



Instructional Design for Self-directed Learning Using E-platforms


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Overview of this session

- Instructional Design for Self-directed Learning
- Setting Up E-platforms with STEM Project Exemplars
 - Google Classroom
 - WordPress



Instructional Design for Self-directed Learning

<https://www.youtube.com/watch?v=Erm2Kokx8Ro>

Basic Concepts of SDL

- Learning is a process of **personal** construction of knowledge
- Help learners understand how they **learn best**. Make connection between effort, learning strategies, and use of information.
- **Externalize** the self-directed learning process for teacher assessment, peer discussion and self-reflection.
- Teacher as a **facilitator** of learning

Using E-Platforms for SDL

Efficient Management

- Monitor students' participation, while student can review their progression of learning
- Assessment can be cloned, modified and even marked automatically
- Tools: Checklist, Online Test or Quizzes, E-portfolio, Automarking...



Using E-Platforms for SDL

Improved Co-operation

- Facilitate communication and collaboration in class or outside the class
- Upload and share content, ideas or files
- Tools: Forum, Co-working platform, Instant Messaging, Peer assessments system...



Using E-Platforms for SDL

Up to Date and Immediate Content

- Instant access to update the content of courses
- Add materials and resources for students for immediate access
- Tools: Posts wall, Announcement, E-calendar, Polling...



Using E-Platforms for SDL

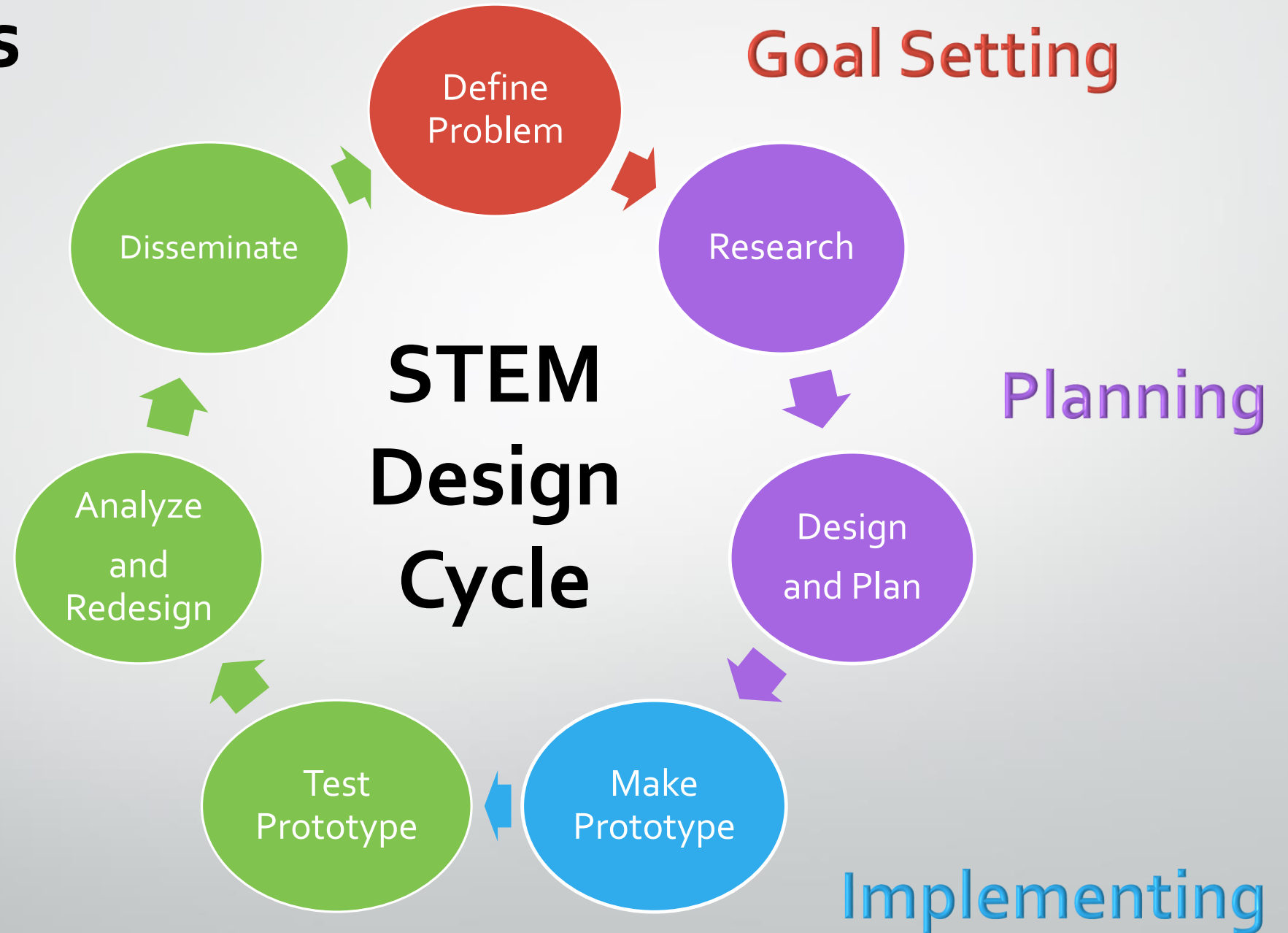
Assess of Information and resources

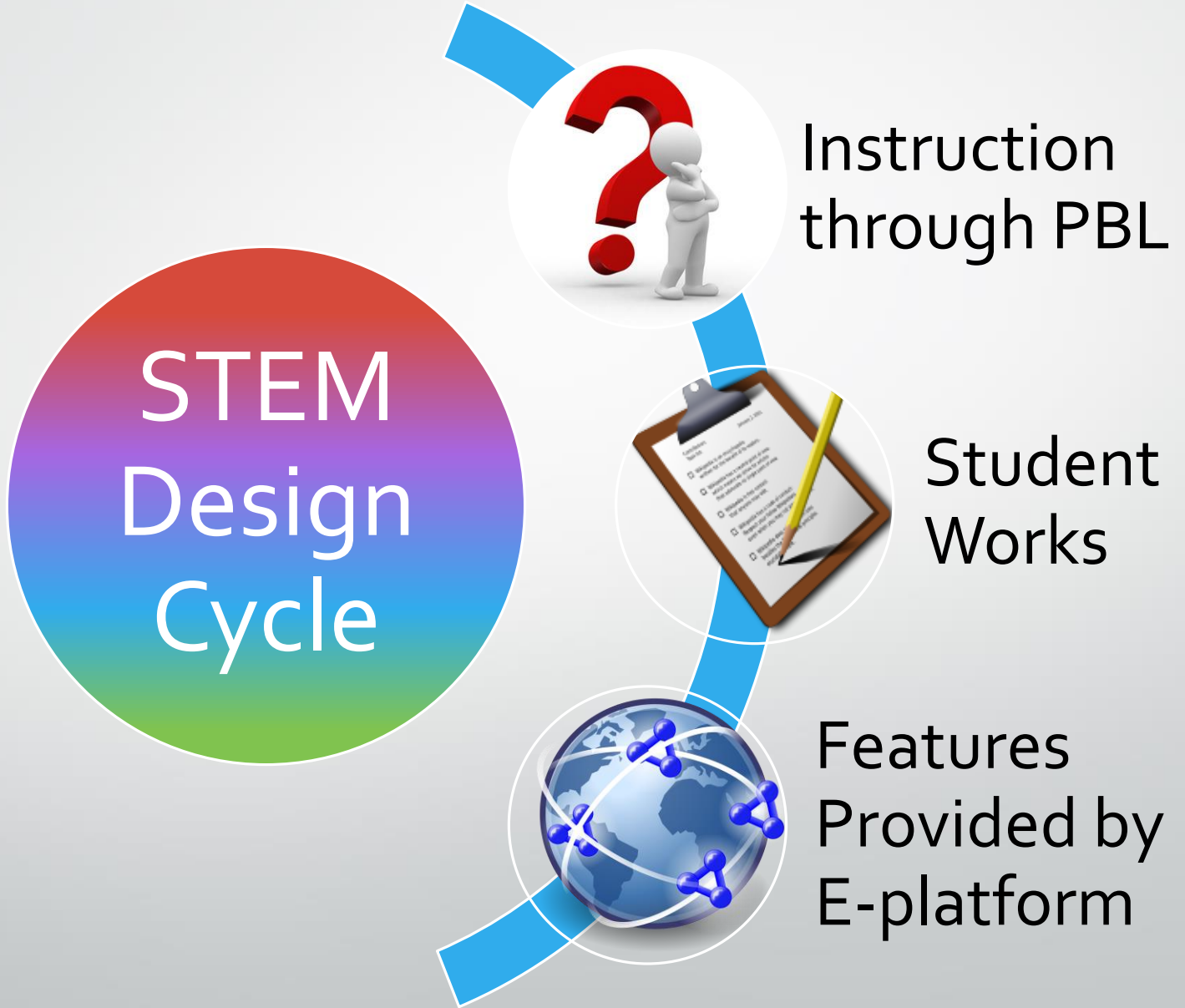
- Centralize the lesson materials and be accessible for students anytime.
- Link up varies powerful learning tools to enhance the student learning
- Tools: Online Data Storage, Hyperlink, Plug-in function...



Stages of SDL

Reviewing,
Evaluating,
Reflecting





The diagram features a central circular node with a rainbow gradient, containing the text 'STEM Design Cycle'. To its right, a blue ribbon-like path curves downwards, connecting three circular nodes. The top node shows a 3D white figure thinking next to a large red question mark. The middle node shows a clipboard with a checklist and a yellow pencil. The bottom node shows a blue globe with molecular structures. To the right of each node is a text label. The background is light gray with a blue and black decorative shape on the left side.

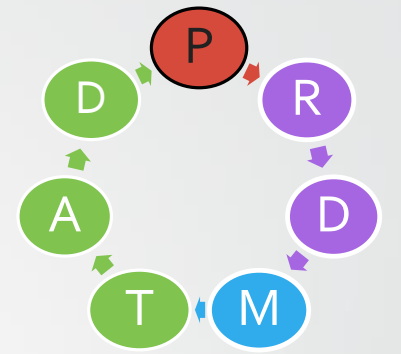
STEM Design Cycle

Instruction
through PBL

Student
Works

Features
Provided by
E-platform

Define Problem



Goal Setting

Instructions

- What do you understand about the problem?
- What are the criteria for the solution?
- What are the constraints in solving the problem?

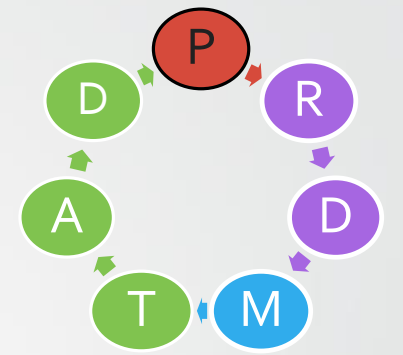
Student works

- Set the goal for the project with self-reflection

Define Problem

Features provided by E-platform

- Posts Wall
- Online Questionnaire



Goal Setting

Amy Lui
9月20日 (上次編輯時間：9月20日)

STEM活動目標

今年度STEM探究活動主題為智能家居。

任務：
隨著物聯網的發展，智能家居隨之而誕生。與傳統家居設置不同，智能家居具備節省電源，自動化及遙距控制的功用，其中自動餵食器幫助長期不在家的上班族一族餵養寵物。但是，正如一般的智能家居系統，一般自動餵食器價錢昂貴，並非常人能所負擔。

在這個活動中，同學們請先分回五組。每組透過運用環保物料，及先前於電腦課所學習的littlebit或microbit的知識，設計及製作一個智能家居設備。

但是，製作過程要符合以下3個條件：
- 使用廢棄的物料作為主要的製作材料
- 廢棄物料の種類不超過4種
- 選用littlebit 或 microbit控制部件運作

問題 回覆

訂定目標

讀就老師給予的提示，思考一下你選擇的項目的行動計劃

你想達到甚麼？
長答英文字

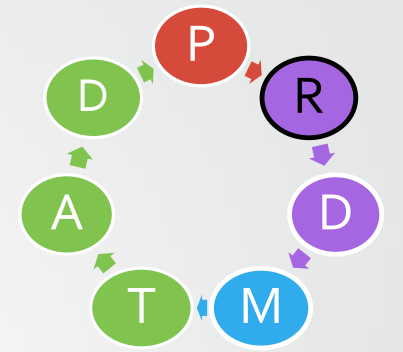
你怎麼知道自己已經達到目標？
長答英文字

你可以怎樣達到目標？
長答英文字

這個目標值得你努力去完成嗎？為甚麼？
長答英文字

你預計需要多少時間達到目標？
長答英文字

Research



Planning

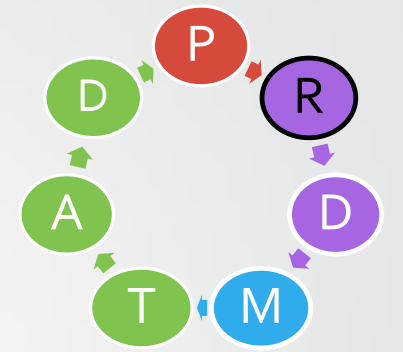
Instructions

- What do you know about how to solve the problem?
- What knowledge do you have that could help solving the problem?
- What New Knowledge do you have to learn?
- How could you learn the knowledge Required?

Student works

- Make a record of the information collected that are useful
- e.g. Scientific/ Engineering/ Mathematical Concepts, existing designs/ solutions in the form of photos, etc.

Research



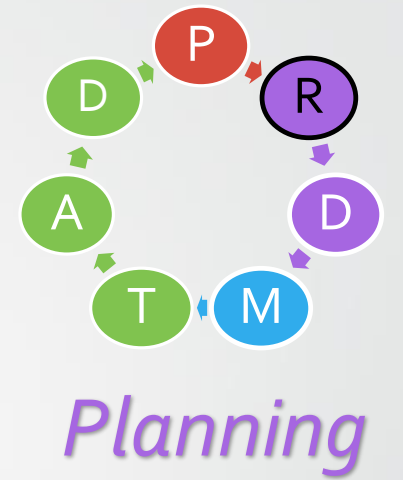
Planning

Features provided by E-platform

- Allow students to post the information to designated areas in the form of hyperlinks, pdf files, photos, videos, etc.
- Provide an additional channel for groupmates to share the information they have collected
- Allow the teacher to monitor students' progress and offer help if needed
- Allow teachers to provide supplementary information to students (in the form of hyperlinks, etc.)
- Allow students to consult the teacher when in need

Research

- Embedded Multimedia
- Open Learning Resources



Ref: <https://simbucket.com/circuitbuilder/>

  Amy Lui
9月20日 (上次編輯時間: 9月20日) ! 缺交

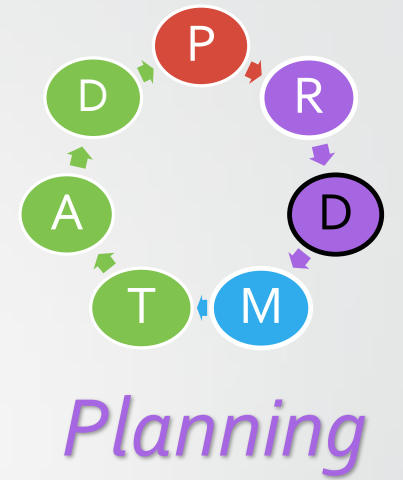
進行研究 開啟

繳交期限: 9月22日

請每位同學自行觀看以下影片及資料, 了解何謂齒輪機械, 馬達, 能量轉換及電磁鐵, 並完成預習。

	EDpuzzle https://edpuzzle.com/assignments/59c2827e207ac940349b23a4/watch
	Power Tech馬達齒輪組組裝技術 YouTube 影片 0 分鐘
	連結 http://www.xypssc.edu.hk/xoops/html/elearning/1415/6c/gs/4/GS6C10B.pptx
	【生活裡的科學】20150129 - 馬達的超級馬力 YouTube 影片 24 分鐘
	預習 Google 表單

Design and Plan



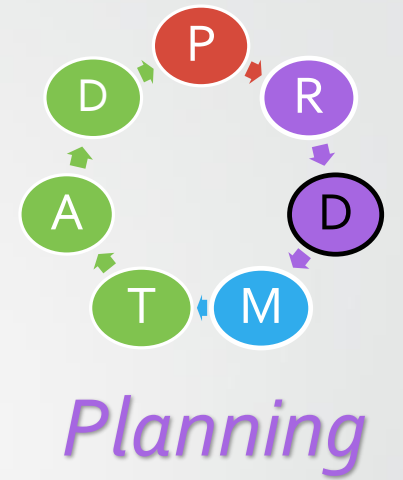
Instructions

- What ideas could you generate about the solution based on knowledge you have gained?
- How to pull together ideas in your group and come up with a feasible design?
- What does your design look like?

Student works

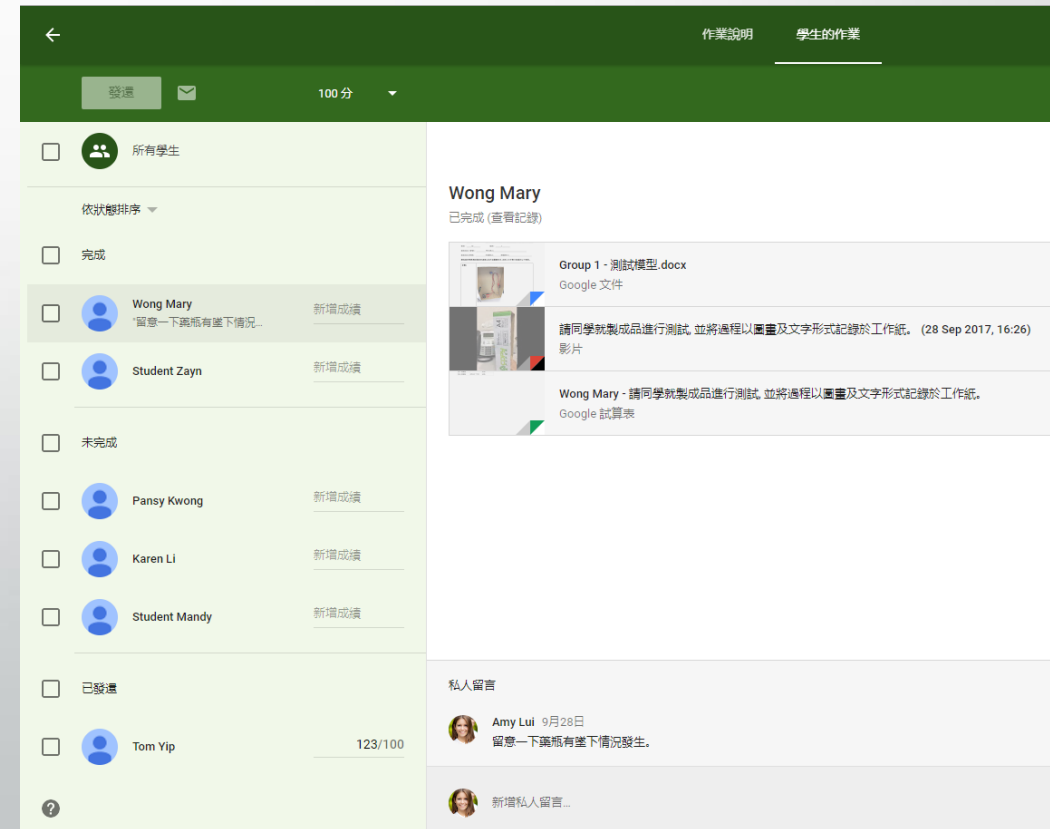
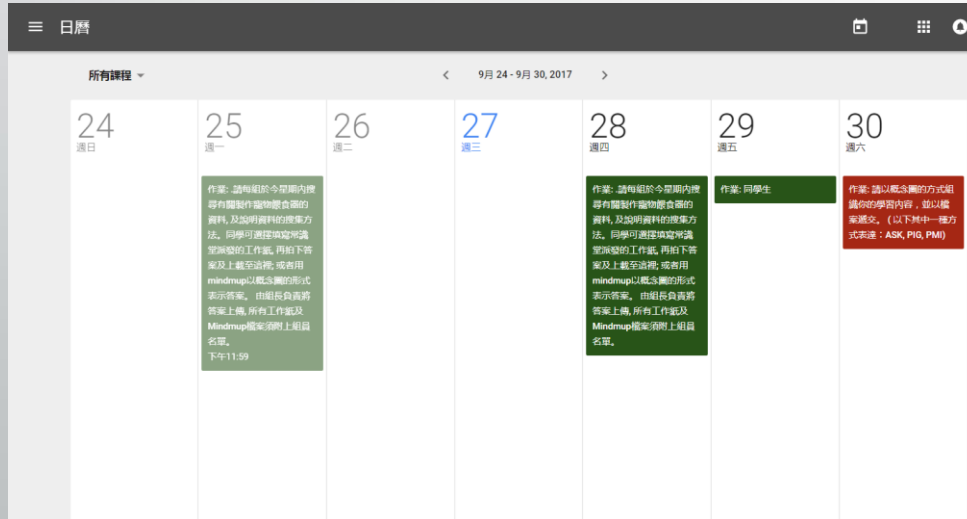
- Annotated drawings of the design (by individuals or groups)

Design and Plan

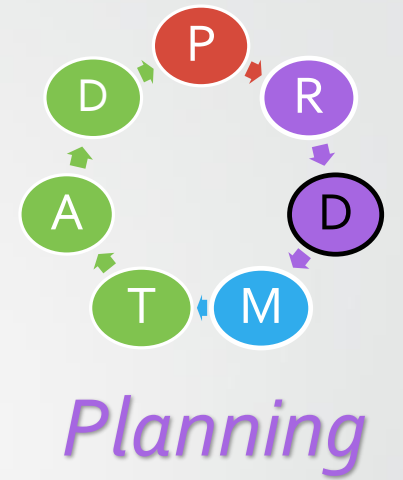


Features provided by E-platform

- Allow the teacher to monitor students' progress and offer help if needed
- E.g. E-Calendar, Online Feedback System

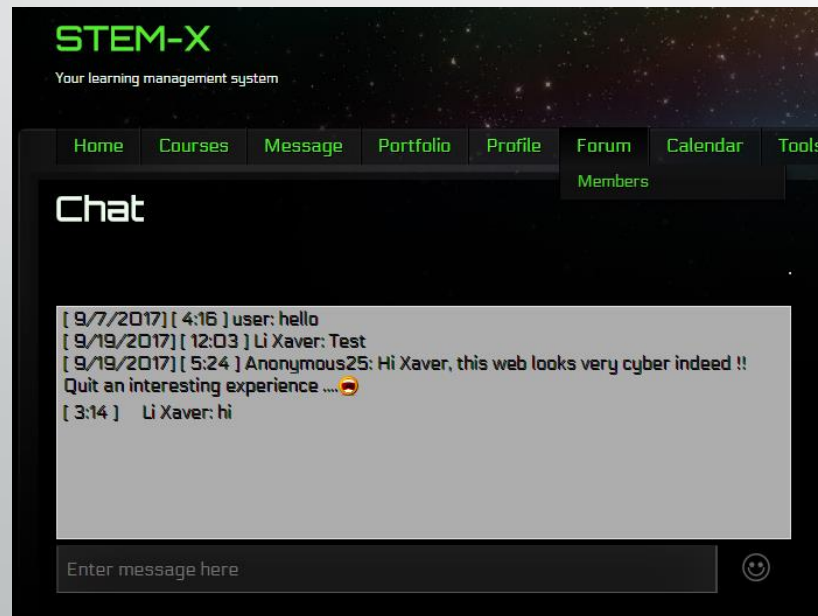


Design and Plan



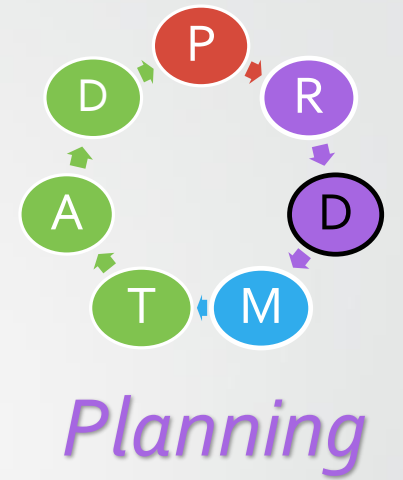
Features provided by E-platform

- Provide an additional channel for students to share their design ideas within the group
- Allow teachers to provide feedback on students' design
- E.g. Discussion forum, Co-working platform



	A	B	C	D	E
1	試記錄至少一組的製成品並在這裡進行評價。				
2					
3					
4					
5	Click on the row you want to respond to and click the respond button. New comments go in column C. Responding to the previous person directly, place comments in column D. Suggestion to click on Column F when you reply.				
6	Email Address	Name or Alias	Response to Question	Response to Comment	Click Here to Respond
7	studentone114@gmail.com	陳麗英	第一組，因為製作十分認真。 第三組，因為看見有一組同樣用microbit控制 跳食器，但不同電線的金線接駁位置互相接 觸，增加發生短路的風險。	為何你覺得第一組十分認真？	
8	studenttwo114@gmail.com	李文昇		大家都需要留意使用電的安全問題。	
9	codingforhandinghw@gmail.com	譚大文	李文昇說得很好!!!		
10	studenttwo114@gmail.com	李文昇	還有第五組的作品很新穎。	t	
11	codingforhandinghw@gmail.com	譚大文	第一組，講程內容簡單，但我希望可以自動化一些	若你是第一組，你會如何令第一組的作品自動化一些？	
12					

Design and Plan



- E.g. File Upload, Peer Assessment Table

Peer Assessment_Electricity_Plan			
File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive			
100% HK\$ % .0_ .00 123 Arial 10 B I S A			
	A	B	E
1	Student Name	Files	Derek
2	Amy	獵鷹X行動方針_Amy.docx	如果以聲音來傳遞訊號，會否讓敵方偵察到呢？
3	Pansy	獵鷹X行動方針_Pansy.docx	設想很周全，而且能夠運用數學科的工具來處理問題
4			

同儕互評表

題目：_____

班別：_____ 組別：_____

組長姓名(學號)：_____

組員姓名(學號)：_____

請每組同學參考其他組別的作品，並選擇其最少一組同學的製成品進行評價。同時，請思考一下如何優化自己組別的設計。

1. 試就一至三組同學的設計進行評價，並在下方作出紀錄。

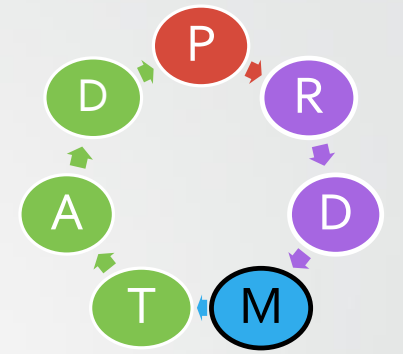
我們看過第____組的設計，因為：

	(評分, 圈出分數, 5為最高, 1為最低)				
配合科學原理程度	1	2	3	4	5
實用性	1	2	3	4	5
創意	1	2	3	4	5
安全性	1	2	3	4	5
容易操作度	1	2	3	4	5

及第____組的設計，因為：

	(評分, 圈出分數, 5為最高, 1為最低)				
配合科學原理程度	1	2	3	4	5
實用性	1	2	3	4	5
創意	1	2	3	4	5
安全性	1	2	3	4	5
容易操作度	1	2	3	4	5

Make Prototype



Implementing

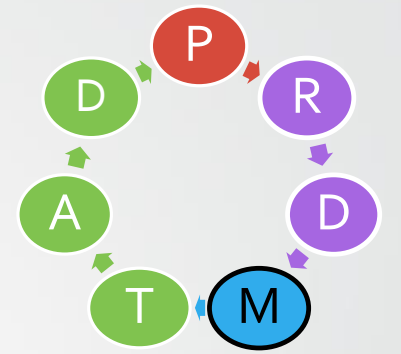
Instructions

- What Resources/materials/tools/instruments do you need to turn the design into a prototype?
- How to get those resources, etc?
- If these Resources are not available, what alternatives will you use?

Student works

- Annotated prototype made by students (in the form of photos, videos showing how the prototype operates)

Make Prototype



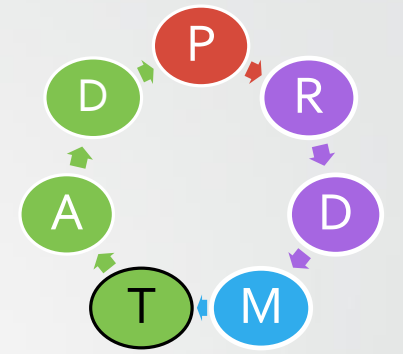
Implementing

Features provided by E-platform

- Allow students to embed videos to explain how their prototype operates

The screenshot displays a user interface for an e-learning platform. At the top, there is a green header with navigation tabs for '作業說明' (Assignment Instructions) and '學生的作業' (Students' Assignments). Below the header, a message in Chinese asks group leaders to upload final solutions as photos or videos and complete self-evaluations. A progress bar shows 3 completed, 1 pending, and 2 returned assignments. A '自我評估' (Self-evaluation) section with a 'Google 表單' (Google Form) link is visible. The main area shows a grid of student submissions for '全部' (All) assignments, including names like Wong Mary, Tom Yip, Student Zayn, Pansy Kwong, Karen Li, and Student Mandy, along with their submission status (e.g., '沒有附件 已完成', 'trim.86F308D4-BC01... 已重交').

Test Prototype



*Reviewing,
Evaluating
and Reflecting*

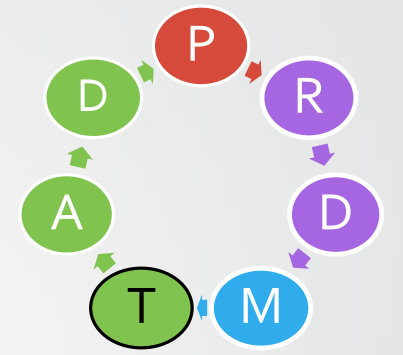
Instructions

- How to test the effectiveness of the prototype against the criteria?
- What parameters do you need to measure?
- How to Measure? What measuring instruments should be used?
- How to present the results?

Student works

- Result of the tests in the form of tables, charts, etc.

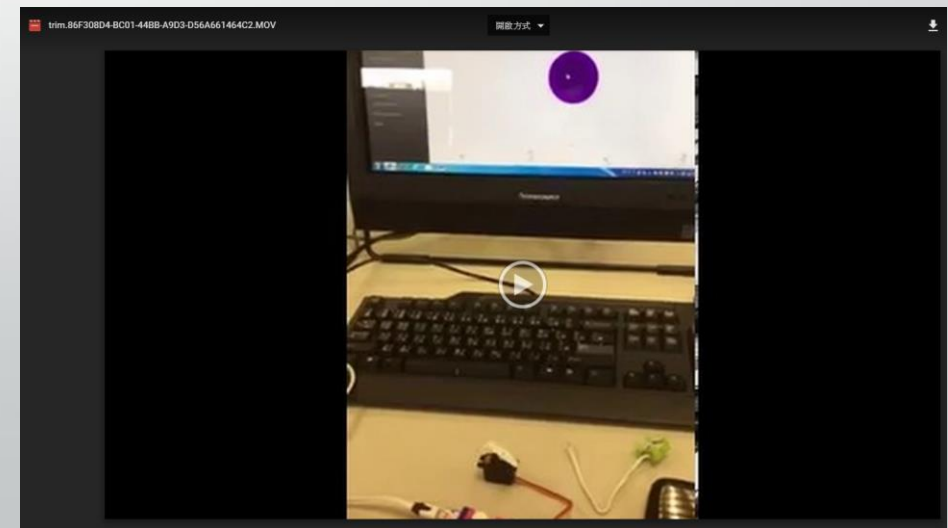
Test Prototype



*Reviewing,
Evaluating
and Reflecting*

Features provided by E-platform

- Allow students to present charts other than tables or hand-written results
- If videos on how the prototype works are uploaded by students, teachers could cross the validity of their results



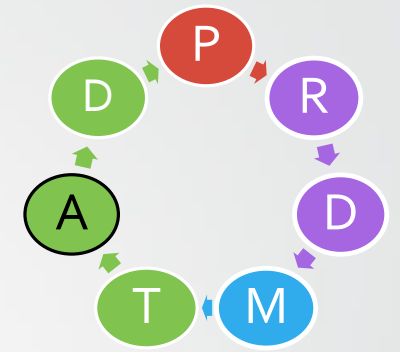
Analyse and Redesign

Instructions

- What do the results tell you about the effectiveness of your solution to the problem?
- Do you think the results are accurate and reliable?
- How to improve your prototype?
- Do you need to change part of the design (e.g. the materials used) or the whole design concept?
- Do you need to do further research before redesigning?

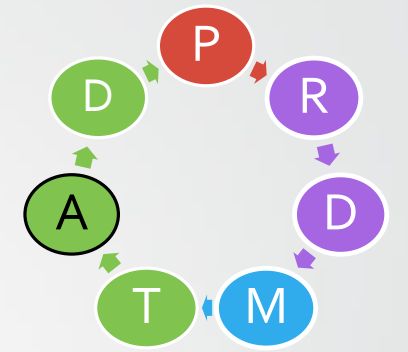
Student works

- Drawing of revised/ new design
- Prototype of revised/ new design
- Results of the tests



*Reviewing,
Evaluating
and Reflecting*

Analyse and Redesign



*Reviewing,
Evaluating
and Reflecting*

Features provided by E-platform

- Allow students to present charts other than tables or hand-written results
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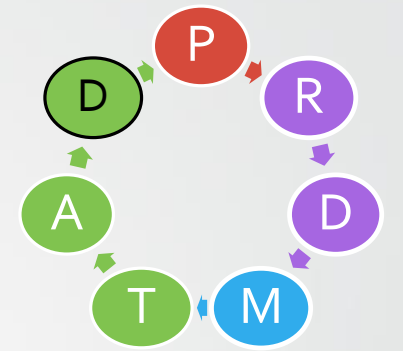
Disseminate

Instructions

- What is your purpose of dissemination of your work?
- How do you disseminate your result?

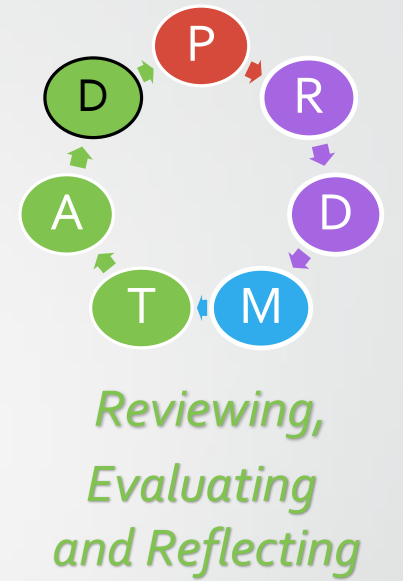
Student works

- Group presentation
- Self-evaluation questionnaire
- Reflective journal



*Reviewing,
Evaluating
and Reflecting*

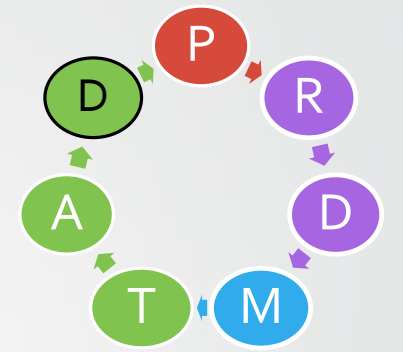
Disseminate



Features provided by E-platform

- Allow students to generate personalized e-portfolios for presentation to other classmates
- The e-portfolio can serve as a record of students process of learning
- Provide an alternative channel for student to share their work with other classmates

Disseminate



*Reviewing,
Evaluating
and Reflecting*

E-Portfolio

- [Sample 1](#)
- [Sample 2](#)
- [Monitoring Platform](#)

王麗美 STEM E-Portfolio

我是王麗美，今年就讀光明小學四年級。這個博客是一個電子學習歷程檔，記載了這幾年我的學習成果及經歷 ^_^

2017年9月12日 星期四

STEM活動—智能家居5

成品及反思

根據上次的測試，以及組員的意見，大家最終都成功製作了一台能順利轉動的饋哺器。真的要鳴謝每位組員的支持，包括英明神武的李文昇組長，同我同名同齡的陳麗美，更加要多謝雷老師的鼎力相助及指導。我很喜歡這類型的課程，因為老師給予很大的空間給我們，各位同學亦可以按自己的時間來完成不同的任務。一個字，非常好！

製成品的影片



最後，雷老師叫我們想一想在這個活動中學習甚麼，我便用了雷老師教過的PMI模型，以及運用網上的Mind Map 工具來組織我的學習內容：



關於我自己

Wong Mary

檢視我的完整簡介

檢視會員

35

誰給小美小小鼓勵：

做得好！

博學精深，佩服用心呀！

還有進步空間，加油！

誰喜歡我的投票

目前投票數：1

投票截止剩餘天數：274

網站存檔

九月 2017 (5)

我的網站清單

鄧永銘老師的Blog | 鄧永銘老師的Blog
分子科學

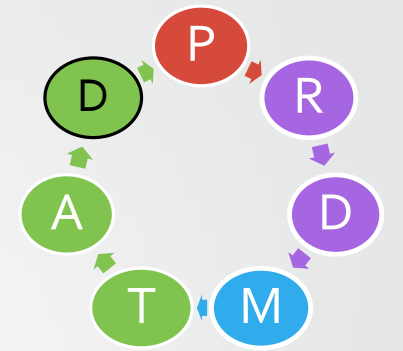
檢舉濫用情形

• 首頁

Disseminate

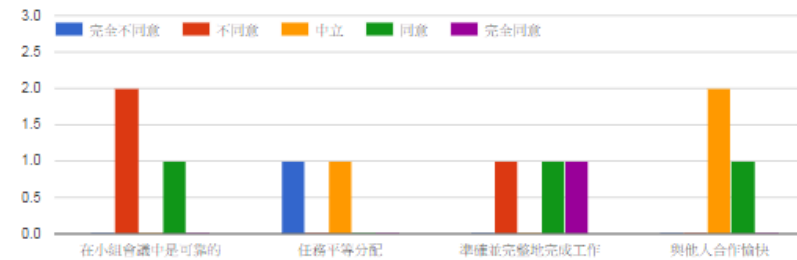
Features provided by E-platform

- Allow for statistical analysis of the outcomes of students' self-evaluation for the whole class

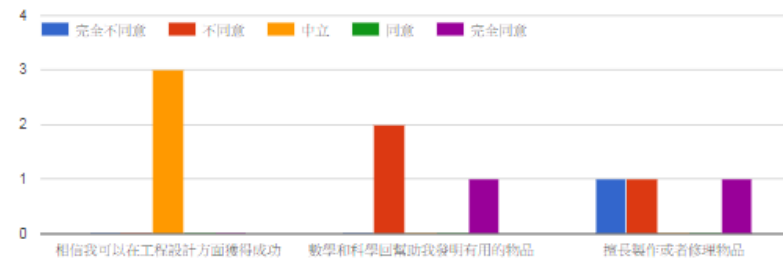


*Reviewing,
Evaluating
and Reflecting*

自我和同儕評估 - 知識及技能



工程與技術 - 態度



Self-direction Learning across School levels

- Self-direction learning should be developed on a continuum:

Low
Strong
Simple

Expectations
Supports
Context

High
Less
Complex

Junior Primary

Senior Secondary

Example

Take STEM project “Smart Home” as an example, the progression of self-directed learning is suggested as follow:

Level	Elementary	Intermediate	Advanced
Complexity	Specific topic e.g. DIY security	Broad topic e.g. Smart Home Design	Interdisciplinary Project studies e.g . Research on age-friendly city and innovative home design
Duration	1-2 week activity	1 month mini-project	6 months project
Voice & Choice	A assigned task with different choices of solutions	List of Choices e.g. Leak detectors, thrmostats, lighting system	Student frames project with teahcer as advisors
Management	Student manage teacher-framed tasks	Students manages project with daily/weekly checking	Student management project with several advisor consultations

Other advantages of using E-platform to assist in self-directed learning in STEM contexts

For Teacher

- Track and monitor students' progress over the project period
- Facilitate interaction between Teacher and Students in the form of Q&A and provision of feedback or information
- Allow for statistical analysis of data
- Showcase e-learning in the school

For Students

- Monitor own progress over the project period
- Enjoy collaboration among group-mates
- Personalize own work in the form of e-portfolios
- Develop ICT competencies and capability of e-learning

Concerns of using e-platform

- Motivation Issues
 - Embedding reward systems, such as ranking, Badges, etc
- System Problems
 - School can choose their platform, and get support from EdUhk
- Technical Issues
 - E-platform set up Guide and support will be provided
- Time Limitation
 - Need time in practice, but save time in using
- Teaching and Learning Culture/School Culture
 - Form a team in school to lead the change



Setting up E-platforms and exemplars