

Appendix 1- the Project Management Game

A New Product Design Project Game

Flying Object Product

This game simulates the realistic product development projects from the very beginning conception stage to the closing stage.

Assuming you are working as a PROJECT team to develop a new product (a paper flying object), from scratch to the production till the sales to the client (sole client).

1. Definition of product (Specification, scope)
2. Production operation planning (process planning, job design)
3. Resources planning (materials, manpower for production, and budget)
4. Control and Monitoring, Risk management
5. Contracting (a contract confirming the set objectives)
6. Execution of plan (production) (Day 4)
7. Closing (Post workshop evaluation) (Day 5)

Stage 0 (Team forming and Project Conception)

Teams are formed to work as a project team.

Product requirement

Each team (of 5-7 students) is given a task which is about to produce ‘high-tech’ product:- paper flying objects (PFO) of particular customer specifications (as requested by the client). There are two main types of product design, and selling prices vary upon the design and **types of materials**.

Each team needs to design TWO types of products. Despite having good aesthetic quality of their design, all designed products are at least **20 cm** in length. In addition, all products (flying objects) must be able to fly a linear distance of **6 m***.

The two types of products are minimum **seven folds (one sheet and two sheets)**. Each team needs to demonstrate that their products can meet the specified criteria, and keeps one completed set of prototype planes serving as production and inspection references.

Product types		Selling price (HK\$)
		Min. 7 folds

One sheet: 1	White paper	10
	Coloured paper	12
	*plus one clip	17
Two sheets: 2	White paper only	18
	Coloured paper only	22
	1 white paper + 1 colour paper	20

Teams are required to produce the prototypes for approval before they go ahead to Stage 1

Stage 1 (Definition and Planning)

Production Plan and Resources planning

Teams are required to produce at least **12** for each of their designs in order to meet the minimum requirements of sales contracts. There is no upper limit for the contracted quantity.

Teams need to conduct job design for the approved product productions

*The prices of different types of materials are:

white paper, HK\$2 per sheet;
coloured paper, HK\$3 per sheet;
paper clips HK\$3 each

Materials purchase (Template 1)

Materials will be order prior to the production, and teams are required to confirm the amount right before the production (including the materials for failed products)

Each team is given a line of cash credits of **HK\$480**

Stage 1a. Contracting:

Prior to the project production day, teams have to propose their product types and quantity. In order to attain the greatest possible profit, teams need to determine the complexity of their designs, develop their product-mix strategy, and project their maximum production capability (i.e. based on four production personnel in 15 min).

Teams have to get the sales contracts signed/agreed on Day 3

Sales contract (Template 2).

Nevertheless, if any teams fail to deliver their agreed quantities, a contract-binding penalty will be imposed on their planes that cannot meet the production specifications and/or cannot pass the flying test. The penalty is 50% of the product prices per each failed products,

Any planes that are produced exceeding the contracted quantities will not be counted.

Stage 1b Operation Planning:

Based on the contracted quantities in the Sales Contracts signed. Teams need to develop the detail plan (i.e. both processes and resources etc).

Furthermore, control and monitoring should also be incorporated in the plan, while there may be consistent with the risk management (if any).

Stage 2 (Execution)

Teams have to assigned member for different roles during the execution stage:

- production (4)
- internal quality auditor/observer (1-2)
- external auditor to audit other competitors (1)

The agenda of the execution workshop is as following:

	Time (mins)
1. Purchase of materials;	20
2. Modification of purchase order (if materials are in shortage);	10
3. Set up for production (only 4 members)	10
4. Production	15

Each team can only assign 4 personnel in the production system, while the rest of team mates are the auditors. Each team will delegate one to two members as a financial auditor and a quality auditor) to one another competitor team.

The financial auditor is responsible for checking and signing off the contracts, whereas the quality auditor looks after the inspection of finished planes and other quality audit matters for that team.

The auditors will stay with the teams they are delegated to and monitor the team activities throughout the game.

Day 4: Production

Purchase of production materials (e.g. colour paper, white paper, paper clips) is from a sole supplier managed by the instructor.

If the aggregate demands for certain materials are far greater than the supplier's stock, these may be short in supply. Therefore, in case they face material shortages, teams need prepare alternative purchase orders in a very limited time (say, within 10 min) with respect to possible modifications in product design and use of materials.

The production of planes begins once the purchase of materials is completed. Each team can assign up to four members for production in 15 min. No extension of production time is allowed.

Stage 3 (Evaluation of products)

Product specification: the delegated quality auditor will count the number of final products (i.e. finished planes) and inspect them with respect to the predetermined design **specifications**.

Only those planes that pass the inspection can proceed to the next step of a FLYING TEST. After the inspection, teams can appoint ONE member to test-fly the inspected planes in a given testing venue. Each plane has only ONE flying test.

The auditor then records the number of planes that satisfy the requirement (i.e. fly beyond a linear distance of 6m).

Financial audit: Calculations each team then calculates the profits earned and compiles a financial statement (this should be prepared beforehand). Only those planes meeting the design specifications and passing the flight test are counted towards the fulfilment of sales contract.

- An example of when the contract-binding penalty applies: Penalty (50% of sale price of each shorted)
- e.g. if a team loses one HK\$30 product from a sales contract, the profits will be reduced by HK\$15.

The final champion of the workshop will be selected according to:

(1) the profits plus the cash on hand (budget remained and profits made)- financial statement;

(2) the quality objectives met; (both specification audit and flying test);

This project management action game is modified from a game, which was used in a production management courses at City University of Hong Kong. Reference: Pun, K.F., Yam, R.C.M., & Sun, H. (2003) Teaching new product development in universities: an action learning approach, European Journal of Engineering Education, 28:3, 339-352

Template 1: Purchase Order

Materials		*Quantity	Unit Price (HK\$)
1	White paper		
2	Colour paper		
3	Clips		
		Total	

Template 2: Simple Contract Template

To: XXXX

We, _____, agree to produce the following products (at the agreed quantities).

Product		*Quantity	Unit Price (HK\$)
Compulsory 1*			

Compulsory 2*			
Optional			

For compulsory product types, minimum quantity is 12 for each type.

Finished products (after quality audit) will be delivered by XXX, 2018.

*50% of sales price as penalty will be applied for each shorted product

Appendix 2: Guidelines of individual reflection

Individual reflection

This is a documentary of your learning (in the group project).

The structure of this reflection is flexible but is expected to incorporate the following components:

1. Personal particulars (your details)
2. Description of your learning process from the group project (in brief), this can be of weekly basis, of activity basis.
3. Self-assessment on your own performance the project game.
4. Lastly with a reflection on your learning , what you think are inspiring and what you value the most.