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What is the FLIP Guide?

It is a tool to aid Educators in developing the subject to enable students to take ownership over learning of. It is based on the general principles of a *Flipped Classroom* but the tool's focus is not solely on videos neither is it a guide for Educators on how to make learning videos. Rather, it gives thought to all types of materials (e.g. readings, discussion boards, audio feeds) and encourages Educators to understand and develop communication channels with the students to better understand and respond to their needs.

Expected desirable outcomes

For Educators:

- To arouse student's interest in the subject
- To give student ownership over learning process
- To encourage learning outside of classroom settings, preparing student for the process of life-long learning
- To allow for periodic and continuous assessment, by both Educators and Students, to measure the degree of knowledge

Design of the FLIP Guide

The design of the *FLIP guide* is to enable students to regain confidence in independent learning using the method of a *Flipped Classroom*. It encourages the Educators to implement the *Flipped Classroom*, in part and in moderation, in combination with the traditional lecture, to encourage activity during class time. The tool has three sections—guideline (flowchart), guide, examples—to guide the process of implementation. The guide also included some online resources that educators may find helpful when determining where to search for online learning materials or ways to encourage activity during lectures.

The guide directs the educators to consider four (4) areas during the planning:

1. **F**inding the concept

Finding the concept/topics that students can take over the learning process, start small and simple. Concept/topics should be something that could have been covered in either secondary education or in previous semesters (may be under different subjects)

2. Learning Resource

Identify the types of resources that are required for the learning, types of tasks students should do and where they can acquire the resource. Resources can be online videos, short readings, etc... Tasks can involve students completing online quizzes, writing short summaries, prepare for debates/presentations.

3. Incentive to Learn

Identify reasons for students to learn, what the students should gain out of this exercise. It is recommended to state the purpose/objective of the exercise and what the educators expect of the students.

4. Practice Learning

Educators will need to follow up exercise with in-class activities during lectures. From the activities, educators should be able to identify gaps in students' knowledge. Educators should use the lectures to clear up confusions, or have the students aid one-another to clear up confusion (e.g., let the students teach the class). At this stage, the Educator's role becomes a facilitator to learning.

How to use the FLIP Guide

The guide has three (3) main sections

- Guidelines: Flowchart and guidelines for decision making
- FLIP Guide: worksheet for educators to help structure the class
- Examples: Geospatial discipline specific examples that could implement such process

Educators are recommended to start small, choosing concepts/topics that are likely to have been covered under prior education (from secondary or previous semester).

Share your Ideas

Send us your ideas and share with fellow educators on: Geo-spatial Education Platform: http://www.polyu.edu.hk/proj/gef/ Email: lsgi.gef@polyu.edu.hk

Foundation Topic

Concept/Topic that student can take ownership of learning

Learning Resource

Resources used: What effort should the students put in? e.g. Reading? Watching videos? Online exercise?

Incentive to Learn

Why do the students need to do it? E.g. Graded assessment? For presentation in class? Class debate? Will there be Exemptions?

Practice Learning

Lecture follow-up: What are some of the points that need to be clarified? Did the student works show any gap in knowledge? What activities could be introduced during contact hours for students to apply their knowledge?

Surveying

FLIP Concept: Adjustments

To be carried out by Students.

- Concepts of adjustments
- Types of adjustments
- Mathematical properties of adjustments

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Demonstrating/in-class exercise of adjustment
- Working through example adjustments with the students

FLIP Concept: Error

To be carried out by Students.

- Types of errors
- Sources of errors

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Adjustments to errors
- Network planning (e.g. have students share how they would plan the survey run and allow for class discussion on the pros/cons of the design)

Computing

FLIP Concept: Database Structure

To be carried out by Students.

- Database (internal) structure
- Physical hardware configuration

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

• Compare and contrast different configurations (full class discussion and/or Think-Pair-Share)

FLIP Concept: Data and Database Attributes

To be carried out by Students.

- Types of attributes
- Effect of attributes within database and execution of processes

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Sharing of ideas for database design to accommodate for different types of data
- Demonstration and discussion of errors resulting from mismatch between design of database and data attribute

Underground Utility

FLIP Concept: Radiation

To be carried out by Students.

- EM radiation—how it works
- Physical principles of EM waves

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Application of radiation in the field
- Reading the output, understanding and analyzing outputs

FLIP Concept: Underground Surveying

To be carried out by Students.

• Different method of underground surveying

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Discussion on pros and cons of various methods
- Sharing of ideas on application of methods

Remote Sensing & Photogrammetry

FLIP Concept: Light

To be carried out by Students.

- Properties of light
- How materials absorb/reflect certain wavelengths
- How light reacts in different levels of the atmosphere (or different weather conditions)

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Demonstration on various analytical techniques
- Discussion on applications of Ratios
- Discussions on types of errors that can occur and how to overcome the errors

Visualization

FLIP Concept: Perception

To be carried out by Students.

- Optics
- Perception theories

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Application of perception theories into design
- Discuss various visualization outputs and how it is perceived by viewer (Think-Pair-Share)

FLIP Concept: Maps

To be carried out by Students.

- Types of map projections
- Characteristics of maps
- Different elements on a map
- Theory of map making

LECTURE/IN-CLASS:

To be carried out by Educators during assigned contact hours.

- Application and use of different types of maps and styles of projections
- In-class debate on pros and cons of different types of projections
- Demonstration of methods on how a map (or its projection) is created