明
3	小組守則	建立小組合約
4	團隊有效運作評分標準	了解團隊運作問題
5	小組成員評分表	小組同伴互評



Forming Teams NOT Groups

	週日	週一	週二	週三	週四	週五	週六
7-8 AM							
8-9							
9-10							
10-11							
11-12							
12-1 PM							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							



Forming Teams NOT Groups

- **小組組長**：擬定工作時程、分派協調工作、確保每位組員都有參與和運作，作業批改下來後帶領組員了解失分和問題改正；
- **書記**：會議重點記錄、寫下所面臨問題和後續處理追縱；
- **總編**：彙整美編檢查資料並繳交作業，寫上有實際參與組員的名字，如果遇事無法處理作業繳交事宜，需負責交接其他組員處理。



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Class Requirements

物理課 Physics

- One team 5 persons
- Conceive a set of Physics experiment modules base from assigned topic
- Design experiment modules
- Document project proposal
- Create and test the projects
- Document the experiments
- Implement in class
- Write final report

Class Requirements

Physics Grading

- **Midterms 40%**
 - Complete proposal (完整專題提案報告) (15 %)
 - Presentation (10%)
 - Preliminary results from each member (75%) → (15%/member)
- **Finals 40%**
 - 專題報告 (20%)
 - Teamwork (20%)
 - Peer evaluation (10%)
 - Individual Presentation (50%) → (10%/member)
- **平時成績 20%**
 - Weekly report showing
 - Attendance
 - Quizzes

Class Requirements

- 各組可以共同分享資料收集成果、共同 brainstorm
- 每位成員必需要參與每次討論、輪流公開發表成果。
- 選寫專題提案報告與專題成果報告



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Documentation Training

- 書記會議記錄（每週）
- 獨立學習（每週）
- 團隊有效運作評分標準（每個月）
- 估價單（採購訓練與設備購買前使用）
- 請購單（買材料必填文件）
- 專題提案報告（期中書面審查用）
- 專題成果報告（期末書面審查用）

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Meeting Time

第一組開會時間

星期二

下午2:00-6:00(時間時
常改變)

第五組開會時間

三下午4:00~6:00

五早上9:00~11or12點

開會時間若有變更 另行通知

第八組開會時間

(一) 上午10:10-12:00

(四) 下午13:30-14:40

(五) 上午10:10-12:00

第三組開會時間 (w棟二樓)

星期一 10:00~12:00

星期五 10:00~12:00

第六組開會時間

一 下午 3:50~5:40

二 下午 3:50~5:40

三 下午 3:50~5:40

五 上午 10:10~12:00

開會時間不固定，另行公告

第九組開會時間

星期五 9:00~12:00

第四組開會時間

星期一:10點~12點(主要)

星期二:13點~14點(次要)

星期四:13點50分~14點40分(次要)

星期五:11點~12點(主要)

第七組開會時間

一 : 3:00~5:00

二 : 3:00~5:00

五 : 3:00~4:00 (如有需要)

Delta 第十組開會時間

星期四 13:00~15:00

星期五 10:00~12:00



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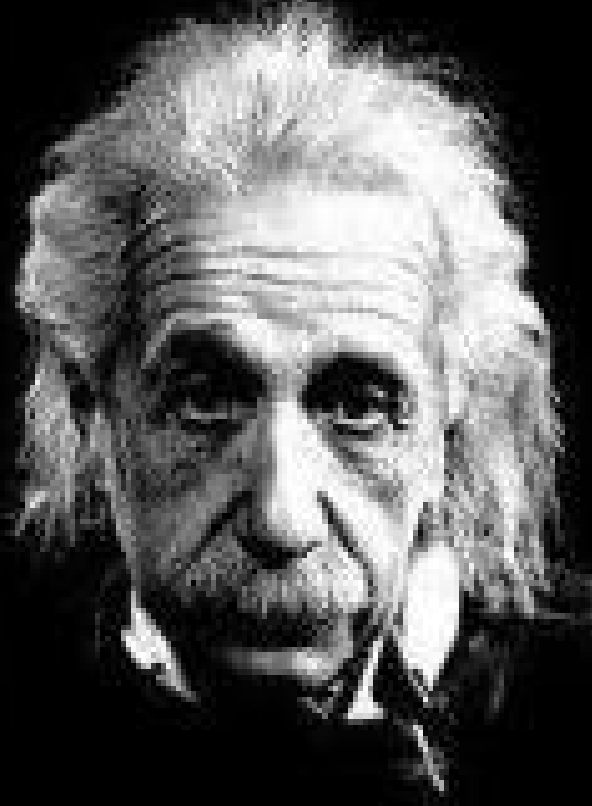


Conclusions

- We are NOT an elite class, but we hope to *develop a sustainable system* that can train ordinary students to become elite students
- Professors need to spend time for more discussions
- Students need to be encouraged for self and group study
- We need more professors to join us



"WE CANNOT
SOLVE OUR
PROBLEMS
WITH THE SAME
THINKING WE
USED WHEN WE
CREATED THEM"



**THANK YOU
FOR
YOUR ATTENTION**

