MINISTRY OF EDUCATION, YOUTH, & SPORT

IMPLEMENTING PROJECT WORK

Useful Session Plans for Trainers

PREPARED BY
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PREFACE

The present manual on Project Work Methodology has been developed by the Ministry of Education, Youth, and Sport to assist local educators to transition from textbook-driven learning to more 'applied learning' in which students have the opportunity to use what they learn in concrete contexts. The education system considers this transition to applied learning to be essential, as Cambodian society adjusts to both the social and economic demands of the 21st Century. Although the Project Work Method is not new to Cambodia, its adoption by the education system has generally been limited to a few programs and projects such as New Generation Schools. The Ministry of Education, Youth, and Sport, however, would like to promote more systematic adoption of this methodology to schools at all levels. The introduction of this manual, therefore, marks the beginning of a more systematic campaign to foster the more widespread use of this methodology to complement other new methods of teaching such as Inquiry-based and Problem-based Learning. The manual is very 'user friendly' in its organization and consists of both session plans for trainers and course materials for participants. These features make this manual an ideal resource document to use in many contexts such as national workshops, Teacher Training Institutes, and school-based Continuous Professional Development activities. It is, therefore, the hope of the Ministry that this document will be an important resource of the education system to help modernize teaching practice in all of the Kingdom's schools.

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1. INTRODUCTION

1.1 Overview of This Manual

The present manual provides a concise overview of key techniques that educators can use to implement Project Work Methodologies (PwM) in their school. Project Work is a methodology that has existed for many decades to help deepen students' understanding of the various principles that they learn in different subjects (see Box 1 for a definition). This methodology has several key characteristics such as the following:

- Entails collaborative inquiry
- Uses applied learning
- Requires problem-solving and critical thinking skills in realistic settings
- Encourages research
- Is versatile and can be used across multiple subjects
- Results in the creation of concrete knowledge products

What is the Project Work Method?

The Project Work Method is a teacher-facilitated collaborative approach in which students acquire and apply knowledge and skills to define and solve realistic problems using a process of extended inquiry or research. Projects are student-centered in their implementation, following standards and milestones that are clearly identified.

As Cambodia's education system seeks to better address the learning needs of a new century that places more and more emphasis on 'applied learning,' the importance of Project Work as a learning technique has steadily increased. This is because it helps to facilitate the creation of structured tasks that promote student learning beyond the textbook. In such cases, we say that students use learned principles to 'create' or 'construct' new knowledge. Thus, the Project Work Method models a philosophy of education known as *Constructivism* in which students do more than just memorize facts and principles but create new knowledge in the form of projects.

A Khmer Language Project: *A teacher provides guidance to students to research the origins and evolution of the Khmer Language by reproducing an ancient inscription copied from a local Prasath.*

This manual has been organized to include both **Session Plans** for prospective trainers who are tasked by the Ministry to disseminate the use of Project Work Methodology to various schools as well as a set of **Course Materials** that trainers can share with workshop participants. This

ensures that participants have proper reference materials, which they can review following the completion of the workshop. The developers of this manual have tried to avoid the use of dense narrative that is difficult to understand and even more difficult for prospective trainers to share with teachers and other educators at school level. Thus, the manual provides clear guidance to trainers about how to use concrete activities and materials to ensure that trainees acquire a good understanding of what the Project Work Method is and how it is applied and evaluated.

1.2 Purpose and Content of This Manual

The purpose of this manual is to provide some structured guidance to Facilitators who have been selected to train teachers on how to implement Project Work Methodologies using concrete explanations, practical examples, real case studies, and other training tools. The manual contains a set of 11 user-friendly *Session Plans* to guide Facilitators in presenting a practical training program to introduce stakeholders to some of the basic concepts of Project Work. The content of these modules is explained in Box 2. Each session plan includes the following information:

- Learning objectives
- A suggested timeframe for each training session
- A statement of preparation required to deliver each training session
- Implementation process
- A list of useful materials and resources to facilitate training. In this respect, it should be noted that the manual contains a set of *Participant Course Materials* that should be given to stakeholders participating in the training program so that they can use these as reference documents after the conclusion of the training workshop.

BOX 2: Summary of the Modules in this Manual

PART 1: The Theory Underpinning Project Work

3.1 Why There is a Need to Use Project Work Method in Our Teaching – This module traces the origins of Project Work Method and how it has evolved to meet the needs of a 21st Century society.

3.2 What is Project Work Method? – This module provides a clear summary of the key characteristics of the Project Work Method and how they contribute to applied learning.

3.3 Linkages between Project Work Method and Other Similar Methodologies – This module helps to explain the linkages of the Project Work Method with other similar methods and how it exemplifies a philosophy of Constructivist Learning.

PART 2: Practical Applications of Project Work

3.4 General Steps in Implementing Project Work Method in the Classroom – This module explains the process of organizing Project Work starting from the selection of topics, the organization of groups, the use of research techniques, setting of milestones, and the final creation of a unique product.

3.5 Kinds of Project Work Presentations and How to Organize Them – This module provides guidance about how Project Work Presentations can be woven into the learning context such as through school-wide project fairs, bulletin board exhibitions, classroom-based presentations, etc.

3.6 Needed Institutional Support to Facilitate Implementation of Project Work Method –This module provides guidance to schools about how to support the implementation of Project Work such as classroom organization, the organization of timetables, budgetary support, access to materials, the role clubs can play, etc.

3.7 Effective Organization of Project Work Teams – This module reviews special techniques used in organizing student groups so that there is a clear division of labor and maximum engagement from all team members when undertaking Project Work activities.

3.8 Effective Use of Resources for Project Work – This module provides guidance on the effective use of material, budgetary, time, technological, and other resources so projects are feasible, even when such resources are in short supply. The module also specifically provides guidance on how to organize resources to implement Project Work Fairs.

3.9 Possible Variations in Project Work by Subject – This module provides guidance about how Project Work activities may vary by subject as well as concrete examples of subject-specific Project Work.

PART 3: Evaluating Project Work

3.10 Different Techniques that Can Be Used to Evaluate Project Work – This module seeks to help teachers use various techniques in assessing Project Work including dynamic, process-oriented, informal, or portfolio-based strategies.

1.3 Intended Applications of This Manual

A Manual for Generic Use: This manual has been designed for generic use in many contexts. It may be used by trainers working at provincial and district level or it may be used by project-based trainers who are implementing a specific project. Although the manual was originally designed for schools at secondary school level, there is no reason that it cannot also be used for primary schools, as well. Each module in this manual is organized sequentially starting with topics on the most basic concepts of Project Work and ending with topics on actual application and evaluation. Nevertheless, Facilitators may also pick and choose specific modules relevant to their situation and need not necessarily teach every module from first to last.

Project Work at Primary School Level: *A group of Grade 4 children shows a device that uses the downward force of gravity on water to move the device forward. Even young children can work together to create simple projects.*

Subject Applications: It is commonly thought that Project Work is best used with the STEM subjects, since these subjects lend themselves well to the development of concrete projects. While the Project Work Method is well suited to promote applied learning in the sciences, it can also be used effectively in many other subjects such as Khmer Literature, Foreign Languages, Mathematics, Social Studies, Civics, and other subjects.

Seeking Ways to Accommodate Variability between Schools: Project Work Methods work best in schools that have adequate resources to support research, the procurement of materials, and facilities that promote applied learning. This refers in particular to the availability of a functioning library, science and ICT labs, as well as access to the internet. Although many schools may not have these resources, it is still possible to implement Project Work Methods, but in a more basic form using whatever simple materials are at hand. Educators must, therefore, be thoughtful about the extent to which they can employ Project Work Methods based on the actual context of the school. It is, therefore, very important to accommodate variability between schools by using a "graduated" or "levelled" approach when implementing Project Work Methods. One suggestion is to organize Project Work implementation into different levels of actual practice such as "advanced", "intermediate", and "basic", as per the school classification system outlined in the Child Friendly School (CFS) Policy. Depending on the enabling environment, schools may move from one level to another, as the implementing context improves. This gradual incremental approach helps schools to organize practical applications of Project Work Methods based on a proper assessment of what is possible.

Organizing Participants: A final key issue to note in using this manual is to determine who your audience is, because it may affect the way that Facilitators organize the delivery of the modules. For example, the best way to deliver this manual is to work directly with stakeholders at the level of the school. By constructing the audience in this way, Facilitators will avoid a cascade model of content delivery and go directly to all stakeholders at the same time.

Some General Guidelines for Organizing the Workshop: The following are some general recommendations for organizing the workshop so that the delivery of content is most effective.

- ***Guideline 1:*** This manual is best used with small groups of participants. The ideal number of participants in a workshop using this manual is between 30 and 40 persons. Anything more than this number is likely to mute the effectiveness of module delivery.
- ***Guideline 2:*** When participants arrive for this workshop, the Facilitator should organize them into permanent groups of 6 to 10 people. The ideal number of groups is 4 or 5 in any given workshop. Placing participants into groups will help facilitate the delivery of each module because small group work is a key strategy for participant learning. Using permanent groups reduces the potential for confusion; helps participants to develop relationships with each other; and fosters a greater sense of trust.
- ***Guideline 3:*** When organizing participants into groups, try to ensure that groupings are homogeneous. For example, do not mix teachers and school administrators when forming groups because the latter may dominate the former during discussions. Similarly, try to assign teachers who are teaching the same or similar subjects to the same group. Do not mix science teachers with literature teachers or vice versa.
- ***Guideline 4:*** While the session plans provided in this manual are for the Facilitator(s), the course materials in Section 4 are intended for the participants so that they will have useful reference documents to take home with them. In order to help participants organize the course materials that they receive, each participant should be presented with a ring binder notebook in which they can store all handouts neatly and in a way that is easy to access.

With the above provisos in mind, MoEYS hopes that this manual will provide a sound guide for Facilitators throughout Cambodia to tailor Project Work implementation to their specific situation and context.

An Example of a Simple Project: *Students explain a project during a Project Work Fair on the Principle of Capillary Action, which plants use to absorb water and spread it up the stem and into the leaves. This project required only some local plants, glasses, water, and food coloring, but helped students to better grasp an important biological principle.*

2. EXPLANATION ABOUT HOW TO USE THIS MANUAL

2.1 Standard symbols

This manual uses the following standard symbols to make the manual as user friendly as possible for the Facilitators using it. These symbols quickly convey the kinds of activities to be used with participants for each step of each session plan.

Timing Required for the Lesson

Facilitator Preparation: Contains information on how to set up your training area for learning activities. It also gives suggestions on how to organize materials needed for the activity.

Materials Needed: This provides an overview of necessary materials. Most of the time, these will be very basic things, like pens or paper. Other material in the training sessions will be provided through handouts that are attached in this manual. In general, handouts need to be duplicated by the Facilitator.

Learning Outcomes: Gives a statement of what should have been achieved and assessed at the end of the session.

2.2 Steps and Process Icons

Section 3 of this manual provides a series of training sessions on how to train teachers who are expected to employ Project Work Methodologies in their schools. The symbols below are used to help guide the actual training session. These symbols will tell the Facilitator quickly what sorts of activities need to be planned for in this part of the training session. This section of the manual includes possible activities, stimulating questions, examples to clarify exercises and optional extra tasks. Although it is advisable to read through the whole lesson clearly from the beginning, especially when used for the first time, Facilitators can easily see what he or she has to do because of the icons used.

Action to be Taken: This symbol indicates that the Facilitator must take a concrete action such as passing out a Handout, re-arranging desks, organize groups, etc.

Questioning Behavior: This indicates that the Facilitator needs to ask a key question to the participants as a prelude to an activity or discussion.

Discussion: This symbol indicates that the Facilitator must lead a discussion or allow participants to discuss something in their groups.

Writing Tasks: This symbol indicates that the participants need to write something on poster paper, complete an exercise, or other written task.

Explanation: This symbol indicates the Facilitator must explain something to participants.

3. Facilitator Session Plans

Lesson 3.1 Why There is a Need to Use Project Work Method in Our Teaching

Summary: This module traces the origins of Project Work Method and how it has evolved to meet the needs of a 21st Century society.

Lesson Time: 4 hours

Facilitator Preparation:

- Write up the key objectives of the session on a sheet of poster paper so that these can be placed on the blackboard for explanation.
- Make copies of **Handout 1a:** *Some Key Facts about Project Work and Where it Came From*
- Make copies of **Handout 1b:** *Why Is Project Work So Popular in the 21st Century?*
- Make copies of **Handout 1c:** *The Evolution of Project Work from Its Beginnings Until Now*

Resources/Materials:

- Poster Paper, Marker Pens, Tape
- Poster Paper summarizing the learning outcomes of the lesson
- **Handout 1a:** *Some Key Facts about Project Work and Where it Came From*
- **Handout 1b:** *Why Is Project Work So Popular in the 21st Century?*
- **Handout 1c:** *The Evolution of Project Work from Its Beginnings Until Now*

Learning Outcomes:

1. Participants can explain the various types of Project Work in terms of their key differences.
2. Participants can explain how projects may differ in terms of their practical significance after the conclusion of the project.
3. Participants can identify the advantages and disadvantages of the various types of Project Work Methods based on their understanding of the Handouts and workshop discussions.
4. Participants can create tables that demonstrate how a 21st Century learning environment interfaces with the various characteristics of Project Work.
5. Participants can explain how Project Work has evolved over the years and what forms are most suited to the Cambodian context (Optional).

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the module. Explain the outcomes and that this is what the participants should be able to do at the completion of the module.

Determining a Baseline of Participant Knowledge

The Facilitator should next introduce participants to some of the basic facts about Project Work. Before beginning this part of the module, it might be helpful for the Facilitator to get a sense of how many participants have actually ever heard of this methodology. Take a quick show of hands among participants to see how many of them have ever heard of project work. Draw the following table on the board and complete after asking participants this question. This should give the Facilitator an idea of how quickly he/she can review the information provided in the handouts. Another way of doing this activity is to ask participants to come up to the front of the room one by one with a marker pen and mark where there knowledge lies. Then tabulate the results to assess participants' familiarity with Project Work Method.

How many of you have ever heard of Project Work Method?					
I have heard of it and understand it.	%	I have heard of it but don't understand it well.	%	No, I have never heard of it.	%

Some Key Facts about Project Work

Following the rapid survey of participants' familiarity with project work method, distribute **Handout 1a:** *Some Key Facts about Project Work and Where it Came From.* This handout provides concise definition of Project Work and some key facts about its **Origins, Different Types** of Project Work Methods, and **Key Traits.** When reviewing this handout with participants, the Facilitator should point out that there are some bold-face terms to highlight in the definition provided including:

Collaborative Approach. Apply Knowledge & Skills. Research. Milestones

Guided Discussion Points on Definition & Key Traits of Project Work

The Facilitator should spend some time explaining these ideas in the definition. Use the explanations and guided questions given below to help participants to reflect on the explanations provided. Here are some helpful points to help Facilitators to provide cogent explanations and lead a guided discussion using the questions provided.

- ***Collaborative Approach:*** This is an important aspect of Project Work because students learn from each other and develop teamwork skills at the same time. Such skills are considered to be very important skills for the 21st Century.

Question for Discussion: What things do you think students can learn from each other? (e.g., different perspectives on an idea, different things they may have found online, etc.).

- ***Apply Knowledge & Skills:*** This aspect of Project Work helps students' understanding to move beyond what they might get from a lecture or simple book-learning by having the opportunity to actually 'use' what they learn in a real setting.

  Question for Discussion: Can you give some examples of actual knowledge/skills students might be able to practice in a project? (e.g., using a thermometer to measure temperature, mixing chemicals, using rules of story organization to write a real story, using debating or public speaking skills, etc.).
- ***Research:*** This aspect of Project Work gives students the opportunity to use internet search engines or library books to find information relevant to their project and synthesize it into a coherent whole.

  Question for Discussion: What thinking skills from Bloom's Taxonomy do you think students acquire when they do research? (e.g., they have to use 'analysis' to determine which information is relevant to their project and which information is not so relevant; they have to be able to 'synthesize' different information into a whole, etc.).
- ***Milestones:*** Project Work requires students to define clearly what the final product of their activities will be. Defining milestones teaches students to use goal-directed planning to achieve the milestones that they set.

  Question for Discussion: What implications do you think that setting milestones has for a teacher's ability to evaluate a project? (e.g., when students set clear milestones for a project, it is easier for a teacher to evaluate it because they can check which aspects of the project have been achieved and which aspects have not been achieved.).

Following the above discussion, the Facilitator should next discuss the **different types of Project Work Methodology** as it has evolved since the 1920s when it first came into general use in formal education systems. Some important questions (and answers) that participants may have about these different iterations of Project Work are provided in p. 2 of the Handout. Review these questions and answers together. Although all Project Work Methodologies promote collaborative activities that end in a product or project, the Facilitator should highlight the key differences as follows:

- Some methods encourage projects at the end of the study unit while others start at the beginning and students learn principles and skills as they go.
- Some methods require projects to have practical significance even after the project ends while others do not. Here are two examples below that the Facilitator can use to help explain these differences to participants:
  - **Example 1:** A student group creates a mechanism that can detect moisture in the soil. When the soil is dry, the mechanism activates a device that releases water to ensure that garden plants have enough water to grow. *https://www.facebook.com/NGSAction/videos/540970754473055*

- **Example 2:** A group of students creates a project that demonstrates the capillary action of plants when they absorb water. To demonstrate the principle of capillary action, they place different plants in glasses with colored water and watch the plants turn into a different color as the colored water is ingested by the plants. Although this project has no practical use after its completion, it helps students to better understand the principle of capillary action.

Review the examples provided above by going over the case studies that are described in Handout 1a.

The Advantages & Disadvantages of Different Kinds of Project Work

Following the discussions and explanations above, ask participants to work in their groups and to determine what they think might be the advantages and disadvantages of the various kinds of project work methods that have been presented. This exercise requires participants to consider what they know so far about each method and infer what might be the advantages and disadvantages, especially when they try to apply them in their individual schools. Encourage participants to think about key factors such as time required, budgetary and material resources, the flexibility of school timetables, the management intensity of each project, etc. Participants should summarize their analyses in a matrix like the one shown in Handout 1a. To facilitate this task, the Facilitator should pass out marker pens and a sheet of poster paper to each group. Provide about 30 to 40 minutes to participants to complete this exercise.

When groups have completed their analyses, ask a member of the group to present their findings to the large group. The Facilitator may use the example of advantages and disadvantages provided below to help assess group findings.

Advantages and Disadvantages of Different Kinds of Project Work Methods

Methodology	Advantages	Disadvantages
Project Work (Basic)	▪ Takes less time to complete because it comes at the end of study unit. ▪ Can often be done with few resources and little budget. ▪ Easier to do within the rigid timetable of the school. ▪ Does not require very high understanding of project method on the part of the teacher.	▪ Does not provide as much depth of understanding as other project methods. ▪ Does not easily address practical problems in the school environment. ▪ Such projects may be 'too easy' for some students who are not challenged by the project.
Project-based Learning	▪ Provides greater depth of understanding for students. ▪ Can address practical issues within the school environment. ▪ Completing a project of great depth	▪ Uses a great deal of time to complete ▪ Requires significant amounts of resources and budget. ▪ Requires a great deal of

Methodology	Advantages	Disadvantages
	and complexity will give students a greater sense of accomplishment and satisfaction when it is completed.	management and oversight on the part of the teacher. ▪ Difficult to undertake within the rigid timetable of the school.
Problem-based Learning	▪ Provides greater depth of understanding for students. ▪ Can address practical issues within the school environment. ▪ Completing a project of great depth and complexity will give students a greater sense of accomplishment and satisfaction when it is completed.	▪ Uses a great deal of time to complete ▪ Requires significant amounts of resources and budget. ▪ It must be difficult to find practical problems in the local environment that can be solved through a short-term project. ▪ Difficult to undertake within the rigid timetable of the school.

Why Is Project Work So Popular in the 21st Century ?

In the present session, the Facilitator seeks to help participants understand why Project Work has undergone a revival in terms of its popularity in the 21st Century. To help participants understand why there is a strong focus on Project Methods in the 21st Century, pass out **Handout 1b:** *Why Is Project Work So Popular in the 21st Century?* This handout summarizes some of the key differences between education in the 20th and 21st Centuries according to some key parameters such as Concept of Learning, Curriculum, Assessment, etc. Review these differences as a large group. A key point that the Facilitator should stress is that HOW students learn is today much more important than WHAT students learn. The reason for this is that knowledge in the 21st Century changes very quickly, much faster than was true in the 20th Century. Thus, Learning How To Learn is much more important than What We Learn.

Next, the Facilitator should explain to participants that we see many ways that Project Work Method traits interface well the characteristics of education in the 21st Century. If we consider the list of Project Work Method traits below that we have already discussed, we can see many points of intersection with 21st Century Education. Pass out a sheet of poster paper to each group and ask them to draw the matrix given in Handout 1b and classify each of the Project Work Method traits given below with a facet of 21st Century Education given in the second column of the matrix. Give participants about 25 to 30 minutes for this exercise. A trait may be used for more than one parameter.

Focus on Applied Learning Student Research Resource Intensive
Collaborative Learning Requires Space for Investigation
Team-Work Focus on Creative Products

Parameter	21st Century Education	What Project Work Traits Are Implied by the Characteristics of 21st Education?
1. Concept of Learning	▪ Learning to Learn ▪ Active Learning ▪ Applied Learning	▪ Focus on Applied Learning
2. Curriculum	▪ Individualized ▪ Research-driven	▪ Student Research

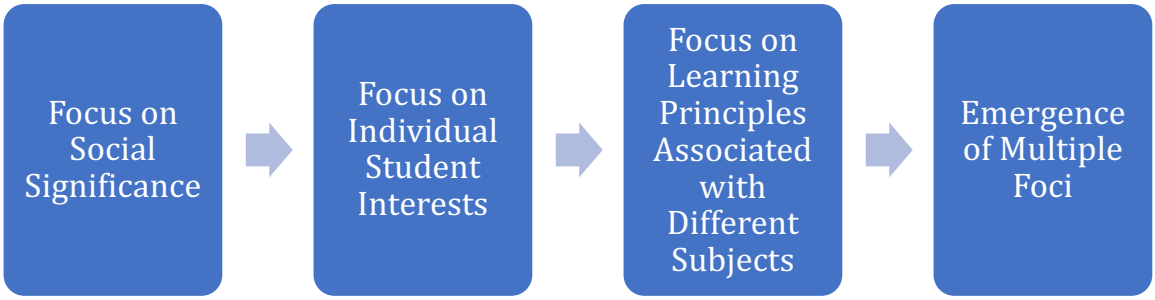
Parameter	21st Century Education	What Project Work Traits Are Implied by the Characteristics of 21st Education?
	▪ Internet-driven	
3. Assessment	▪ Portfolio-driven ▪ Project-driven	▪ Focus on Creative Products
4. Classroom Organization	▪ Flexible ▪ Organized for Group & Collaborative Learning ▪ Resource Rich	▪ Collaborative Learning ▪ Team-work ▪ Requires Space for Investigation ▪ Resource-intensive
5. School Organization	▪ Networks and Relationships	▪ --
6. Educational Philosophy	▪ Dynamic ▪ Non-conformist ▪ Creative	▪ Focus on creative products
7. School Architecture	▪ Dynamic ▪ Unstandardized ▪ Diverse Facilities Foster Research, Experimentation, & Collaborative Learning	▪ Focus on Applied Learning ▪ Student Research ▪ Requires Space for Investigation ▪ Collaborative Learning

When participants have completed the exercise, ask them to present their analyses to the large group. If different groups arrived at different classifications, ask them to justify the differences and discuss. Some sample answers are provided for the Facilitator in the matrix above to help guide the discussion. It is acceptable if participants have identified classifications that are different from those given above, as long as they can logically justify their classifications.

The Evolution of Project Work from Its Beginnings Until Now (Optional)

Note: *The present session is optional. Its main focus is on the historical evolution of Project Work from the 1920s until now. Although it is not essential for participants to know about this history, it might help them to better understand why Project Work has so many different forms today.*

The Facilitator should start this session by passing out **Handout 1c:** *The Evolution of Project Work from Its Beginnings Until Now.* Review the handout contents with participants, focusing on key changes that occurred to Project Work from one decade to the next. Use the graphic below to help summarize this evolutionary change:



The Facilitator should note that some of the arguments that occurred among 20th Century educators when Project Work was still evolving were quite bitter. For example, John Dewey who was an American educator often known as the 'Father of Project Work Method' had rejected Project Work as a viable method in the 1940s. He believed that modern educators had moved too far away from the original idea of Project Work with its focus on teaching principles of cooperation, democratic organization in groups, civics, etc. He believed that catering to student interests without regard to the social purpose of project work undermined the whole philosophy of Project Work. We still see this division today with some educators maintaining that Project Work must have practical significance (e.g., Problem-based Learning/Project-based Learning) while others believe that it is enough if a project helps students to better understand a principle discussed in the textbook (Basic Project Work Method).

Following this discussion, bring the attention of participants to the questions at the end of Handout 1c. Ask participants to discuss these questions in their groups and make notes about their opinion about each. After about 15 minutes, lead a discussion with the whole group about possible answers to these questions. Some notes are provided for the Facilitator in italics to help him/her to lead the discussion in the large group.

Question 1: Why do you think early educators in the 1920s supporting Project Work methods at its beginning thought that it was so important for projects to have practical social significance, especially as this related to efforts to support such issues as civics and social responsibility?

Possible Answer: *Project Work was a methodology that was promoted by progressive educators of the early 20th Century. For them, learning about civics, democracy, and cooperation was as important if not more important than subject-specific curricular topics. This was particularly true in the time between the two world wars (1919 to 1938) when democracy was once again under attack. Thus, it is not surprising that having a social significance dimension was a key element of Project Work Method at that time.*

Question 2: Why do you suppose that later educators (1930s and 1940s) thought that it was not so important for student projects to have practical social significance?

Possible Answer: *At the time many educators probably felt that limiting project work to only activities of social significance was too limiting. It must have been difficult for teachers to identify such projects for every student in their class and inefficient to focus on one key dimension of students' learning. It must have seemed a much more efficient use of their time in organizing projects to focus on students' interests in particular subjects to help them achieve deeper understanding of their lessons.*

Question 3: Do you think that it is a good thing or a bad thing that Project Work Method has splintered into several different methodologies in the 21st Century? Explain your answer by also reflecting on the situation in Cambodian schools today.

Possible Answer: *The emergence of multiple types of Project Work with different foci is probably helpful for educators in today's world. Having a diversity of project work methodologies helps to accommodate the very different conditions that exist*

at different schools. Some schools with flexible timetables and access to many resources likely appreciate a type of Project Work Methodology that can achieve high quality learning but that also requires lots of time and resources. On the other hand, schools that lack both time and resources for Project Work probably appreciate having a Basic Project Work alternative to Project-based and Problem-based learning.

Lesson 3.2 What is Project Work Method?

Summary: This module provides a clear summary of the key characteristics of the Basic Project Work Method and the teacher activities that they imply to achieve applied learning. In this respect, it builds on the discussion of methodological traits discussed in the previous module. The module also helps participants to analyze Project Work Method and more Traditional Teaching Methods in terms of both the advantages and disadvantages of each.

Lesson Time: 2.5 hours

Facilitator Preparation:

- Write up the key objectives of the session on a sheet of poster paper so that these can be placed on the blackboard for explanation.
- Make copies of **Handout 2a:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply*
- Make copies of **Handout 2b:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply* (Exercise Answers)
- Make copies of **Handout 2c:** *Comparing Project Work Method with More Traditional Teaching Methods*
- Make copies of **Handout 2d:** *Comparing Project Work Method with More Traditional Teaching Methods* (Exercise Answers)

Resources/Materials:

- Poster Paper, Marker Pens, Tape
- Poster Paper summarizing the learning outcomes of the lesson
- **Handout 2a:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply*
- **Handout 2b:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply* (Exercise Answers)
- **Handout 2c:** *Comparing Project Work Method with More Traditional Teaching Methods*
- **Handout 2d:** *Comparing Project Work Method with More Traditional Teaching Methods* (Exercise Answers)

Learning Outcomes:

1. Participants can name the key characteristics that define Project Work Teaching Method.
2. Participants can indicate the teaching actions or techniques implied by specific characteristics of the Project Work Teaching Method.
3. Participants can create a matrix that describes the advantages and disadvantages of Traditional Learning Strategies and Project Learning Strategies.

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the module. Explain the outcomes and that this is what the participants should be able to do at the completion of the module.

Understanding the Traits of Project Work Method in Terms of the Teacher Actions That They Imply

This session builds on the discussion of methodological traits of Project Work that was touched on in Module 3.1. The Facilitator should begin this session by passing out **Handout 2a:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply.* Emphasize that the focus of the workshop is mainly on Basic Project Work Method, which is easier to apply than other methods. Review once again the key traits of the Project Work Method in the diagram provided in the handout.

Following this review of Project Work traits, the Facilitator should point out that these methodological traits imply certain actions on the part of the teacher when organizing Project Work in his/her classroom. A list of such actions is provided on p. 2 of Handout 2a. The Facilitator should explain one or two such actions in the list provided just to be sure that participants understand what they are trying to describe. Next, the Facilitator should distribute a sheet of poster paper to each group. Participants should draw the matrix provided at the bottom of the handout onto the poster paper and then classify each action according to the trait with which it seems to be associated. Provide about 30 to 40 minutes for this exercise.

Project Work Method Characteristics	Implied Teacher Actions (Answers)
Collaborative Learning & Group Work	▪ *Provide guidelines for students to form their groups (e.g., self-selection, teacher-assigned, etc.)* ▪ *Guide students to create a division of labor within the group so that everyone is involved in the activity.*
Applied Learning	▪ *Provide examples of how concepts and principles are used in realistic settings (e.g., lab work, demonstrations, etc.).* ▪ *Give choices of project topics to student groups that imply applied learning.*
Problem-solving in Realistic Settings	▪ *Guide students in the identification of clearly defined problems.* ▪ *Guide students in the development of hypotheses to solve real problems.* ▪ *Guide students in identifying the steps needed to test a hypothesis.*
Encourages Research	▪ *Provide guidance students on how to use the library.* ▪ *Provide guidance to students on where to find needed resources (e.g., resources to do an experiment.* ▪ *Provide time for students to meet in their groups outside of the classroom.*
Leads to Completion of a Concrete Product	▪ *Provide resources/budget to students to make or create their projects.* ▪ *Help students to plan out the steps they need to follow to complete their project.* ▪ *Provide time to students so that they can demonstrate/explain their project.*

Project Work Method Characteristics	Implied Teacher Actions (Answers)
	▪ *Organize events in which students can demonstrate/explain their project.*

When participants have finished their classifications, ask each group to post their matrix on the white board so that other groups can examine them. The Facilitator should note differences in classifications between groups and ask the groups to justify why they classified some actions differently. Such discussions will help participants to better understand the meaning of each action and how it reflects the process of organizing Project Work in one's class.

Next, the Facilitator should distribute **Handout 2b:** *Key Characteristics of Project Work Method and the Teacher Actions that They Imply (Exercise Answers*) (see the table provided above). This handout provides a nominal classification of the actions provided in the earlier handout. Compare this classification with those done by other groups and note where the classifications are the same/different. Participants need not necessarily change their classifications if they have a strong justification for how they have done the classification. The most important objective of this exercise is for participants to better understand the implied teacher actions and how these support the implementation of Project Work in the classroom.

Comparing Project Work Method with More Traditional Teaching Methods

The present subtopic seeks to create a contrast between Project Work Methods and Traditional Teaching. Start the discussion on this subtopic by first trying to identify what are some of the most common examples of Traditional Teaching so that everyone is thinking about the same thing. Make a list of Traditional Teaching Methods on the board based on participant responses. For example:

Traditional Teaching Methods		
• Lecturing	• Recitation (**ការស្តែ្រ**)	• Rote Learning
• Repeat After (**ថាតាម**)	• Board Copying (**សរេរតាមគ្រូ**)	• Etc.

After making this list with participants, the Facilitator should ask participants what the main difference is between learning in this way and the Project Work Method. Some common responses to this question might include the following:

- Students are only using lower-level thinking skills such as memorization when Traditional Methods are used.
- Student learning is passive because they only model responses initiated by the teacher
- There are few opportunities for applied learning in which students 'apply' learned principles to real settings.
- Etc.

The above discussion will set the scene for the next exercise by helping participants better understand why we advocate for the use of Project Work Method. The Facilitator should pass out **Handout 2c:** *Comparing Project Work Method with More Traditional Teaching Methods* along with a sheet of poster paper for each group and marker pens. Explain to participants that while we consider Project Work Method a superior method

in terms of its ability to foster higher order thinking skills, it has both advantages and disadvantages. Similarly, Traditional Teaching Methods also have their advantages and disadvantages. Ask participants to review the unsorted advantages and disadvantages provided in Handout 2c and classify each into the matrix provided. Draw the matrix onto the poster paper provided and complete the table. Provide about 30 to 40 minutes for this exercise.

When participants have completed the exercise, ask each group to post their matrices with their classifications onto the white board and compare any differences that might have occurred. Once again, the Facilitator should ask participants to justify differences. Following this discussion, the Facilitator should distribute **Handout 2d:** *Comparing Project Work Method with More Traditional Teaching Methods (Exercise Answers),* which once again provides a nominal analysis of advantages and disadvantages for participants to consider. Compare any differences between participants' analyses and those in Handout 2d. Again, encourage participants to explain any differences that may have occurred in an effort to increase everyone's understanding of the strengths and weaknesses of Project Work Method.

	Project Work Teaching Method	**Traditional Teaching Methods**
Advantages	▪ Encourages creative thinking ▪ Reduces the role of lecturing in teaching ▪ Allows students to interact together and work as a team ▪ Encourages student research ▪ Promotes opportunities to apply learned principles ▪ Builds student confidence ▪ Promotes deeper understanding of concepts	▪ Many teachers are highly familiar with this method of teaching ▪ Time efficient ▪ Requires fewer resources ▪ Easier to evaluate student learning ▪ A great deal of content can be covered very quickly ▪ Can be used easily in large classes
Disadvantages	▪ Time Intensive ▪ Resource Intensive ▪ Requires extensive planning ▪ Difficult for many teachers to understand and apply ▪ Difficult to evaluate student learning ▪ The amount of content that can be covered is narrow ▪ Only works well in small classes	▪ Discourages creative thinking ▪ Relies heavily on lecturing and rote activities ▪ Few opportunities for applied learning ▪ Does little to build the confidence of students ▪ Results in shallow understanding of concepts ▪ Does little to promote collaborative learning

Lesson 3.3 Linkages between Project Work Method and Other Similar Methodologies

Summary: This module helps to explain the linkages of the Project Work Method with other similar methods and how it exemplifies a philosophy of Constructivist Learning.

Lesson Time: 3 hours

Facilitator Preparation:

- Write up the Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.
- Draw the Venn Diagram shown in Handout 3b onto poster paper.
- Make copies of **Handout 3a:** *What is the Relationship between Constructivism and Project Work?*
- Make copies of **Handout 3b:** *Sample Venn Diagram Illustrating Relationship between Constructivism, Related Teaching Methods, and Techniques*
- Make copies of **Handout 3c:** *Achieving a Common Understanding of Educational Terms such as Approaches, Methodologies, & Techniques*
- Make copies of **Handout 3d:** *What Do We Mean by a 'Hybridized' Approach to Teaching & Learning? (Optional)*

Resources/Materials:

- Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.
- A large hand-drawn copy of the Venn Diagram shown in Handout 3b.
- Copies of **Handout 3a:** *What is the Relationship between Constructivism and Project Work?*
- Copies of **Handout 3b:** *Sample Venn Diagram Illustrating Relationship between Constructivism, Related Teaching Methods, and Techniques*
- Copies of **Handout 3c:** *Achieving a Common Understanding of Educational Terms such as Approaches, Methodologies, & Techniques*
- Copies of **Handout 3d:** *What Do We Mean by a 'Hybridized' Approach to Teaching & Learning? (Optional)*

Learning Outcomes:

1. Participants can define the difference between educational philosophies, methodologies, and techniques.
2. Participants can cite specific philosophies and methodologies that have linkages with Project Work Method.
3. Participants can explain how Project Work relates to the educational philosophy of Constructivism and why this is strategically important for 21st Century education.
4. Participants can explain the differences between Project Work

Method and other related methodologies using a Venn Diagram.

5. Participants can explain the benefits of using a 'hybridized' approach to Project Work Method (Optional)

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the module. Explain the outcomes and that this is what the participants should be able to do at the completion of the module.

What is the Relationship between Project Work Method and other Methodologies and Approaches

This session builds on the discussion of methodological traits of Project Work and related methodologies that were discussed earlier. One of the key goals of this module in this regard is to help participants understand more exactly the relationship between Project Work and other methods that they may have heard of.

In starting the session, ask participants the following questions:

Have you ever heard of Constructivism? For those that have heard of this Approach, is it the same as Project Work Method?

In trying to lead a guided discussion around these questions, the Facilitator should help participants see the similarities between Constructivism and project work such as the following:

- Both lead to knowledge 'creation'
- Both encourage collaborative learning
- Both require research

The Facilitator should then ask participants that given so many similarities between Constructivism and Project Work Method, 'what is the difference between these two ways of learning?'

To address this question, the Facilitator should pass out **Handout 3a:** *What is the Relationship between Constructivism and Project Work?* Use this handout to review the official definition of Constructivism and the conclusion that while Project Work Method and Constructivism are similar, Constructivism is a much broader framework that subsumes not only Project Work but several other methodologies that we have reviewed such as Problem-based Learning and Project-based Learning. That is, Constructivism is what we call an 'Approach' or Philosophy of Education that underpins many teaching methodologies such as Project Work.

What is the Difference between an Approach, a Methodology, and a Technique?

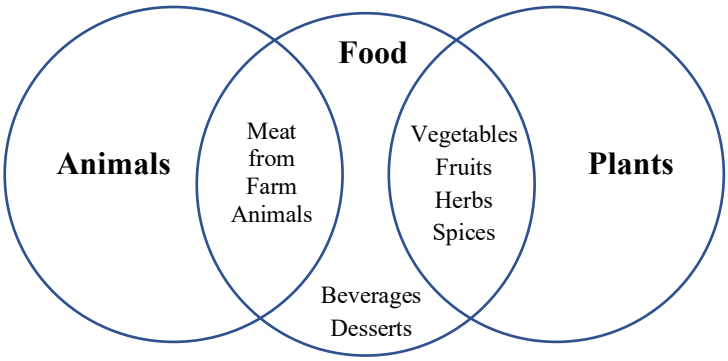
Before going on with the rest of Handout 3a, the Facilitator should distribute **Handout 3c:** *Achieving a Common Understanding of Educational Terms such as Approaches,*

Methodologies, & Techniques. This handout will help the Facilitator illustrate the difference between what we call an Approach (or Philosophy), a Methodology, and a Technique. The Facilitator should review the definitions provided in the handout. Accordingly, the Facilitator should explain that Constructivism is an example of an 'Approach' or a Philosophy that is defined by several **abstract principles** such as the ones that were reviewed in Handout 3a. This explanation should help to reinforce the idea that Constructivism is a much broader conceptual framework than a single method. Approaches such as Constructivism subsume many methodologies including Basic Project Work, Project-based Learning, and Problem-based Learning. As shown in Handout 3c, there are other Approaches (e.g., Behaviorism, Progressivism, etc.) with their own methodologies. For now, however, we want to concern ourselves mainly with Constructivism because this is a system of learning of great relevance to 21st Century education systems. Techniques on the other hand are even more specific and are the actions that a teacher undertakes, which together comprise a Methodology.

Using a Venn Diagram to Map Out the Differences between Concepts

The Facilitator can now return to Handout 3a and the explanation about Venn Diagrams. Ask to see how many participants have ever heard of a Venn Diagram. For those who have never heard of this kind of diagram, review the definition on page 2 of Handout 3a. The Facilitator should explain that Venn Diagrams consist of circles that help to organize lists of related concepts. Sometimes these concepts are 'superordinate' in their relationship with other concepts, which are 'subordinate' in their relationships. Sometimes categories overlap, which is represented by overlapping circles.

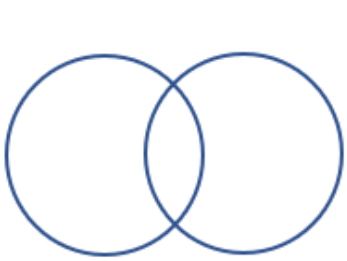
Review the example of the Venn Diagram provided that illustrates the relationship between Animals, Plants, and Food. These categories are examples of superordinate concepts. Food overlaps with Plants and Animals. Items such as vegetables, fruits, meat, etc. are examples of subordinate concepts within the Plant/Animal categories, which overlap with food. Beverages and desserts are examples of concepts that are neither plants nor animals but are examples of Food. The Venn Diagram provided illustrates how concepts overlap and are related to one another.

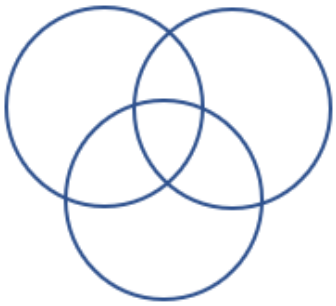


Example of a Venn Diagram from Handout 3a that illustrates the relationship between Animals, Plants, and Food

Following this explanation, participants are now ready to undertake the exercise provided at the end of Handout 3a. In this exercise, participants must map out the relationship between key concepts such as Constructivism and the different methodologies that they have studied starting with Project Work. A list of possible concepts discussed in previous modules is provided in the box below. The Facilitator

should be sure that participants understand the different configurations that circles in a Venn Diagram can take, drawing a few examples on the board:

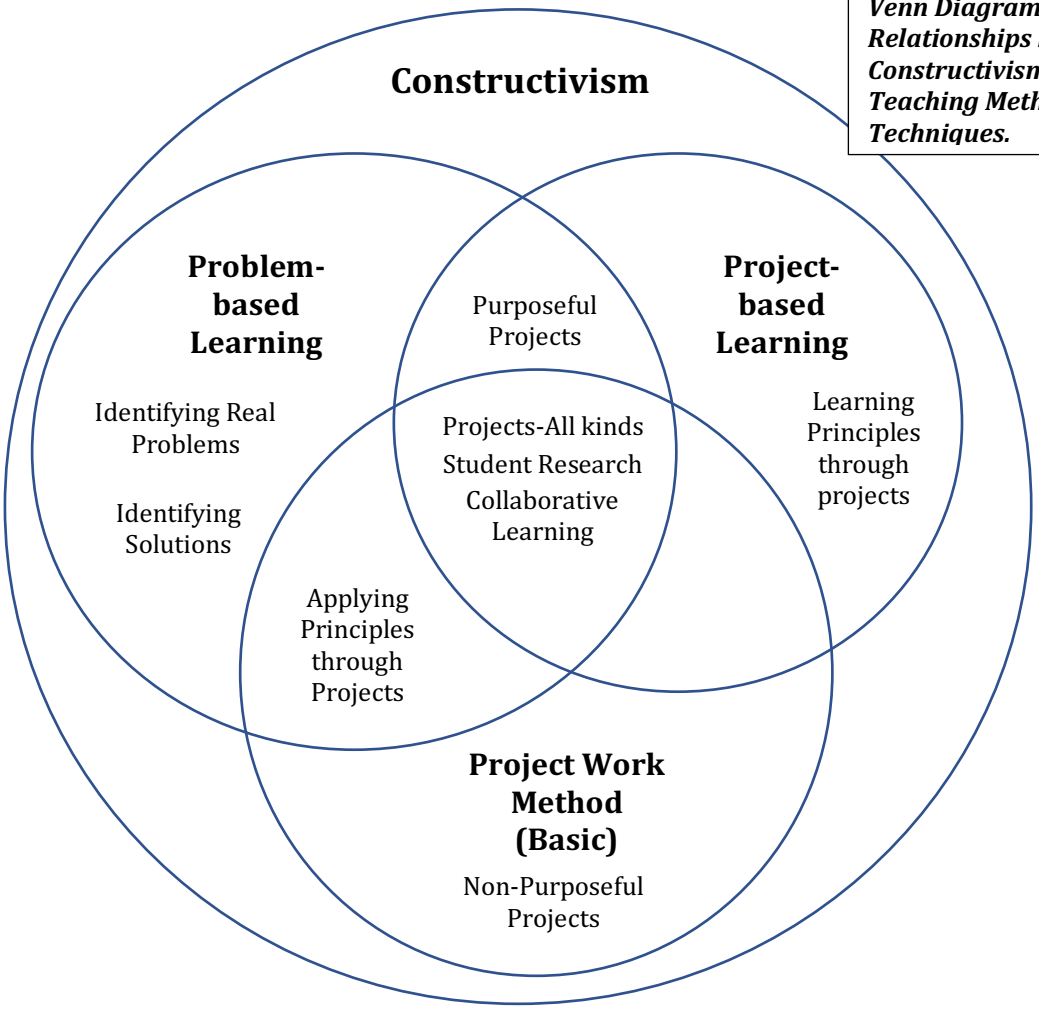




Next, the Facilitator should distrubte a sheet of poster paper and marker pens to each group and ask them to organize the concepts provided below using a Venn Diagram of their own making. Remind participants to start their discussions by first determining which are the superordinate and subordinate concepts and then proceeding from there to organize their circles accordingly. If participants wish to add more concepts based on what they have previously learned, they are invited to do so. Provide about 40 minutes for this exercise.

Elements to Organize:	
• Constructivism • Project Work Method (Basic) • Project-based Learning • Problem-based Learning • Student Research • Collaborative Learning • Projects of all kinds • Purposeful Projects	• Non-purposeful Projects • Identifying real problems • Finding solutions to problems • Learning principles through projects • Applying principles through projects • Other?

Before inviting each group to present their Venn Diagrams, share with participants the sample Venn Diagram shown in **Handout 3b:** *Sample Venn Diagram Illustrating Relationships between Constructivism, Related Teaching Methods, and Techniques.* This diagram provides an analysis of the elements shown in the concept list above. This is only one example of an analysis, but may not be the only one possible. Other groups may have used different circle configurations to arrive at the same arrangement of relationships.



Venn Diagram Illustrating Relationships between Constructivism, Related Teaching Methods, & Techniques.

In reviewing each Venn Diagram, the Facilitator should check the following:

- Are the superordinate concepts properly identified? In the case above, Constructivism, Project-based Learning, Probem-based Learning, and Project Work Method (Basic) are all examples of superordinate concepts and should have their own circles.
- Are the subordinate concepts assigned to the correct superdinate concepts? For example, 'Identifying real problems' is a subordinate concept that is most closely associated only with Problem-based Learning.
- How is the sharing of subordinate concepts among superordinate concepts demonstrated. For example, subordinate concepts such as Projcts and Student Research are shared by all methodologies while Purposeful Projects is shared only by Project-based Learning and Problem-based Learning.

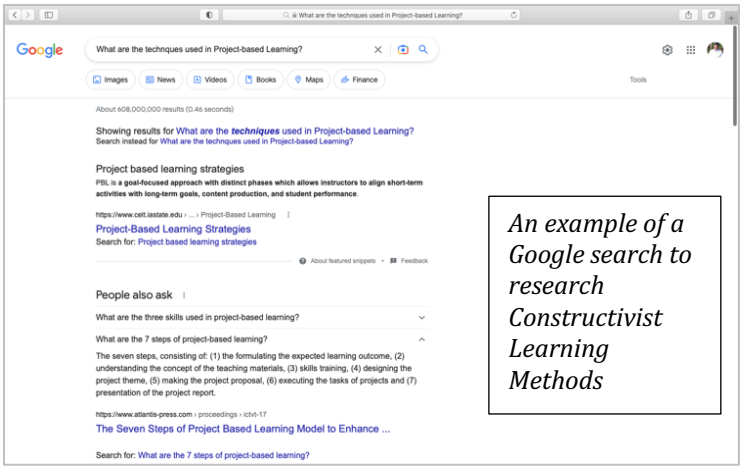
In cases where participants have used an alternative configuration to demonstrate their understanding of the relationship between Constructivism, Project Work, and other methodologies, be sure that they are able to articulate a justification for how they organized concepts, making an assessment based on the guidelines in bullet points shown above.

Identifying & Organizing Teaching Techniques according to the Methods to Which They Belong

A follow-up exercise to the Venn Diagram Analysis is provided at the end of Handout 3c, which introduces partipants to the differences between Approach, Methodology, and Techniques. The purpose of this exercise is to once again emphasize that there are multiple methodologies that are encompassed by Constructivism and that each of these methodologies are often closely connected; there are also subtle differences.

The Facilitator should also remind participants that they have already discussed the similarities and differences between what we call the *Basic Project Work Method* and what is also known as *Project-based Learning.* Both of these methodologies involve the development of projects but there are two key differences:

- In Basic Project Work Method, the projects chosen do not have to be purposeful; they can focus on any topic that promotes deeper understanding of a prinicple learned in class. In Project-based Learning, however, projects must be purposeful (meaning that they must have usefulness after the project is completed).
- In Basic Project Work Method, students learn principles first and then apply them in a project. In Project-based Learning, students learn principles as a result of implementing the project; that is, principle learning and project implementation happen at the same time.



An example of a Google search to research Constructivist Learning Methods

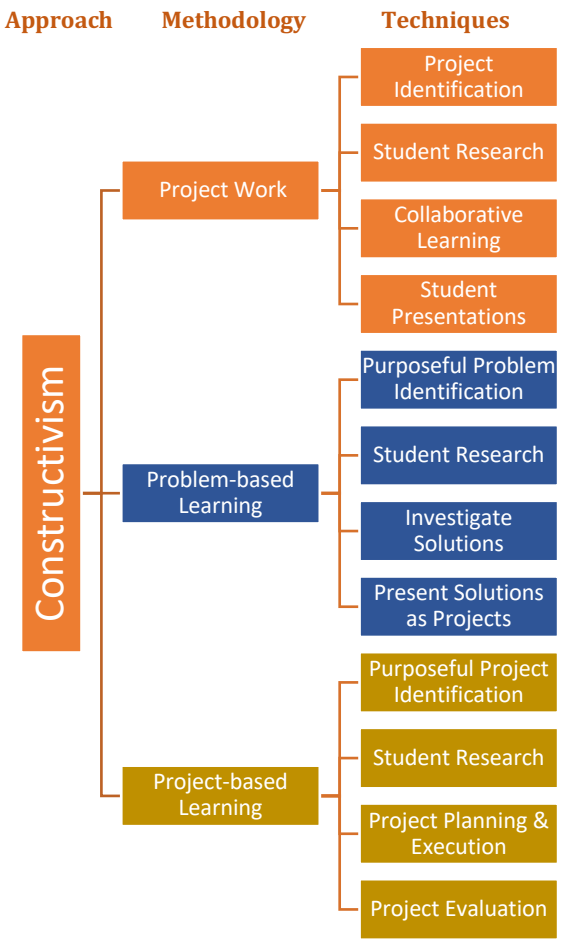
After providing this explanation to participants, the Facilitator should then pass out a piece of poster paper to each group and ask participants to choose three methodologies that each reflect the Constructivist Approach to learning and map out the key techniques that characrterize them. Participants should use the diagram provided at the end of Handout 3c for this puprose. Some techniques will be same across methodologies while some will be different. This exercise will help demonstrate the linkages (and differences) between Project Work and other related methodologies. In completing this exercise, participants may have to do a Google search by asing, *What techniques are used in Methodology X.* An example of a search is provided in the inset above.

Some of the Constructivist Learning methodologies that participants may consider include:

- Project Work Method (Basic)
- Project-based Learning
- Problem-based Learning
- Inquiry-based Learning

Participants may choose any of these methodologies to research but Project Work Method MUST be one of them. When they have completed their research and completed the diagram, participants should re-create the diagram on a large piece of poster paper and tape it to the board for other groups to review.

An example of one way to complete the diagram is provided in the diagram provided here. This is simply an example and the workshop groups may arrive at different answers depending on their research. In reviewing the work done by different groups, the Facilitator should check to see that each method has some techniques that are the same and some that are different. Those that are different mark distinctive ways that Project Work is distinguised from other Constructivist Methods. The Facilitator should be sure to make this point several times during group presentations.



Hybridizing the Implementation of Project Work to Meet the Context (Optional)

The Facilitator should start this final session by passing out **Handout 3d:** *What Do We Mean by a 'Hybridized' Approach to Teaching & Learning?* Review the first page of this handout with participants noting that it is often not possible to strictly adhere to the recommended techniques of a particular methodology (such as Project Work) due to constraints in the learning environment. In such cases, teachers are advised to 'hybridize' their teaching by substituting some technques from other methodologies or simply improvising new technques altogether based on the actual context.

Following this explanation, the Faciltiator should review the discussion questions at the bottom of the handout with participants. Lead a discussion that touches on some of the main points raised in the Discussion Guide provided for the Facilitator below.

Questions for Discussion

1. Can you think of specific factors in a learning setting that may require a hybridized approach to teaching and learning? When citing factors, try to think about the conditions that you as teachers face every day in your classrooms.

   Discussion Guide: *Constraints in the learning context requiring a hybridized approach to teaching may include the following:*

   - *Not enough time in the timetable*

- *No resources (e.g., labs, computers, etc.) available at the school*
- *No budget available from the school to do projects*
- *Students are not used to working on their own*
- *Students are only interested in studying for their exams and are not interested in knowledge creation*
- *Etc.*

2. What do you think are the advantages and disadvantages of a hybridized pedagogical approach to promote Constructivist Learning? Explain whether you think that the advantages outweigh the disadvantages or vice versa.

Discussion Guide:

- *The main advantage to hybridizing a teaching method to achieve Constructivist Learning goals is that it enables the teacher to at least do something that promotes knowledge creation. Better to do something than nothing at all.*
- *An important disadvantage in hybridizing one's teaching might be that the teacher has to water down a methodology so much as to be meaningless in terms of what it actually accomplishes or that it no longer reflects the key goals of the original method. This suggests that teachers need to be mindful of how much they compromise when hybridizing their teaching methods.*

Following the above discussion, ask participants to look at the exercise provided at the end of Handout 3d. This exercise provides a short description of a constrained teaching and learning environment (see Teaching Context). Contrast this context with the learning objective. Participants should then examine some of the methodologies that might be used to achieve the learning objectives.

After reviewing this background with participants, the Facilitator should next ask participants to describe what techniques they would use to achieve the learning objectives, but which also takes account of the constraints in the learning context. Pass out a sheet of poster paper to each participant group and ask them to describe how they would hybridize their teaching method to match the context.

Discussion Notes

Some ideas that teachers may consider in order to make the implementation of the learning objective more doable include the following:

- Allowing for larger group sizes than is recommended for Project Work
- Assign projects only to part of the class who volunteers to do the project.
- Only choose those techniques from each methodology that are easy for students to do and avoid those techniques that sound difficult.
- Limit project topics to problems in the social environment (e.g., litter, water pollution, etc.), which are easy to identify and solve rather than complex issues in the sciences since these will be difficult to address as there is no science lab at the school.
- The teacher identifies the problem and the project for the students rather than letting them do it themselves.
- The teacher has to join each student group in reviewing problems in the context as it might be too difficult for students to do on their own.
- Etc.

Teaching Context: A classroom in a rural setting has a very large class size of almost 50 students. These students have never encountered self-directed learning before and have limited research skills. The learning objective that the teacher wants to achieve is as follows:

- Students can identify problems related to the environment in their community.
- Students can do simple projects that help to address some of the problems they identify.

PHILOSOPHICAL APPROACH: Constructivism

Constructivism is 'an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner'

Methodological Exemplars	Techniques Associated with Each Method	Describe Your Hybridized Method
Project Work Method requires students to undertake a project that demonstrates that they understand specific principles learned in class. The project may be suggested by the teacher or determined by the students; however, the project should be planned and executed by students themselves either individually or in groups.	▪ Project identification ▪ Students work in small groups or individually to plan and organize the project. ▪ Group members should not exceed 6 students per group. ▪ Students determine a role for each person in the group to execute the project. ▪ Student research ▪ Student presentation	•
Inquiry-based Learning Method is a form of active learning that starts by posing questions, problems or scenarios. It contrasts with traditional education, which generally relies on the teacher presenting facts and their own knowledge about the subject.	▪ Student identification of questions they want answered ▪ Student research ▪ Student presentation ▪ Student Reflection on processes that worked/did not work	
Problem-based Learning Method is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts.	▪ Step 1: Explore the issue and identify the problem. ▪ Step 2: Students state what is known. ▪ Step 3: Students define the issues ▪ Step 4: Students research knowledge ▪ Step 5: Investigate solutions ▪ Step 6: Present and support the chosen solution. ▪ Step 7: Students review their performance.	

Ask each group to present their hybridized description of how they would achieve these learning objectives in the constrained context and review the appropriateness of each through guided discussion using the discussion notes provided above.

Lesson 3.4 General Steps in Implementing Project Work Method in the Classroom

Summary: This module explains the process of organizing Project Work starting from the selection of topics, the organization of groups, the use of research techniques, setting of milestones, and the final creation of a unique product.

Lesson Time: 3 hours

Facilitator Preparation:

- Make copies of **Handout 4a:** *Project Work Process Overview*
- Make copies of **Handout 4b:** *Blooms Taxonomy*
- Make copies of **Handout 4c:** *Identifying a Driving Question*
- Make FIVE copies of **Handout 4d:** *Role Play: The Brainstorm Session*
- Make copies of **Handout 4e:** *Making a Project Plan*
- Make copies of **Handout 4f:** *Presenting a Project*
- Write the Reflection Questions about a failed project in the first part of the Training Session Plan on poster paper.
- Think of a humorous example from your own life of a failed project. You will use this to prompt participants to think about their own.
- Divide participants into groups as described in the introduction.
- Give each group some sticky notes. Each group should have their own color. Make a note of which group has which color.
- Ask five participants to be actors in the role play. Choose a participant for each person in the role play: Panha, Sopheap, Sreyleak, Samnang, and Makara in the role play. Given **Handout 4d** to these participants.

Resources/Materials:

- Poster paper, marker pens
- Poster sheet summarizing the learning outcomes of the lesson.
- Poster with the Reflection Questions about failed projects.
- Packs of sticky notes with 1 color per group
- **Handout 4a:** *Project Work Process Overview*
- **Handout 4b:** *Blooms Taxonomy*
- **Handout 4c:** *Identifying a Driving Question*
- **Handout 4d:** *Role Play: The Brainstorm Session* (only 5 copies)
- **Handout 4e:** *Making a Project Plan*
- **Handout 4f:** *Presenting a Project*

Learning Outcomes:

1. Participants can identify the four main stages of doing a project.
2. Participants can explain the characteristics of a good Driving Question.
3. Participants can identify which Bloom's Taxonomy critical thinking skills are relevant to Project Work.

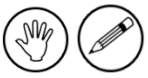
4. Participants can describe the critical elements of a Project Plan.
5. Participants can anticipate challenges in project execution and know how to mitigate those.
6. Participants have some new ideas about how content can be shared in interesting ways through a Creative Product.

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the lesson. Explain the outcomes and that this is what the participants should be able to do at the completion of the lesson. Explain how these relate to the overall goal of the session (from the summary).

Ask participants to get together in their groups and discuss personal or professional projects that they have done which have not gone well. They could be personal projects like planning a family vacation, making changes to a house, preparing a wedding, etc. or they could be from a professional setting. By way of example the Facilitator will think of a humorous one from his/her own experience and tell the story to the participants.



Ask participants to reflect on a failed project that they mentioned or that of one of the group members. Using the reflection questions below, have them write briefly why they believe that the project failed. Note that these questions correspond to the project steps which will be discussed.

Reflection Questions

- Was the project idea ill-conceived in the first place? Was it a project that you should have even started?
- Did you plan well for the project? Did you have clear, accurate steps? Did you know what resources were needed and get those resources? Did you know what it would look like to say that the project was complete or good?
- Did you execute the project well or did they make mistakes in execution? Why were those mistakes made?
- Was the project not successful because you were not able to present or explain it well to the stakeholders? If so, why did that happen?

Invite any willing participants to share their reflections on their failed project and why they believe that it failed.

Tell participants that you will now discuss *student* projects. As they listen, ask them to consider: Does following a process make it likely that a project will succeed?

Four steps of the Project Work process

Pass out **Handout 4a:** *Project Work Process Overview*.

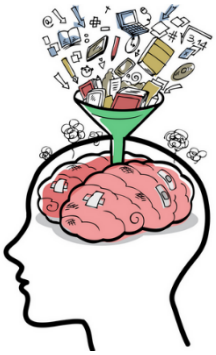
The information in the handout needs to be read out loud. It is recommended that the Facilitator go one by one through the Project Work process. Start by reading the first process step, Brainstorm, and then read questions in the blue rectangle. Then, ask a participant to read the corresponding bullet point. Next, go to the second Project Work step and so on.

Step 1: Brainstorming

The Facilitator now explains that s/he will talk about the first step, Brainstorming, and in particular the sorts of Driving Questions that need to come out of a team's brainstorming time. First, the Facilitator goes through Bloom's Taxonomy as that will lead to an understanding of what are good Driving Questions.

Ask participants about traditional educational practices. How were they taught in school? Were they asked to apply concepts that they learned? Were they asked for their own ideas? How were they assessed?

Draw the image on the right on the white board or poster paper. If it did not come up in discussion, suggest that traditional educational practices often do the following:



- Focus on lower order skills such as **remembering facts** and using textbooks and pedagogical methods that are aimed at the **transmission of information** like stuff put into the brain through a funnel (image).
- At a maximum require students only to **understand** the information but not to be able to apply it to real life situations or to pull concepts apart and look carefully or to create something new from what they have learned.
- Assessments are often just a matter of students **regurgitating** the facts that they had memorized.

Pass out **Handout 4b:** *Blooms Taxonomy*. Ask how many participants are familiar with Bloom's Taxonomy. This will determine how in-depth you will need to go on the next section.

Project Work strives to engage students in using **critical thinking skills** which go beyond remembering facts and obtaining knowledge.

Blooms Taxonomy is an ordered list of skill categories with the more sophisticated, complex skills at the top of the pyramid. Those higher-level skills are the ones targeted in Project Work.

When the Facilitator feels participants are ready, s/he has the group try the exercise in categorizing questions/tasks according to Bloom's Taxonomy skills at the bottom of **Handout 4b**. After, the Facilitator goes through each and asks groups which Bloom's thinking category they thought the question/task requires.

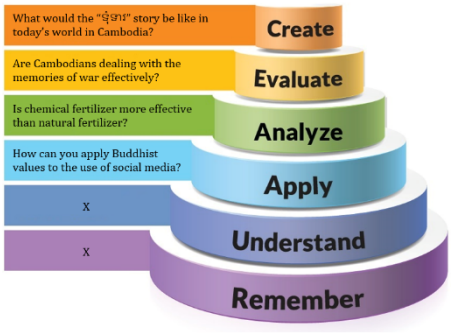
Answer Key

When discussing the answers, mention the underlined words as those gives clues to what sort of skill is required.

Question/task	Skill required
Do <u>you think</u> it is true that the time of the Angkor Empire was the best time in the history of Cambodia? Why?	**Evaluating.** The student is asked for his/her *idea* and must *defend* it.
Write a <u>summary</u> of the early history of Cambodia using your own words.	**Understanding.** This is *not memorization*. A student *must understand* in order to summarize.
<u>Design</u> a government (laws, policies) and culture which has the characteristics of the Angkor Kingdom**,** but which thrives and does not fall. What would that look like?	**Creating.** Student is asked to *make* something *new* based on what the understand already.
<u>What</u> were the <u>names</u> of the two states that the Chenla Kingdom was divided into?	**Remembering.** This is a question that only requires *recalling* a fact. The student need not even understand about the kingdoms.
<u>If</u> Cambodia's leaders <u>today</u> used the same strategy as Jayavarman II, what might he do?	**Applying.** This is tasking existing knowledge and applying it to a *new context*—today's world.
<u>Why</u> did the Angkor Kingdom fall?	**Analyzing.** This requires looking at the various factors (*parts*) of what was happening at the time, *going deep* into details.

Pass out **Handout 4c:** *Identifying a Driving Question*. Ask different participants to read the bullet points out loud to the group.

Explain that Driving Questions and Project Work do not have to be about STEM-related topics, as is sometimes thought. Read through the example Driving Questions in the handout (also shown on the right) which relate to Khmer literature, history, chemistry, and civics.



Step 1 Role Play: Brainstorm to find a Driving Question

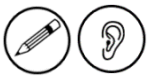
Explain what is happening next: Participants will listen to a brainstorm conversation among five students who have just formed a team to do a project about the Khmer Literature classic ទុំទាវ. Ask the participants who you had selected to play parts in the role play to conduct the role play now. Ask the others to listen for indications that their Project Work will utilize Bloom's Taxonomy higher level skills and life skills.

After the role play, ask participants what they heard. Participants should note that students talked about or asked questions about: (1) what they are interested in, (2) what they want to know more about, (3) what skills (Bloom's taxonomy skills and life skills) they want to develop, (4) how they will be assessed.

Ask participants to gather in their group and discuss a particular topic in their subject area that they find interesting. Request that they go through the brainstorming step to get to the point of framing a Driving Question. If they have time, they are welcome to come up with multiple Driving Questions.

Step 2: Planning

The Facilitator explains that s/he will talk about the second step, Planning, and in particular all of the elements that make up a good plan. Write the Reflection Questions below on poster paper.



Ask participants to think by themselves and write examples from their own lives of when they have had a plan but things did not work out as expected.

Reflection Questions

- Was the plan not detailed enough or was it incomplete?
- Did the plan not specify who was responsible for which task?
- Did the plan lack specific target dates for tasks?

After they have had enough time, ask them to pair with their neighbor and share what they have written. Finally, bring the whole group back together and ask the pairs to share one point that came up. As you go around the room, ask pairs to try to mention a point that has not yet been mentioned.

Pass out **Handout 4e:** *Making a Project Plan*. Ask participants to gather in their small groups. They should agree on their Driving Question and plan their project. Tell them to assume that the project is due in three months from now. Ask them to use the sheet provided to make a project plan, filling in the details about tasks, resources, persons responsible, and deadlines.

Return to the big group and ask a group to share their project plan. Ask the others to listen and then provide any feedback. Then, ask the other groups if their plan included steps that were not in the plan that was read out loud. Ask if other groups had a significantly different plan from the one that was read. If so, have that group go through their plan.

Make sure that the following are mentioned/considered:

Task	**Resources Needed**	**Person's responsible**	**Deadline**
The following may be included: ▪ Admin: o Set up communication mechanism (e.g., Telegram group) o Set up content storage (e.g., Google Drive) o Schedule team meetings ▪ Determine Driving Question ▪ Determine the final product ▪ Research using reliable resources ▪ Interview experts or other relevant persons ▪ Learn how to use needed tools/apps ▪ Write content ▪ Create PowerPoint ▪ Make product ▪ Rehearse presentation	The following can be physical or online: ▪ Academic journals ▪ Published books ▪ Lectures or demonstrations ▪ Online courses or content produced by a university ▪ Newspaper / magazine articles ▪ Interviews with experts Participants should make clear to students that some information sources are more reliable than others. Part of their learning is to know who to trust and how much. Wikipedia should only be used as a starting point, a way to find other, more reliable resources. Students should be careful with YouTube. There is a danger of them simply copying a project they see on YouTube. Physical resources should also be included if students are building/making something physical.	Make certain that all team members are involved in the steps and that there is equity among team members. Team members have different skills. Use the skills available and give "stretch tasks" as appropriate (see session 3.7).	These should be realistic. For tasks that are less clear or certain, more time should be allocated in case things take longer than anticipated. Time should be allowed for changes or fixes after the rehearsal.

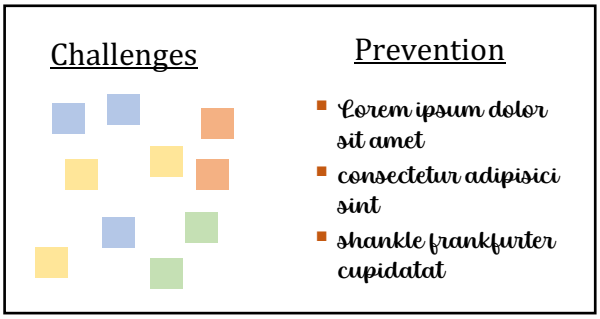
Step 3: Execution

The Facilitator explains that now s/he will talk about the second step, Execution, and in particular the challenges to effective project execution.

Pass out one pack of sticky notes to each group with each group having their own color. Explain to participants that they will be talking about problems they anticipate students might have in the execution of projects. If they have done project work in the past, they can speak from experience. If they have not, they can imagine the sorts of issues that might come up. Groups write one potential issue/problem on one sticky note.

As they discuss or after 10-15 minutes, they will put the sticky notes on the left side of the whiteboard or poster paper under "Challenges".

As the groups put up their sticky notes, gather together sticky notes which are similar. When ready, read out loud the first group of sticky notes. After you read, ask participants how they might handle that particular challenge. Write those answers on the right side of the whiteboard under "Prevention".



Below are some possible challenges that you might hear. If those do not come up, you can add them.

- **The Takeover:** In project work, sometimes particular students might assert themselves too strongly, e.g., extroverts, boys, etc. The direction of the project may take a turn that many team members do not want.
- **Freeloaders:** It is common that a team member does not assume responsibility for a task or does but does not carry through.
- **Procrastination:** Students waiting until the last minute to complete work is an ever-present temptation and can make a project ultimately fail.
- **False starts:** Going the wrong direction initially can lead to delays. Usually, this happens because the Driving Question was not narrow enough or it does not lead to a do-able Creative Product.
- **Skill mismatch:** Students might be assigned to do tasks for which they do not have the skills or temperament. This causes them undue stress or failure.

Most of these challenges can be overcome by teacher oversight of the Driving Question and periodic check-ins on how the team is working together. (See session 3.7.) Having a good Plan with clear assignments helps avoid some of these challenges as well.

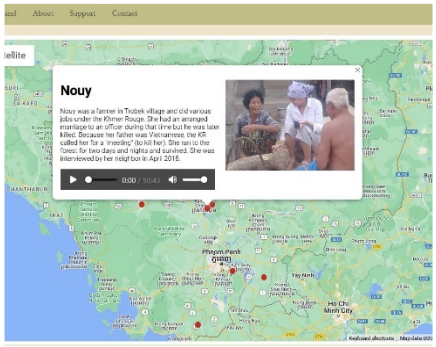
Step 4: Presentation

The Facilitator explains that now you will talk about the fourth step, Presentation, and, in particular, all of the elements that make up a good *creative* presentation.

Pass out **Handout 4f:** *Presenting a Project*. Explain that a critical element of Project Work is to give students the opportunity to be creative in how they show what they have learned. Teachers should not limit the teams' outputs to slideshows and group lectures. Open wide the doors of opportunity for students to develop an original presentation which they can be proud to show to others.

Using the Driving Question from **Handout 4c**, explain how the outputs in **Handout 4f** relate to those questions by going through the table below.

Before you begin, ask participants to listen carefully for what Bloom's Taxonomy skills students used in the process and what life skills they employed.

Driving Question	**Creative Product & Presentation**
What would the "ទុំទាវ" story be like in today's world in Cambodia? 	Students decided to rewrite the ទុំទាវ story to take place now. The product shows how they had thought through the characters and their relationships and created analogs to personalities in the current culture. The sequence of events echoes that of the original ទុំទាវ story and shows how they understood the critical elements of the story—what is important to include so that it is truly the story of ទុំទាវ. All team members were not actors; some were involved in "behind the scenes" work. For their production, students had a meta-conversation and Q&A to describe the creative process. Ask participants what Bloom's skills and life skills did the student use/learn.
Are Cambodians dealing with the memories of war effectively? 	Through their research, this team discovered that there are few first-hand stories of people's experiences at the time. By looking into research about trauma and healing, they understood that the telling of personal stories is very effective. The team decided to interview their grandparents and other villagers. Their creative product is a custom Google Map which uses geolocation to put "pins" in the Cambodia map where their interviews took place. Clicking on a pin pops up a window where a user can see a photo, read a bio, and listen to the interview. For their presentation, the team gave a demo of the website they created.

Driving Question	**Creative Product & Presentation**
	Ask participants what Bloom's skills and life skills did the student use/learn.
Is chemical fertilizer more effective than natural fertilizer?  	Students saw their project as an opportunity to learn about something practical which affects their family's day-to-day lives: the use of fertilizer. They obtained commonly used chemical fertilizers and fast-growing plants to demonstrate their result. Students presented their methodology and results to the class and lead a discussion about whether using fertilizer is worth the costs/risks even if plants grow faster, bigger, and are less prone to being destroyed by pests. Ask participants what Bloom's skills and life skills did the student use/learn.
How can you apply Buddhist values to the use of social media? 	Students created written guidelines on social media conduct and cross-referenced Buddhist teaching, content beyond what they learned in class. After presenting their guidelines, they conducted a debate: "Should Buddhist teachings guide Cambodian youth online behaviors?" They made two debate groups which included classmates mixed with their team members. Onlookers filled in analysis papers given to them by the team which required that they write up analyses of the arguments and give feedback on presentation style. Ask participants what Bloom's skills and life skills did the student use/learn.

Ask participants to individually write in the blank box in **Handout 4f** what their team's Creative Presentation might look like. They can write, draw a picture, or communicate in whatever way is best to explain their team's output.

When finished, ask particpants to gather in their small groups and share what they have written. Groups discuss together which they most prefer and then, in the large group, the Facilitator requests that groups share the Creative Presentation that they liked the most.

Lesson 3.5 Kinds of Project Work Presentations and How to Organize Them

Summary: This module provides guidance about how Project Work Presentations can be woven into the learning context such as through school-wide project fairs, bulletin board exhibitions, classroom-based presentations, etc.

Lesson Time: **2.5 hours**

Facilitator Preparation:

- Make copies of **Handout 5a:** *Active versus Observed Presentations*
- Make copies of **Handout 5b:** *Characteristics of Active and Observed Presentations*
- Make copies of **Handout 5c:** *Implementing Active and Observed Presentations*
- Write up the Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.

Resources/Materials:

- Poster paper, marker pens
- Poster sheet summarizing the learning outcomes of the lesson.
- **Handout 5a:** *Active versus Observed Presentations*
- **Handout 5b:** *Characteristics of Active and Observed Presentations*
- **Handout 5c:** *Implementing Active and Observed Presentations*

Learning Outcomes:

1. Participants can distinguish two types of project presentations: live and observed.
2. Participants can make a determination regarding what type of project presentation to require of students based on a number of factors.
3. Participants can identify several presentation type examples.
4. Participants can describe what sorts of projects could include both active and observed presentations.

Training Session Plan

Active versus Observed Events

Explain to participants what is meant by "active" and "observed" project presentations. See **Handout 5a:** *Active versus Observed Presentations.*

Ask participants to think on their own about examples of active and observed project presentations. Perhaps give one example so they understand what you mean. Allow a few minutes for them to write.

Pass out **Handout 5a:** *Active versus Observed Presentations.* Go around the room and have each person read out loud to the group one bullet point with an example of a project presentation.

As participants to get into small groups and complete the exercise on **Handout 5a:** *Active versus Observed Presentations.* After groups have finished, go through each example and ask a group, one by one, to give their answer and explain to everyone why they answered as they did.

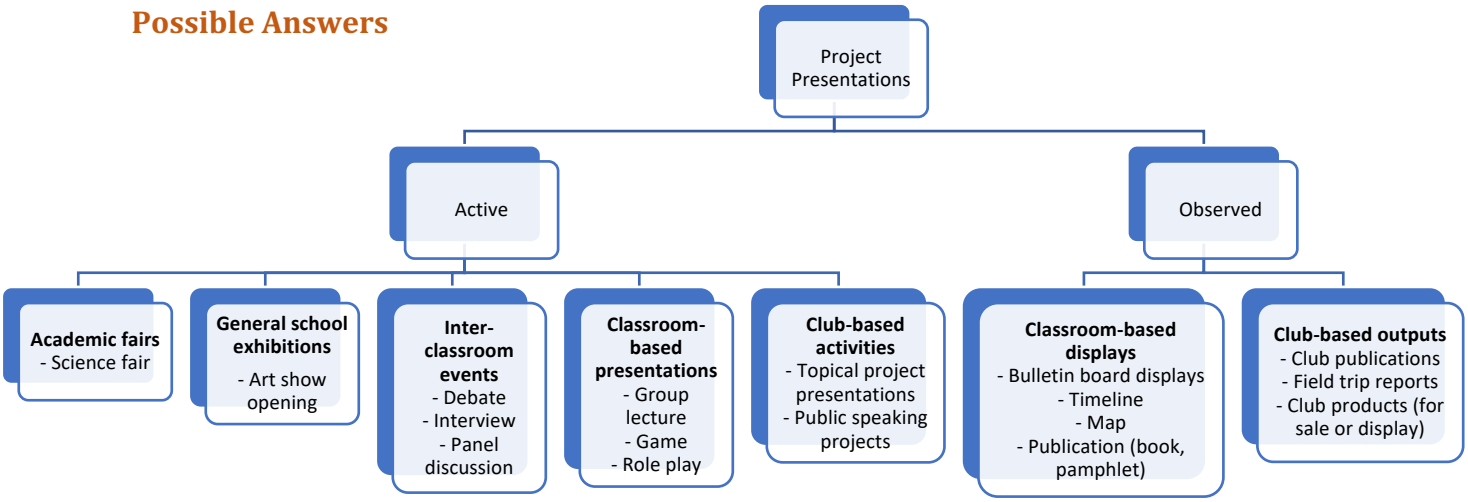
Answers

Active Presentation	Observed Presentation
2, 4, 5, 7, 8	1, 3, 6

Explain to participants that presentations might be categorized based on the context in which they are displayed. Ask them to look at the diagram on page 2 of Handout 5a. Post on the wall the poster listing example project presentations.

Now, ask the participants to break into their small groups. They are to consider each presentation and write the number of the presentation in the box with the category where they think it fits. When they are finished, go through each and ask groups how they categorized the presentation. If groups disagree, ask them to explain.

Possible Answers



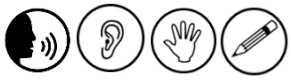
Explain to participants that many of these presentations can fall into multiple categories. Some projects might even utilize an active presentation and also include an observed presentation. Give the example of a timeline which might include an active component (student presentation) and an observed one. See Handout 5a.

Ask participants to consider the example presentations in the first column of the table. They are to consider each presentation and put a tick √ in the box(es) where they think the presentation could be exhibited. Be sure to remind them that one row might have multiple ticks—in fact, that it the point of the exercise.

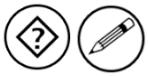
When participants have finished, bring the group back together and ask for a volunteer to tell which box(es) s/he ticked and why. If other participants had different answers, they can be invited to explain. Go through the whole table. Explain that this exercise show the need for a teacher to understand when to require a particular types of presentation.

Possible Answers

Examples	**Active Projects**					**Observed Projects**	
	Academic fairs	General school exhibitions	Inter-classroom events	Classroom-based presentations	Club-based activities	Classroom-based displays	Club-based display
Lecture			√	√	√		
Debate			√	√	√		
Science fair	√		√				
Timeline	√	√	√	√	√	√	√
Map	√	√	√	√	√	√	√
Publication		√			√	√	√
Bulletin board				√		√	



Characteristics of Active and Observed Presentations



Ask participants to consider why it might be better to require students to create an active presentation versus an observed presentation. Give them a few minutes to write something down on paper.

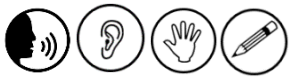
Pass out **Handout 5b:** *Characteristics of Active and Observed Presentations.* Ask students to gather again in their small groups to do an exercise. Explain that there are many factors that might go into a teacher's decisions about what to require for student presentations of their projects. This handout details some of these considerations. Read out each of the factors in the first column. If needed, give some further explanation. Then, go through the example regarding available time.

Have students go through the exercise in their small groups. When finished, lead a discussion about their answers, making sure to include all groups in the discussion.

Reflections / Answers

Factors	Active Presentation	Observed Presentation
Amount of **time** available in class for students to present their project	If there is very little time in class for teams to present their project work live, an active presentation might not be wise or possible.	An observed presentation like a poster or other display can be put up and left in a classroom or public space for students to view *on their own time*.
Need for **interactivity** between project team and project presentation viewers	Interaction is possible in the case of an active presentation. Some active presentations make is more likely than others, e.g., a lecture without a Q&A would not allow interaction but a role play certainly would.	There is no formal interaction between project display creators and viewers.
Physical space available for project presentation	Active presentations have a start and a stop. The physical space needed is only used on a temporary basis. Therefore, limited physical space generally does not present a problem.	Depending on the size of an exhibit, physical space might be an issue with many groups each creating an exhibit. For something like a bulletin board, groups could rotate use of the limited physical space with each group displaying their exhibit for one month.
How **widely** should the project presentation be viewed, e.g., teacher only, full class, multiple classes, school admin, visitors	In the case of an active presentation, the more widely a teacher wishes student presentations to be viewed, the more challenging the presentation can be to coordinate. For example, a whole-school science fair requires a huge amount of effort. But a panel discussion with guests and	The possibility of student project presentations being viewed by others outside their own classroom depends on the configuration of the school. If there is a communal area, if there is space in the library or ICT lab, or if there is something as simple as a wall that students regularly pass by, then

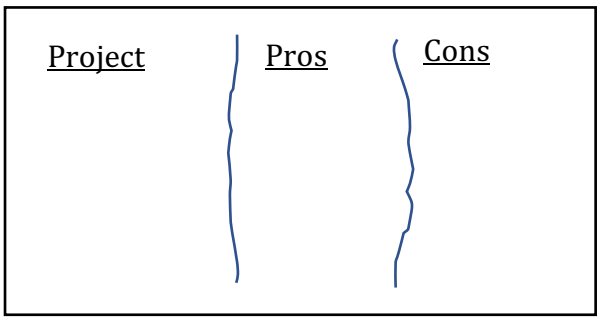
Factors	Active Presentation	Observed Presentation
	two classes requires less coordination.	wide viewing of a student presentation is possible.
Shared **technology** required for project presentation	If an LCD projector, computer, or other piece of technical equipment is needed, active presentations are best. The equipment can be checked out for the class/time it is needed and then returned.	In the case of an observed presentation, like a student-built website or game, using shared school technology is more challenging. Tech equipment that could be borrowed for the time required for students to experience the presentation would be the best situation. Or, students might use their own technology provided that it is monitored and kept safe.
Wow effect. Need/desire for projects to trigger motivation, enthusiasm, and/or a general positive emotional experience for teams and viewers	Live events typically generate enthusiasm and interest. The possibility of engaging the creators of the presentation gives a dynamic effect which likely has a positive ("Wow!") effect.	An observed presentation can also have a "wow effect" if it is interesting, aesthetically pleasing, or the topic particularly relevant to students.



Implementing Active and Observed Presentations

Explain that the next section just gives examples of active and observed project presentations. It is not exhaustive; they are many more possibilities.

Pass out **Handout 5c:** *Implementing Active and Observed Presentations*. Write on a piece of poster paper the following and post it on the wall.



Introduce active presentations and have one participant read the first example. After that, write the project presentation and ask participants to give pros and cons for using that type of project presentation in their situation. Write them down as they are stated. Continue until the end.

Tell students that this nearly concludes this session. Their last task is to take out a piece of paper and write a promise to themselves by filling in the blanks in the sentence below.

> "Within the next three months of class, I will have my students do a project about _____[topic]_____ for which they will produce a _____[type of presentation]_____."

Lesson 3.6 Needed Institutional Support to Facilitate Implementation of Project Work Method

Summary: This module provides guidance to teachers about how specific Facilities and Organizational Structures at their schools can support the implementation of Project Work. This includes such things as Libraries, Labs, Classroom Configurations, Student Clubs and other institutional features at their schools. The module explains what functions these Facilities and Organizational Structures can play to support specific examples of Project Work activities such as Science Fairs, Book Reports, and other knowledge creation activities.

Lesson Time: 3.5 hours

Facilitator Preparation:

- Write up the Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.
- Make copies of **Handout 6a:** *The Role of Specific School Facilities and Organizational Structures in Supporting Project Work*
- Make copies of **Handout 6b:** *Definitions of Project Work Activities and the Institutional Arrangements That Can Facilitate Them*

Resources/Materials:

- Poster paper, marker pens
- Poster sheet summarizing the learning outcomes of the lesson.
- **Handout 6a:** *The Role of Specific School Facilities and Organizational Structures in Supporting Project Work*
- **Handout 6b:** *Definitions of Project Work Activities and the Institutional Arrangements That Can Facilitate Them*

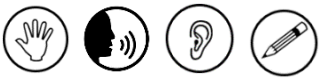
Learning Outcomes:

1. Participants can explain the role that specific facilities and organizational structures in a school (e.g., libraries, student clubs) can play in supporting Project Work.
2. Participants can determine how to strengthen Facilities and Organizational Structures at their schools so that they can better support Project Work activities.
3. Participants can explain the definition specific activities that exemplify Project Work (e.g., Science Project, Book Report, etc.).
4. Participants can identify the institutional conditions needed to effectively implement Project Work activities (e.g., field trips, exhibitions, etc.).

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the module. Explain the outcomes and that this is what the participants should be able to do at the completion of the module.



Introducing Facilities and Organizational Structures that Can Support Project Work Activities

The Facilitator can start this session by giving a short explanation about how we as teachers do not organize project work activities in a 'vacuum.' That is, we expect institutional arrangements at the school to also support us. When we talk about supportive institutional arrangements, there are generally two categories of things to which we refer. These are 'Physical Facilities' and 'Organizational Structures.' Draw the following table on the board and ask participants to give some examples of each one based on their own personal knowledge:

Physical Facilities	Organizational Structures
▪ ▪ ▪ ▪	▪ ▪ ▪ ▪

The Facilitator should fill in the table based on comments from participants, whether he/she thinks that they are right or wrong. Following this large group exercise, pass out **Handout 6a:** *The Role of Specific School Facilities and Organizational Structures in Supporting Project Work.* Review some of the Physical Facilities and Organizational Structures summarized in the handout and compare this with the list that participants made on the board. There may be some ideas that participants have suggested that can also be accepted, if participants can logically explain how such Facilities or Organizational Structures can support Project Work activities.

Next, the Facilitator should review each of the Facilities and Organizational Structures identified in the handout. Provide some details on each of the explanations provided in the handout about how Facilities and Organizational Structures can support Project Work. For example, the idea of 'maker-spaces' in libraries may be new to participants. Explain that in a modern school, we do not expect libraries to be used only as book warehouses, as was often the case in the past, but rather as dynamic places of learning where students can do collective research, have quiet discussions, and even do some small tasks together as indicated in the pictures in the handout. It is important for school librarians to understand their new institutional role in this regard, i.e., that they are not 'custodians' but rather 'facilitators' of projects and other student learning.

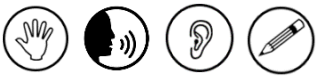
The Facilitator may next ask participants how many schools have some of the facilities described in the handout. Although New Generation Schools may have such Facilities and Organizational Structures, they may not exist in other schools. Informally survey participants to assess the institutional situation in everyone's schools. Lead a short discussion about whether changes could be made to provide a more effective institutional structure that can support Project Work activities. Encourage other participants to join

in this discussion.

Following the above discussion, the Facilitator should ask participants to work on the exercise at the end of Handout 6a. Pass out some poster paper to each group and ask them to draw the exercise table in the handout onto their paper. For this exercise, each group need only identify two Facilities or Organizational Structures to analyze at their schools. Give participants about 30 to 40 minutes for this activity. To help the Facilitator review each group's analysis, some examples are provided for the Facilitator below to help him/her give appropriate feedback to participants.

Example for the Facilitator

Facility or Organizational Structure	What Are the Operational Deficits at Your School(s)?	How Can the Facility or Organizational Structure be Strengthened?
School Library	▪ No internet ▪ No computer research stations ▪ Librarian sees her/himself as a custodian and not interested in working with students ▪ No maker-spaces	▪ Use a personal smartphone in place of a computer ▪ Use hotspot on smartphone to provide internet service ▪ Use school operating budget to pay for phone cards to support internet ▪ Replace the librarian with a more dynamic teacher ▪ Re-arrange library furniture to accommodate student discussions & activities
Student Clubs	▪ Clubs do not exist ▪ Clubs exist but have no teacher guidance ▪ Students/Teachers do not want to volunteer for club work because they are too busy with 'rien kua' ▪ Student Clubs have no budget	▪ School directors can actively advocate to recruit teachers who will volunteer for club support ▪ School directors can allocate some part of the school operating budget to club activities ▪ School directors advocate to reduce 'rien kua' activities so students have time to join clubs



Defining Project Work Activities and Identifying the Institutional Arrangements Needed to Facilitate Them

The Facilitator should begin this session by reminding participants that Project Work activities promote the creation of learning products. These products can take many forms. Try to brainstorm a list of Project Work activities with participants on the blackboard. Remind participants that these activities should exemplify higher order thinking skills. Give a few examples like Presentations, Exhibitions, etc. to give participants some idea of the kinds of activities they should be brainstorming about.

Next, pass out **Handout 6b:** *Definitions of Project Work Activities and the Institutional Arrangements That Can Facilitate Them.* Compare the list on the board with those in the handout. Discuss whether there are any activities that don't belong? Activities that should be added, etc. Review those activities that are in the Handout, particularly those that may not have shown up in the brainstorm list.

Following this discussion, ask participants to pick two activities from the list and do the exercise indicated in Handout 6b. Pass out poster paper to each group to do the required exercise. The exercise requires participants to think through all the institutional arrangements that would need to be in place for the Project Work activity to occur effectively; however, each group need only pick 'two' activities to analyze. An example has been provided in the handout to give participants some idea of how to do this exercise. Give groups about 20 minutes for this activity. When they are done, lead a guided discussion about the answers provided by each group. Hopefully, each group is analyzing a different Project Work activity so that the group presentations are diverse in terms of their findings. Some examples are provided for the Facilitator below to help guide the discussion and review the group responses provided. The Facilitator should note that some institutional requirements may be relevant for many projects (e.g., internet availability at classroom and/or library level).

Project Work Learning Activity	Required Institutional Requirements to Facilitate Specific Project Work Activities
Science Projects ***(Example from Handout 6b)***	▪ Provisions for a science teacher who volunteers to advise a science club ▪ Budget for scientific materials ▪ Enough time: Either extracurricular or an extended school day ▪ Access to a Science Club Training Manual ▪ Institutional willingness to accommodate the formation of a science club including access to budgetary resources ▪ Internet access in library or classrooms to do research
Group Work Projects	▪ Movable furniture ▪ Willingness of teachers to convert 'lecture' time into group work time. ▪ Adequate materials made available by the school for multiple groups to do a project of their choice ▪ Availability of classroom locations to display group project work such as a bulletin board.
Exhibitions	▪ Budgetary support from School Operating Budget or School Support Committee ▪ Available facilities in and outside of the classroom to display ▪ Teacher willingness to provide guidance to student groups to produce exhibits ▪ Internet access in library or classrooms to do research ▪ Printing facilities available either in the library or ICT lab
Presentations (Classroom-based)	▪ Ceiling-installed LCD Projector ▪ LCD Projector available for borrowing from School Office ▪ ICT lab access to presentation apps such as PowerPoint ▪ Internet access in library or classrooms to do research
Book Reports	▪ Diverse collection of library books to promote book reading ▪ Space available in classrooms or meeting halls for presentation on findings ▪ Access to computer and printing facilities to print reports.
On-line Research	▪ Internet access in library or classrooms to do research ▪ Space available in classrooms or meeting halls for presentation on findings
Field Trip Reports	▪ Budget available to bring students to sites of interest ▪ Internet access in library or classrooms to do research on sites visited

Project Work Learning Activity	Required Institutional Requirements to Facilitate Specific Project Work Activities
	▪ Access to computer lab and printing facilities to print reports.
Science Lab Task Work	▪ Access to science lab workstations ▪ Availability of science lab chemicals, materials, and equipment ▪ Science lab facilities are open to clubs and other groups for extracurricular work
Book Club Publications	▪ Institutional willingness to accommodate the formation of a science club including access to budgetary resources ▪ Availability of Writing Club budgets ▪ Budget from school and School Support Committee to print publications ▪ Willingness of school/library to accommodate meeting space needs of Writing Club members
Public Speaking Projects	▪ Availability of video recording equipment ▪ Institutional willingness to accommodate the formation of a public speaking or English Club including access to budgetary resources

Lesson 3.7 Effective Organization of Project Work Teams

Summary: This module reviews special techniques used in organizing student groups so that there is a clear division of labor and maximum engagement from all team members when undertaking Project Work activities.

Lesson Time: 4 hours

Facilitator Preparation:

- Make copies of **Handout 7a:** *Creating Effective and Balanced Project Work Teams.*
- Make FIVE copies of **Handout 7b:** *Role Play: Who's Who*
- Make copies of **Handout 7c:** *Students Reflect on Teamwork.*
- Divide participants into groups as described in the introduction.
- Give each group some sticky notes. Each group should have their own color. Make a note of which group has which color.
- Ask five participants to be actors in the role play. Choose a participant for each person in the role play: Panha, Sopheap, Sreyleak, Samnang, and Makara in the role play.

Resources/Materials:

- Poster sheet summarizing the learning outcomes of the lesson.
- Packs of sticky notes with 1 color per group
- Poster paper, one for each group, or more if there is no whiteboard
- Marker pens
- **Handout 7a:** *Creating Effective and Balanced Project Work Teams*
- **Handout 7b:** *Role Play: Who's Who* (5 copies only)
- **Handout 7c:** *Students Reflect on Teamwork*

Learning Outcomes:

1. Participants can distinguish a group from a team.
2. Participants can describe the three categories of roles on teams and explain why it is important to have a student or students who play at least one role in each category.
3. Participants understand the nine types of roles on a team.
4. Participants can evaluate students, in a simulated environment, and identify which students would be appropriate to play which role.
5. Participants can explain the importance of student self-reflection about the functioning of their team.
6. Participants can describe a worksheet or tool to give students to aid in self-reflection.

Training Session Plan

Review lesson objectives

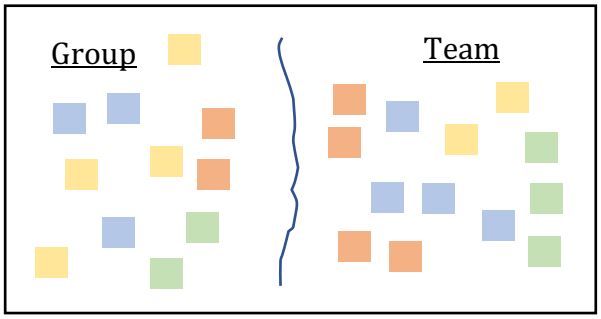
Place a sheet of poster paper up on the board that summarizes the learning outcomes for the lesson. Explain the outcomes and that this is what the participants should be able to do at the completion of the lesson. Explain how these relate to the overall goal of the session (from the summary).

Distinguishing Groups from Teams

Ask participants to gather in their group. As they join together, write "Group" on the left side of the poster or whiteboard, "Team" on the right side, and put a line down the middle separating the paper/board into two sections.

Pass out one pack of sticky notes to each group with each group having their own color. Explain to participants that they will be identifying the similarities and differences between groups and teams. They should discuss together these concepts and write one attribute of a group or team on each sticky note, e.g., "A group is a collection of people who…", "A team generally works by…" Each note should have only one statement about only a group or a team, not both.

As they discuss or after 10-15 minutes, they will put the sticky notes that pertain to groups on the left side of the whiteboard or poster paper and the sticky notes that pertain to teams on the right side. Allow more time if needed. The poster/whiteboard should look something like the image on the right.



Read out loud what is written on each of the notes for "Group". If the content is not clear or if a follow-up question is appropriate, direct attention to the group that corresponds to the color. Do the same for "Team".

Ask participants if they have any additional observations or things to add based on what they have heard.

Pass out **Handout 7a:** *Creating Effective and Balanced Project Work Teams.*

Read together what is written in the table on Handout 7a. The Facilitator can ask participants to read out loud to everyone if desired, one row per reader. Then, ask one teacher to read the paragraph starting with "It is clear…"

Explain to teachers that the next section is about building effective teams and what sorts of roles are needed to make a team that will work well together to do a project in school.

Ask teachers to take 5 minutes to write down a memory they have of students working in a group, perhaps on a project, where it did not go well, e.g., students

were not able to finish the project, their result was poor, the group did not work well together. Have them consider:

- What were the problems that members of the group faced?
- What was the source of the problems?

Ask for a few volunteers to share their stories. Listen for instances where:

- The students in the example given functioned as a group but not as a team.
- The issue was related to a poor mix of students, i.e., the team did not function well because they lacked one or more action-oriented, thought- oriented, or people-oriented members.

Ask participants if they noticed any patterns in the failure examples. The Facilitator follows up with his/her own observations about the two points above (i.e., group versus team, missing roles). Use this to transition into a discussion about the next topic: team roles.

Team Roles

The Facilitator explains in his/her own words the content in the paragraph starting with, "Every teacher…"

Ask students if anyone might give a try at explaining what might be the difference between people who are action-oriented, thought-oriented, and people-oriented.

Affirm people who shared and/or clarify the categories if needed. Then, go through each role and explain in detail.

- **Implementer:** An Implementer likes to take action and bring ideas into reality. They are also very disciplined about keeping things organized. They can support other team members too.
- **Driver:** A Driver is also one who takes action; they move the team forward and motivate others. When a problems happens, they move quickly to solve it. They are often leaders/managers of organizations.
- **Finisher:** A Finisher pays attention to small details and often works independently. S/he wants to make the result high-quality and motivates others to strive for the same.
- **Monitor:** A Monitor is good at strategic planning and generally has advanced knowledge. They consider ideas carefully and, if they are good and possible to do, they move the idea forward.
- **Innovator:** An Innovator is creative. They often think about ideas alone first and then bring them to the team later.
- **Specialist:** A Specialist has deep knowledge about a particular area. Like other thought-oriented people, they tend to work alone more than in a group. They bring their valuable expertise to the team.
- **Investigator:** An Investigator likes to explore new opportunities. They are very good at networking with other people, so generally are effective at things like sales and marketing.

- **Teamworker:** Teamworkers work well with others and are good listeners. Then can deal with conflict by calming people down and making peace. They are adaptable and can step in if a team member has too much to do.
- **Coordinator:** A Coordinator encourages collaboration in the team and are good at motivating the team to meet their goals. They are excellent communicators and are trusted by others.

Ask the students to return to their group briefly and reflect on the dynamics of how they worked together on the previous *Group Versus Team* activity with the sticky notes. They can discuss the following questions which are in the handout.

Discussion Questions

- Could you see from the brief interaction that different people were playing different roles?
- In what ways did the group work well together? Can that be explained by the information we have now seen about the roles needed on a team?
- Did you have any challenges? Why? Can any of those struggles be explained by the information we have now seen about the roles needed on a team?

While they are still in their small groups, talk about examples of team issues. Use the following content or state in your own words. "In a school setting, the necessity of these roles becomes clear. A team made up of similar students might get along well but the result can be disastrous. For example, a team made up of students in only thought-oriented roles might never bring their ideas together and move forward in an organized fashion. The lack of communication and teamwork will make this even more difficult. Even missing one role can prove to be problematic. For instance, if a team has no one playing the role of Finisher, they may have a product which is well thought through, built in a collaborative way, organized and driven by effective members, but it may not be of the highest quality it could have otherwise been if there was a Finisher to check over the final product."

Ask participants to think back about the examples shared about failures of students working in a group. In their small group, request that they revisit those examples shared or examples that they wrote about from their own experience and discuss the following questions.

Discussion Questions

- Which of those examples show issues that relate to team roles?
- What was the nature of the issue?

Explain what is meant by a "stretch project". The Facilitator can use the following content or state in his/her own words. "Students are still developing in many ways. A teacher might recognize that, while a student might not be a skilled Investigator, he shows a natural tendency in a social setting to be a networker. Another student might not have the confidence to be an Implementor but she has the skill to do so. Teachers can intentionally direct students into these roles to foster growth, making the activity a "stretch project" for the students—an opportunity to develop."

Role Play: Who's Who?

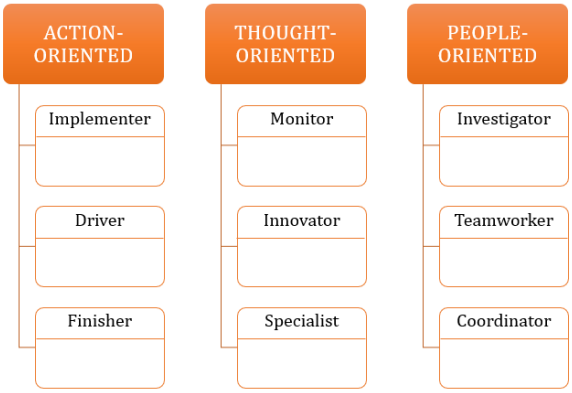
Pass out **Handout 7b:** *Role Play: Who's Who* to the five actors. Explain what is happening next: They will listen to a conversation among five students who have just formed a team to do a project about reducing the use of Styrofoam in Cambodia.

Tell participants to listen carefully to the conversation in light of the discussion about roles. Try to detect who is already stepping into a role and who they think might be appropriate for a role based on what they say in the short conversation.

Ask the actors to come to the front of the room and arrange them so that they are mostly facing the class. Ask them to introduce themselves by giving their actor name. Then, they are to act out the role play, speaking their parts loud enough for everyone to hear.

Students return to their small groups and write student names in the boxes below and discuss among themselves why they think that the student is likely to or appropriate to play the role specified, noting that students can play multiple roles in a group.

One person can be the notetaker for the group, writing the names on the handout.



While the students are in their small group discussions, the Facilitator draws the diagram on a poster or whiteboard.

The Facilitator begins the discussion by selecting one group and asking them which students they thought were action-oriented. Write those names near the "Action-oriented" box. Go to the next group and ask them if they agree and/or if they would add another student or students. Starting with the last group, ask them which particular students they would put in each action-oriented role, i.e., Implementer, Driver, Finisher. Write those names in the boxes. Again, ask the other groups if anyone had another answer. Write the names of all the students mentioned in the boxes.

Continue to "Thought-oriented" and do the same process. Again, follow the same process for "People-oriented".

Mention that in the short conversation, it is not possible to know for certain who might play what role and if the team will be well-functioning; however, some clues are evident even in that short role play.

Working individually, ask participants to write answers to the following questions about the role play. These questions are also in the handout.

Individual Reflection Questions

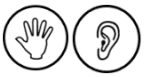
- Based on what you know about the student members of the team, what parts of the project will come easy to them? What sorts of activities will they likely be able to perform well?
- Similarly, what sorts of activities might be a challenge for the team based on the members? Why do you think that might be challenging? And, what can the team members do to mitigate against that/those becoming an issue?
- Should the teacher do anything to ensure the proper functioning of the team? If so, what should s/he do? If not, why do you think that the teacher should have a hands-off approach?

Briefly go through the questions in the large group asking participants for their thoughts on each. Add your own reflections and/or feedback as desired.

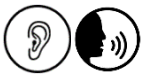
Student Self-reflection

Explain that students reflecting on the *processes* that were a part of their efforts is an important component of the Project Work enterprise. Sometimes this reflection bears as much or more fruit than the doing of the project itself. This reflection includes thinking about how students worked *as part of a team*.

Explain that students should be doing this on their own throughout the project and the teacher should emphasize that. At the end of the project, for sure the students need to do a formal reflection about how their team worked together.

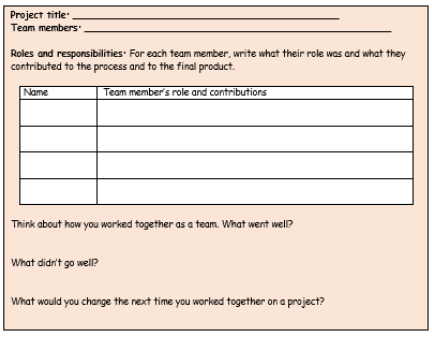


Pass out one piece of poster paper per group. Ask them to think about a worksheet that they would give to student teams to lead them in a teamwork self-reflection exercise. What questions would they like the students to reflect on? What sorts of analyses about the project process related to teamwork would you like them to make? Ask the groups to create a worksheet that would be given to each team for them to fill out at the end of the project titled, "Self-reflection about Teamwork".



After small groups have been given enough time, ask each group, one by one, to come to the front to explain their worksheet. At the end, reflect on similarities among the groups about the sorts of questions they would include in a self-reflection worksheet.

Pass out **Handout 7c:** *Students Reflect on Teamwork* and ask participants to read through the example worksheet.



Project title: _____
Team members: _____

Roles and responsibilities: For each team member, write what their role was and what they contributed to the process and to the final product.

Name	Team member's role and contributions

Think about how you worked together as a team. What went well?

What didn't go well?

What would you change the next time you worked together on a project?

Tell them that they could also require a similar individualized self-reflection worksheet to be filled out by each participant where they rate team members on their level of effort. These should be done anonymously to encourage honest feedback.

Remind the participants that this post-project reflection is very important and that the purpose of project work is not only to augment content knowledge but also to build life skills. In the future, when student team members become organization team members, corporation team members, or family "team members", this sort of meta-analysis will likely pay dividends.

Lesson 3.8 Effective Use of Resources for Project Work Activities

Summary: This module provides guidance on the effective use of material, budgetary, time, technological, and other resources so projects are feasible, even when such resources are in short supply. The module also specifically provides guidance on how to organize resources to implement Project Work Fairs.

Lesson Time: 4.5 hours

Facilitator Preparation:

- Write up the Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.
- Make copies of **Handout 8a:** *The Kinds of Resources Schools Should Provide to Facilitate Project Work*
- Make copies of **Handout 8b:** *Case Study Analysis on Managing Resources*
- Make copies of **Handout 8c:** *Organizing the Resources for a Project Fair*
- Make copies of **Handout 8d:** *Project Work and Useful Technological Tools (Optional)*
- Prepare Talking Points for a Devil's Advocate Debate

Resources/Materials:

- Poster paper, marker pens
- Poster sheet summarizing the learning outcomes of the lesson.
- **Handout 8a:** *The Kinds of Resources Schools Should Provide to Facilitate Project Work* Stuff
- **Handout 8b:** *Case Study Analysis on Managing Resources*
- **Handout 8c:** *Organizing the Resources for a Project Fair*
- **Handout 8d:** *Project Work and Useful Technological Tools (Optional)*
- Talking Points for a Devil's Advocate Debate

Learning Outcomes:

1. Participants can describe the different kinds of resources that are needed at their schools to facilitate the implementation of Project Work.
2. Participants can determine important measures to improve resource management in their schools based on a better understanding of the resources needed to implement Project Work activities.
3. Participants can explain some of the key resources needed to organize a Project Work Fair at their school.
4. Participants can identify the reasons that schools often do not implement Project Work as well as what to do increase the adoption of this methodology.
5. Participants can explain why advances in technological resources align so well with more effective implementation of Project Work Methodology (Optional).

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the module. Explain the outcomes and that this is what the participants should be able to do at the completion of the module.

The Kinds of Resources Schools Should Provide to Facilitate Project Work

The first session in this module is a key one as it summarizes the key categories of resources needed to support Project Work activities at a school. Before starting an explanation of these resources, ask participants to make a list of some resources that they think are necessary for Project Work activities, based on what they currently know about this methodology from previous modules.

Do the listing activity mentioned above as a large group while the Facilitator writes the names of resources on the board. Some of the resources suggested by participants may be specific things (e.g., computer, microscope, etc.) while others may refer to the names of general categories (e.g., Financial Resources, Equipment, Technological Resources, etc.). For now, the Facilitator should write all resources suggested by participants on the board as though this were a brainstorming activity.

When the Facilitator has written 15 or more items on the board, take a pause to review the list together. Try to determine which items are 'specific kinds' of resources and which items refer to 'general categories' as described above. The Facilitator should circle the items that refer to general categories, as shown in the example below:

• *Computer* • *Time* • *Paper* • *Stationery*	• *Money* • *Teachers* • *Equipment* • *Camera*

The Facilitator should next point out that some of the more specific items in the list of resources developed by participants can be classified under the general categories. For example, a camera and a computer are examples of 'Equipment.' This and other examples should provide a good introduction to the resource classification framework that is discussed in **Handout 8a:** *The Kinds of Resources Schools Should Provide to Facilitate Project Work.* The Facilitator is now ready to pass out this handout to each participant.

The Facilitator should review each of the resource categories indicated in Handout 8a and the specific examples cited for each. Some of the key characteristics of each resource category are highlighted in bold print. As the Facilitator goes through the handout with participants, try to lead a guided discussion by observing the following strategies:

Guided Discussion Strategy

- *Ask participants whether there are any categories that seem to overlap (e.g., Equipment and Technological Resources)*
- *Ask participants if they see any grey areas in the categories listed (e.g., Are Reference Materials simply another kind of Material? Why might it be a good idea to separate them?)*
- *Periodically ask participants to what degree they have these kinds of resources at their own schools.*
- *For those resources that require special management requirements like putting two study periods of 45-minutes together (especially for the STEM subjects) to ensure students have more time to work on experiments, ask participants whether this is feasible at their school. Why or why not?*

When the Facilitator has finished reviewing the Resource Classification Framework in Handout 8a, ask participants to work in their groups to complete the exercise provided at the end of the handout. Pass out some poster paper and marker pens for each group to work on this exercise.

In the exercise, participants should review the questions asked in the table and indicate how their school rates in terms of the availability of this resource at their school to support Project Work. Use the 5-point scale provided. For those groups that get a rating of 3 or less, ask the group to jot down some bullet points about how they might strengthen the availability of this resource to support Project Work activities. The Facilitator might consider doing an example with participants together. An example is provided below:

Resource Category	My Rating	How can my school improve its resource situation to support Project Work?
1. Human Resources: • Do teachers know how to implement Project Work? • Are teachers willing to volunteer to work with student clubs? • Do my students have a mindset where they are open to doing project work activities?	**2**	• *SMC can advocate for the establishment of clubs* • *Provide incentives to teachers who volunteer to lead clubs/do project work.* • *Find someone who can mentor teachers in doing Project Work.* • *Organize exposure visits to schools that do project work.*
2. Material Resources: • Do classes have adequate access to stationery supplies? • Are science labs well-equipped with supplies/materials? • Do clubs have access to materials to do activities?	**1**	• *Science lab should be repaired so that it is more usable.* • *Advocate with SMC to keep more funds for the purchase of stationery supplies.* • *Organize subject classrooms so that materials can be kept in individual classrooms.* • *Provide annual budgets to clubs as part of the annual School Improvement Planning process.*

After doing some examples together with the large group, the Facilitator should next ask participants to work on the remaining categories in their small groups. Give about 40 minutes for this exercise. Ask participants to share their analyses with the large group when they are done. The Facilitator should note similarities and differences between presentations and ask provocative questions about why they can or cannot make these resources available. For example, why can't they extend the school day? Why can't they combine classes? Why can't they increase the SOF budget allocation to Project Work supplies? Etc.

Case Study Analysis on Managing Resources for Project Work

The Facilitator should start this session by explaining that the mere availability of resources may not support Project Work activities very effectively if those resources are not managed well. To provide a case study of a well-managed school with effective allocation of resources to Project Work activities, pass out **Handout 8b:** *Case Study Analysis on Managing Resources.* The exercise provided in the handout may be done as a large group exercise or in a small group, depending on the availability of time. The important thing is to help participants reflect on how the case study school has managed its resources to make Project Work activities prosper.

As participants read through each paragraph, ask whether this level of management to promote Project Work might be possible at their own schools. The Facilitator can ask questions that zero in on some of the resource management features of this school that promotes Project Work. Here are some questions to consider:

Guiding Discussion Questions

- *Does your school create School Improvement Plan budgets each year?*
- *Does your school have a special line in the SIP Budget for Project Work Fairs?*
- *Does your school ever advocate with the School Support Committee to support Project Work?*
- *Does your school organize clubs? Is it easy to get teachers to volunteer to work with these clubs?*
- *How accessible is the library at your school? Is it open at lunch time? Is it open in the afternoon? What about the science and ICT labs? Are they open to students to use between class periods?*
- *Are there printers available to students to use?*
- *If LCD Projectors are in short supply at your school, is there a way to borrow them for classroom use?*
- *Are any rooms in your school wired? Is the password available to students to use? How difficult would it be to organize limited internet access at your school?*
- *Are there any computer workstations available in the school? Can teachers/students use them? How do they get access to them?*

In addition, note the relevant resources implied in each paragraph of the case study. Ask participants what general resource categories are implied by each paragraph. Suggested answers for the five paragraphs in the case study are provided below for the Facilitator's reference:

Paragraph	Implied Resources (Answers)	
1	• *Budget* • *Human Resources (for planning)*	
2	• *Human Resources (both among teachers & students*	
3	• *Spatial Resources* • *Human Resources* • *Budget*	• *Materials* • *Time*
4	• *Human Resources* • *Materials*	• *Spatial Resources* • *Time*
5	• *Spatial Resources (e.g., Facilities)* • *Equipment*	• *Reference materials* • *Technological Resources*

Organizing a Project Fair and Debating Its Merits

The present session provides to participants an excellent resource guide about how to organize a Project Work Fair. Such events are the most resource-intensive kind of activity that a school can organize to promote Project Work. Such fairs provide a great opportunity to students to use their creative skills. The Facilitator should, therefore, explain that it is for this reason that we spend some special time on how to organize one's resources to implement a Project Fair. Start the session by passing out **Handout 8c:** *Organizing the Resources for a Project Fair.* This handout contains a great deal of information organized into 7 parts:

• Introduction • Variations to Consider in Organizing a Project Fair	Group 1
• Key Steps to Follow When Organizing a Project Fair	Group 2 (Can use two sheets of Poster Paper)
• Example of Project Floor Plan for Project Fair • How to Set Up a Project Exhibit	Group 3
• Documenting the Project	Group 4
• Judging Student Projects	Group 5

Rather than just providing a long lecture on this handout, the Facilitator may consider using the participants themselves to present this information. For example, the Facilitator may assign the 4 or 5 groups in the workshop to summarize one or two topics in their small groups using only one sheet of poster paper (they cannot use more than this). Limiting the amount of available paper will force each group to focus on the most key points. After about 25 to 30 minutes, each group may then present their summaries to the whole group. For any questions about individual presentations, the Facilitator can assist in providing more detail. An example of how to divide the topics among groups is provided in the table above.

Organizing a Debate: Following the presentations on the mechanics of organizing a Project Fair, the Facilitator should explain to participants that we are going to organize a debate on the merits of Project Work Fairs. As a first step, the Facilitator may read the following statement to the whole group to provide some background:

> **Background Statement:** Project Fairs are a great activity to help students use their creative powers to better understand specific principles and ideas. The sad reality, however, is that few schools in Cambodia ever organize Project Fairs even though everyone gives lip service to the idea that it is a wonderful activity to do. The reasons that schools do not organize Project Fairs are often left unsaid. The purpose of the present exercise is to get the 'pros' and unspoken 'cons' of organizing Project Fairs out into the open where all participants can consider the real obstacles to replicating a Project Fair at their school.

After reading the above statement, the Facilitator should explain that the debate exercise is intended to be a 'fun' activity where participants will be allowed to say outrageous things that they might not ordinarily say in public. Participants may not necessarily

believe these outrageous things but are playing what we call 'Devil's Advocate.' Being a Devil's Advocate is a process where someone says things that are not popular or politically correct but says them not because he/she actually believes these ideas but because they want to get them out into public for people to discuss them.

For this exercise, the Facilitator needs to organize a 'Devil's Advocate Debate.' The 'Debate Statement is as follows:

Debate Statement: Project Work Fairs are effective and useful activities that all schools should practice.

Write the statement on the board for the whole group to see. The Facilitator should then seek out 3 to 5 volunteers to be the 'pro' Project Fair Group and another 3 to 5 volunteers to be the 'anti' Project Fair Group. For the anti-Project Fair group, we want to get some brave people to say politically incorrect things because many teachers/school directors may actually be thinking these ideas, but do not dare to say them. In order to solve these issues, we have to get them out into the open. The Facilitator should give each debate group a list of 'talking points' that argue for and against Project Fairs. Here are some 'Talking Points' for each group to consider:

Talking Points for the Pro Group	Talking Points for the Anti Group
• Project Fairs provide an opportunity for students to be creative. • Fairs are fun activities that make students love learning. • Fairs help schools to show parents and local officials what and how they are teaching local students. • Fairs help Cambodian society to meet the challenges of the 21st Century economy • Fairs help students to gain deeper understanding of their lessons by applying what they learn.	• Fairs are too expensive and take money away from other activities like bringing teachers to Kampong Som for vacation. • Fairs interfere with the ability of teachers to teach rien kua. • Fairs take too much time and undermine the school's ability to teach all subjects by the time examinations occur. • Fairs take time away from studying for the Bac II Examination. • Fairs require too much work from teachers and school managers who have more important things to do. • Most schools have no budget or other needed resources to organize project fairs.

There may also be more points than this but this gives an idea to group members.

The Facilitator should give each group their 'Talking Points' on a separate sheet of paper and prep them for a few minutes (perhaps during the coffee break) before the debate begins. Set up three chairs at the front of the workshop room on one side and three chairs on the other side to seat each debate group. One group may start the debate with an opening statement followed by the other group. Then, each group should respond back and forth to the points made by the other group. Allow the debate to continue for about 15 to 20 minutes.

While the debate is going on, ask the participants who are listening to jot down the pros and cons of each side's argument using the table provided at the end of Handout 8c.

When the debate is over, ask participants about the validity of the arguments made by each group. Lead a wrap-up discussion about how widespread the beliefs of each side are, how can some of the critiques of the anti-Project Fair group be addressed, and whether their own beliefs had changed at all.

Project Work and Useful Technological Tools (Optional)

The present session discusses the availability of technology as another enabling resource that can promote Project Work. Such resources take the form of technological tools such as social media networks and search engines, as we have discussed earlier. The Facilitator may consider starting the session by writing the following statement on the Board:

The rapid advancement of technology in the 21st Century has promoted a rebirth of Project Work Methodology.

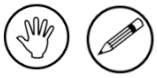
After writing this statement on the board, the Facilitator should start a discussion with participants about why they think that the statement above is correct (or not correct). That is, what is it about technology that has promoted increased interest in Project Work Methodology in our century? Some participants may quickly catch onto why this is the case but in case most are quiet on this issue, the Facilitator may make the following points to help with a guided discussion:

Discussion Guide about Why Project Work is Thriving in a Technology Rich Environment

- Technology has introduced numerous ***social media channels of communication*** such as *Telegram, Messenger, What's App,* etc., which has made it much easier to practice collaborative learning (a key component of Project Work). With the availability of electronic communication, students do not have to be in school to collaborate but can do so from home or any location.
- The invention of ***search engines*** on the internet such as *Google* has made student research, another key aspect of project work, much easier. Libraries no longer need to have extensive book collections for students to research their projects. Now they can use library-based search engines linked to the internet.
- The invention of advanced ***word processing programs*** such as *MS Word* and ***presentation applications*** such as *MS PowerPoint* have made it much easier to create reports, presentations, and other knowledge products. Since Project Work is all about the creation of knowledge products, these developments in technology have been a great advantabe to Project Work activities, which did not exist for most of the 20th Century when Project Work was first developed.

The above discussion should demonstrate to participants what an important role technological tools and resources can play in the implementation of Project Work Method. To follow up on this discussion, pass out **Handout 8d:** *Project Work and Useful Technological Tools.* This handout helps to summarize some of the key points made above. It also provides some specific examples of the technological tools that can be used to promote Project Work such as the following:

- Telecommunication tools
- Word Processing and Presentation Applications:
- Online Workstations in the Library:
- Networked writing programs
- Electronic Simulations



Review each of these tools as a large group and then ask participants to do the exercise provided at the end of the handout. Pass out some poster paper and request participants to rate each of the tools in terms of the difficulty of using them at one's school and which ones would be most feasible to use in terms of supporting Project Work activities. Provide participants with about 15 minutes for this exercise and then ask each group to present their analyses.

The important thing for participants to gain from this exercise is to help them realize to what extent they can incorporate various technological tools into existing institutions at their school (e.g., providing access to search engines in the library, installing LCD Projectors in classrooms, etc.) and how this can strengthen the enabling institutional environment at their school.

Technology Tool	**Difficulty Rating**	**Choose the tool(s) that you think would be easiest to use at your school; what is it about this tool that you think is easier; and how would you use it for Project Work at your school? You may limit your explanation to only 1 or 2 tools.**
Telecommunication tools		
Word Processing and Presentation Applications:		
Online Workstations with Access to Search Engines in the Library:		
Networked writing programs		
Electronic Simulations		

Lesson 3.9 Possible Variations in Project Work by Subject

Summary: This module provides guidance about how Project Work activities may vary by subject as well as concrete examples of subject-specific Project Work.

Lesson Time: 3 hours

Facilitator Preparation:

- Make copies of **Handout 9a:** *Projects by Subject Area*
- Make copies of **Handout 9b:** *Possible Project Outputs by Subject Area*
- Make copies of **Handout 9c:** *Cross-Subject Area Projects*
- Give each group some sticky notes. Each group should have their own color.
- Divide participants into groups where all members teach different subject areas.
- Write two sets of Discussion Questions on a poster or posters—see below.

Resources/Materials:

- Poster sheet summarizing the learning outcomes of the lesson.
- Poster sheet with secondary school subject area listing.
- Poster sheet(s) with Discussion Question sets.
- Packs of sticky notes with 1 color per group.
- **Handout 9a:** *Projects by Subject Area*
- **Handout 9b:** *Possible Project Outputs by Subject Area*
- **Handout 9c:** *Cross-Subject Area Projects*

Learning Outcomes:

1. Participants can give examples of projects in all secondary school subject areas.
2. Participants can identify the various Creative Outputs and detail how projects in different subject areas can render those Creative Outputs.
3. Participants can envision projects that bring together content and/or skills learned in multiple subject areas.
4. Participants can articulate some of the hurdles to implementing cross-subject area projects and have some notions about how those might be overcome.

Training Session Plan

Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the lesson. Explain the outcomes and that this is what the participants should be able to do at the completion of the lesson. Explain how these relate to the overall goal of the session (from the summary).

Is Project Work possible across all subject areas?

Ask participants to consider if project work is possible across the entire secondary school curriculum or if it is only appropriate and/or possible in particular areas.

The facilitator should make clear to participants that Project Work is intended to be used across the secondary school curriculum, not only in science courses as is sometimes thought. In this session, participants will explore how a project might look in a variety of subject areas.

Post on the wall the paper which lists the Cambodian secondary school curriculum.

Subject by subject, ask participants for example projects for each of the secondary school courses. Write their examples in the right column on the poster paper (see image). If no one can think of an example after a few moments, move on to the next course. At this point, it is not important to have the entire table filled in.

Course	Example projects
Mathematics	
Science	
History	
Geography	
Civics	
Literature	
Social Sciences	
Computer	
...	

Ask participants to gather into new groups made up of members who all teach *different subjects* and give a copy of **Handout 9a**: *Projects by Subject Area* to each participant.

Read through the examples in handout explaining that these are example projects in each of the required and optional courses in the secondary school curriculum. Their task, in their small groups, is to think of one or more projects for each curriculum area.

Monitor small groups and stop the brainstorming session when they appear to have filled up their sheet or have come to a standstill.

In the whole group, ask participants if there were any groups who could not come up with a project for one or more of the curriculum areas. If that was the case, start with that subject or those subjects and ask the rest of the groups to share the project(s) that they came up with. Write them down on the poster. For the remaining subjects, you can go through each and ask a group for their project example(s), then

move to the next subject and group. By the end of the exercise, the facilitator should have at least two project examples for each subject written on the poster.

Creative Products across subject areas

Ask participants if there are Creative Products that are unique to particular subject areas.

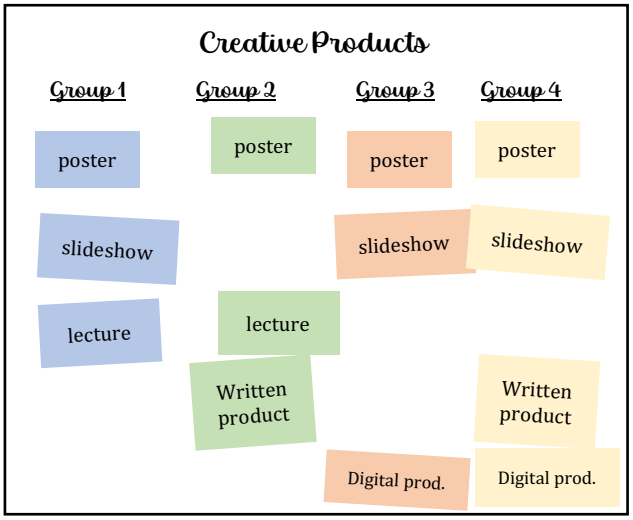
The facilitator explains that, while there are certain Creative Products unique to particular subjects, like the results of a lab experiment shown in petri dishes, many Creative Products can be the output of the projects across multiple subject areas.

Pass out one pack of sticky notes to each group with each group having their own color.

Working as a group, ask participants to write all of the Creative Products they can think of that might result from a project—1 product per sticky note. Set a time limit of 120 seconds. The participants should think of and write down as many as possible during the given time. The "winner" is the group with the greatest number of unique (and legitimate) Creative Products.

Hang up the Creative Products brainstorm poster while groups are working.

When the time is finished, back in the big group, start with the first group and ask them to read their sticky notes, one by one, and post them under their group number on the poster hung on the wall. For subsequent groups, they are to do the same; however, if their Creative Product has already been mentioned, the sticky note should be placed in the same row as the other mention. See example on the right.



Give a copy of **Handout 9b**: *Possible Project Outputs by Subject Area* to each participant.

Explain that the handout shows various Creative Products (lecture, poster, written product, digital slideshow, other digital product, physical construction, experiment, play/production, debate) and how those might be generated through projects in a variety of subject areas. Go through each example:

- "1. 'ទុំទាវ for the 21st Century'" is a play that students produced in their Khmer Literature class which brings the traditional story into today's time. The "1"

(project number) appears under the "Khmer Literature" subject column and the "Play/production" row.

- "2. 'Now We Bear Fruit: Sharing Stories 1975-1979' Google map" is the Creative Product which arose from a Driving Question regarding whether Cambodians were dealing with the memories of war effectively. Students gave a lecture about the digital product that they created, hence the "2" in two Creative Product rows.
- "3. Natural versus Chemical Fertilizer" was a science experiment that resulted in several plants as well as a poster explaining what the students had done. See "3".
- "4. 'Social Media Ethical Guidelines for Buddhists'" was the written publication which came out of a group's research in this area. Also, as a part of their project, they led a class debate on the notion of Buddhists following guidelines. See "4".

Working individually, ask that participants write down projects in the remaining subject areas in the table (5, 6, …) and then identify the Creative Product(s) that those projects generate, i.e., put the number of the project in the table cell that corresponds to the subject area (column) and Creative Product (row). They can use projects that they already identified before.

While students are working, write the discussion questions below on a poster and post on the wall.

Request that participants join their small group once again. They are to share any thoughts or observations that came out of their exercise in **Handout 9b** and then they are to discuss the following questions.

Discussion Questions

1. Are there particular subject areas that lend themselves well to certain Creative Products?
2. Is there any Creative Product (or Products) that may come out of a project in all subject areas? If so, why is that Creative Product (or Products) so versatile?

After allowing for a few minutes of discussion, bring the participants back together in the large group and ask if there are any interesting ideas, thoughts, or questions that came out of their small group discussion.

Cross-subject area projects

Explain that project work allows the unique opportunity for students to engage in academic activities that span subject areas. Students can combine Social Sciences with Computer when it comes to developing their Creative Product—something digital. They might use mathematical skills to create a work of art or evaluate the results of a science experiment.

Give a copy of **Handout 9c**: *Cross-Subject Area Projects* to each participant.

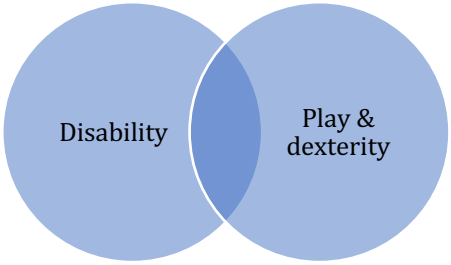
Go through **Handout 9c**: *Cross-Subject Area Projects* and remind students that these are example projects which they have seen before. They may not have noticed, but in the doing of the particular project, students are engaging in content and using skills which are in multiple subject areas.

Ask the students to briefly circle up in their usual group do two things: (1) Determine which subject areas are involved in each of the four example projects, i.e., fill in the blanks next to the numbers 1 and 2 for each; (2) Reflect on a new or previously mentioned project which involves cross-subject research and/or Creative Product creation.

After allowing enough time for completing both tasks, bring the participants back together. Using the Answer Key provided, go through the answers for the four project examples. Then, group by group, ask them to share one of their cross-subject area project ideas.

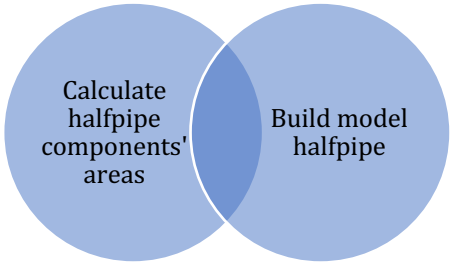
Answer Key

Project: Created a game for students with visual impairment which will help their physical dexterity.



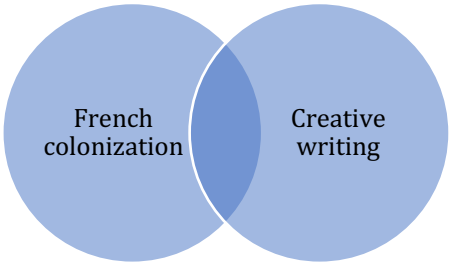
1. Social Sciences
2. Physical Education

Project: Designed and built a model skateboard halfpipe describing dimensions, areas, and cost of materials for all components.



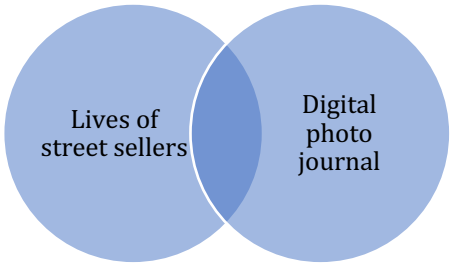
1. Mathematics
2. Arts & Crafts

Project: Wrote a fictional story about the "history" of Cambodia if the French had not established a Protectorate.



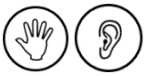
1. History
2. Khmer Literature

Project: Followed street sellers for one day and created a digital photo journal of their lives and activities.



1. Social Science
2. Arts & Crafts

Next, ask participants to reflect on if there are institutional barriers to students doing cross-subject area projects. If so, what are they? How can they be overcome? Give them some time to write down their reflections individually.



Post the questions below on the wall and ask the students to briefly circle up in their usual group and discuss the questions.

Discussion Questions

1. What institutional barriers exist which might prevent students doing cross-subject area projects?
2. Are they philosophical or practical?
3. How might those barriers be overcome?

Bring the participants back together, go through each question, and write group reflections on a poster.

Lesson 3.10 Different Techniques that Can Be Used to Evaluate Project Work

Summary: This module seeks to help teachers use various techniques in assessing Project Work including dynamic, process-oriented, informal, or portfolio-based strategies.

Lesson Time: 2 hours

Facilitator Preparation:

- Write up the Learning Outcomes of the lesson on a sheet of poster paper to introduce the lesson.
- Make copies of **Handout 10a:** *Contrasting Evaluation of Traditional Learning and Project Work*
- Make copies of **Handout 10b:** *Evaluation Strategies in a Project Work Learning Environment*
- Make copies of **Handout 10c:** *Concrete Examples of Evaluation Strategies Used to Assess Project Work*

Resources/Materials:

- Poster paper, marker pens
- Poster sheet summarizing the learning outcomes of the lesson.
- **Handout 10a:** *Contrasting Evaluation of Traditional Learning and Project Work*
- **Handout 10b:** *Evaluation Strategies in a Project Work Learning Environment*
- **Handout 10c:** *Concrete Examples of Evaluation Strategies Used to Assess Project Work*

Learning Outcomes:

1. Participants can explain why Project Work requires special strategies for evaluating students' learning.
2. Participants can identify some key strategies for evaluating learning in a Project Work Learning environment.
3. Participants can describe some of the key characteristics of each evaluation strategy used to assess Project Work.
4. Participants can effectively compare and contrast the characteristics of different evaluation strategies used to assess Project Work using a special table designed for the purpose.

Training Session Plan

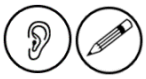
Review lesson objectives

Place a sheet of poster paper up on the board that summarizes the learning outcomes for the lesson. Explain the outcomes and that this is what the participants should be able to do at the completion of the lesson.

Constructivist Processes and Products

The Facilitator should begin this session by explaining that traditional evaluation strategies (e.g., tests, quizzes, etc.) do not lend themselves well to assessing Project Work because the teacher needs to know about the internal process of thinking used by the student to create learning products. That is, understanding how students come to a solution or conclusion about something is as important as the product or solution itself.

After starting with this explanation, pass out **Handout 10a** to help participants understand the contrast between Traditional and Project Work Learning methods and the implications.



Next, organize a small group discussion in which participants examine the cartoons provided in the handout and answer the questions provided at the bottom of the page. Provide about 15 minutes for this small group discussion. Then, review the answers of each group in a large group to ensure that they understand how learning is different in the two contexts and how this would affect student assessment. Use the suggested responses provided below to help guide the large group discussion:

Discussion Questions

1. **What levels of thinking are implied in the evaluation implied in Picture A? in Picture B? Use Bloom's Taxonomy to frame your answers.**
    a. *Picrture A: Memory, Understanding (perhaps Application)*
    b. *Picture B: Application, Analysis, Synthesis, Evaluation*
2. **List the advantages and disadvantages of the evaluation strategies implied in both Picture A and Picture B.**
    a. *Picture A Advantages:*
        i. *Easy to evaluate students through simple tests and quizzes*
        ii. *Requires evaluation that fits well into the traditional assessemnt frameworks of most schools*
    b. *Picture A: Disadvantages*
        i. *Students are not challenged by learning tasks*
        ii. *Learning occurs at a very shallow level*
        iii. *Students have little opportunity to think critically or be creative.*
    c. *Picture B Advantages:*
        i. *Students are challenged by learning tasks*
        ii. *Learning tasks encourage higher order thinking skills*
        iii. *Teachers develop a good understanding of how children think and where they may be experiencing challenges*
    d. *Picture B: Disadvantages*
        i. *Implied assessment methods are very time intensive*
        ii. *Requires new methods of student assessment that many teachers may*

not be familiar with

iii. *Does not fit well with traditional assessment framewrorks used in most schools*

3. **Why do you think teachers in Cambodia do not often use the learning and evaluation strategies implied in Picture B?**
    a. *Most teachers simply focus on teaching to traditional test formats, which do not foster critical thinking.*
    b. *Most teachers are not aware of the evaluation strategies implied by Project Work and similar methodologies.*
    c. *Many teachers have other priorities outside of the classroom and do not have the time to use more time-intensive teaching and assessment technques.*
    d. *Other?*

After the above discussion is completed, pass out **Handout 10b** to review some of the specific evaluation strategies used by educators to assess students' learning in a Project Work Learning environment. These strategies include the following:

- Dynamic Assessment
- Portfolio Assessment
- Process-oriented Assessment
- Informal Assessment

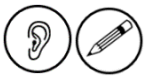
Review some of the key characteristics of these assessment strategies with participants using the handout provided. During this review, be sure to note some of the following points:

- These strategies require a high level of interaction with individual students and the groups that they work in.
- These interactions often take the form of interviews, informal discussions, and observations of student behaviors among others.
- There is as much focus on the process of learning as the actual products and solutions that may result during the completion of a learning task.
- There is often a great deal of overlap between these different strategies in terms of their characteristics.

These strategies can also complement the more formalized evaluation frameworks with the information that they generate about students' learning.

Next, the Facilitator should give further explanation of the discussion above by providing some concrete examples of the evaluation strategies identified in **Handout 10b**. For this purpose, pass out **Handout 10c** and review each example provided as a means to exemplify the explanations provided earlier.

Following these explanations, ask participants to complete the small group exercise provided at the end of **Handout 10c.** Give about 20 minutes for this exercise so that participants can complete the table provided. Pass out poster paper for groups to document their answers.



When groups have completed their tables, ask them to put them on the wall to compare answers. Use the notional answers provided below as a tool to guide your subsequent discussion to reconcile answers and further participants grasp of key concepts.

Factor	Dynamic Assessment	Portfolio Review	Process-oriented	Informal Assessment
Timing (e.g., before, during, end of task)	Continuous	Terminal	Continuous	Continuous
Product Focus (e.g., high, low, etc.)	Moderate	High	Low	Moderate
Process Focus (e.g., high, low, etc.)	High	Moderate	High	High
Teacher Interaction (e.g., high, low, etc.)	High	Moderate	High	High
Use of Formal Assessment Techniques (e.g., checklists, tests, etc.)	Moderate	High	Moderate	Low

4. Participant Course Materials (Handouts)

HANDOUT 1a: Some Key Facts about Project Work and Where it Came From

Definition: The Project Work Method is a teacher-facilitated, **collaborative approach** to learning in which students acquire and **apply knowledge and skills** to define and solve realistic problems using a process of extended inquiry or **research.** Projects are student-centered in their implementation, following standards and **milestones** that are clearly identified.

Origins:

Started in the United States in the 1920s as a way to promote active learning.

It has evolved and changed significantly over the last century.

Different Types:

There are several terms used to refer to Project Work approaches such as:

Project Work Method (Basic)

Project-based Learning

Problem-based Learning

Each of these are different in subtle ways.

Key Traits:

Although there are several different types of Project Work Learning, they all share some common traits such as:

Collaborative

Applied Learning

Research-oriented

Focus on Creative Products

Some Common Questions about Project Work Method

QUESTION: Is there more than one kind of Project Work Method?

- Yes, there are several iterations of Project Work Method that are different in subtle ways. As noted above, people sometimes refer to Project Work Method simply as 'Project Work'. Others sometimes talk about 'Project-based Learning' while others like talking about 'Problem-based Learning.' All involve the use of projects to structure applied learning tasks.

QUESTION: How do various Project Work methodologies differ?

- Here is a list of some of the key differences between the different kinds of Project Work Methods mentioned above:

Differences between Methods that Use Project Work		
Project Work (Basic)	**Project-based Learning**	**Problem-based Learning**
▪ Students learn principles first and then apply them in a project at the end of the lesson. ▪ Completing the project is intended to demonstrate understanding of principles ▪ Projects need not have practical significance after the project is over.	▪ A project usually begins at the start of the unit and ends at its conclusion. ▪ Students learn about specific principles through the 'process' of doing a project. ▪ Projects have practical significance beyond the life of the project.	▪ The project starts with the identification of a practical problem and ends with a solution to the problem. ▪ Projects have practical significance beyond the life of the project.

QUESTION: How does a teacher know when to use different Project Work Methods?

- Knowing which Project Work method to use usually depends on the school context. Project-based and Problem-based learning usually require a great deal of time and resources to complete and are difficult to do if school timetables are not flexible. Basic Project Work is usually more conducive to schools with rigid schedules and a lack of resources.

Examples of Projects With and Without a Practical Use at the End of the Project

Example 1: Sophea is a 9th Grader at Hun Sen Kampong Cham HS in Kampong Cham Town. Sophea and his group had a problem in the Bio-garden at his school. Here is how they described the problem:

Problem Statement:

Plants in the garden seemed to be alternating between getting too much water which made them rot or on some days getting too little water which made them wilt.

In order to solve this problem, Sophea decided to use what he was learning in his 'coding' class to create an app that when connected to an electronic device that he built could control the flow of water to the school garden. In this instance, Sophea used the knowledge he learned in his coding class as well as what he learned in the school Electronics Club. A key component in his 'solution' was to use a sensing device that could detect the amount of moisture in the soil and signal whether water should be turned on or off.

This case study is an excellent example of a project with a very practical use at its conclusion. In this case, a student identified a practical problem and used things he was learning in class and in his club to 'construct' a creative solution to the problem. https://www.facebook.com/NGSAction/videos/540970754473055

Example 2: A group of students were interested in better understanding the Principle of Capillary Action, which plants use to spread water that they absorb through their roots to the rest of the plant. Accordingly, the group undertook a project to demonstrate this principle. In organizing the project, they placed different plants in glasses with colored water and watched the plants turn into a different color, as the colored water was ingested by the plants. Although this project had no practical use after its completion, it nevertheless helped students to better understand the Principle of Capillary Action.

Students demonstrate a project on the capillary action of plants using simple materials such as water, food coloring, garden plants, and glasses.

Group Work Task

Directions: Based on the information provided above, try to identify what you think might be the advantages and disadvantages of each of the Project Methodologies discussed above. Be sure to consider such important factors as time, resources, facilities, expertise, methodological complexity, and other factors when you create your list of advantages and disadvantages. Organize your thoughts on a sheet of poster paper using the table provided below and be prepared to present your ideas to the large group.

Methodology	**Advantages**	**Disadvantages**
Project Work (Basic)	▪ ▪ ▪	▪ ▪ ▪
Project-based Learning	▪ ▪ ▪	▪ ▪ ▪
Problem-based Learning	▪ ▪ ▪	▪ ▪ ▪

HANDOUT 1b: Why Is Project Work So Popular in the 21st Century?

A Comparison of Education in the 20th and 21st Centuries

Parameter	20th Century Education	21st Century Education
1. Concept of Learning	▪ Information Transfer ▪ Passive Learning	▪ Learning to Learn ▪ Active Learning ▪ Applied Learning
2. Curriculum	▪ Standardized ▪ Textbook-driven	▪ Individualized ▪ Research-driven ▪ Internet-driven
3. Assessment	▪ Test-driven	▪ Portfolio-driven ▪ Project-driven
4. Classroom Organization	▪ Standardized ▪ Rigid Rows ▪ Resource Poor	▪ Flexible ▪ Organized for Group & Collaborative Learning ▪ Resource Rich
5. School Organization	▪ Hierarchical	▪ Networks and Relationships
6. Educational Philosophy	▪ Compliance ▪ Conformity ▪ Uniform	▪ Dynamic ▪ Non-conformist ▪ Creative
7. School Architecture	▪ Uniform ▪ Standardized ▪ Basic ▪ Facilities Are Not Diverse	▪ Dynamic ▪ Unstandardized ▪ Diverse Facilities Foster Research, Experimentation, & Collaborative Learning

In the 21st Century, schools focus heavily on **HOW** students learn more than **WHAT** they learn. Because knowledge in the 21st Century is always changing, **WHAT to Learn** is now less important than **HOW to Learn.** The transition in school organization from the 20th to the 21st Century according to different parameters is summarized in the table above.

Project Work Methods provide a way of learning that is very conducive to the re-organization of schools in the 21st Century.

Consider some of the key traits of Project Work Methods and how these interface well with a 21st Century Learning Environment:

Focus on Applied Learning Student Research Resource Intensive
Collaborative Learning Requires Space for Investigation
Team-Work Focus on Creative Products

Group Work Task

Directions: Considering the 20th and 21st Century Education Comparison Matrix above and what you know about Project Work, complete the table below in your group by placing key traits of Project Work learning (use the list provided above) in the last column of the table below according to which parameter of a 21st Century Learning Environment that best interfaces with those traits. Draw your table on a sheet of poster paper so that you can present it to the large group. Be ready to explain your classifications of Key Trait Terms.

Parameter	21st Century Education	What Project Work Traits Are Implied by the Characteristics of 21st Education?
1. Concept of Learning	▪ Learning to Learn ▪ Active Learning ▪ Applied Learning	▪ ▪
2. Curriculum	▪ Individualized ▪ Research-driven ▪ Internet-driven	▪ ▪
3. Assessment	▪ Portfolio-driven ▪ Project-driven	▪ ▪
4. Classroom Organization	▪ Flexible ▪ Organized for Group & Collaborative Learning ▪ Resource Rich	▪ ▪
5. School Organization	▪ Networks and Relationships	▪ ▪
6. Educational Philosophy	▪ Dynamic ▪ Non-conformist ▪ Creative	▪ ▪
7. School Architecture	▪ Dynamic ▪ Unstandardized ▪ Diverse Facilities Foster Research, Experimentation, & Collaborative Learning	▪ ▪

HANDOUT 1c: The Evolution of Project Work from Its Beginnings Until Now (Optional)

Historical Overview: Project Work has changed considerably over the years. Originally, project work activities had to have a **practical social purpose** such as 'improving the school yard,' 'creating more books for the library,' or other socially important purposes (1920s). Later in the 1930s and 1940s, some educators promoted the idea that projects should be based on **students' interests** and focused on improving their understanding. It was not necessary for a project to have a purpose beyond the life of the project. However, many educators strongly objected to this change in the Project Work Method.

By mid-century, project work had lost its focus on projects with 'social significance' and became mainly aligned with efforts to help students learn principles in specific subjects, especially the sciences.

By the 21st Century, Project Work Method had once again become increasingly popular because of its focus on 'applied learning' and 'research.' However, by this time, it had splintered into several different methods, some with a focus on projects of 'practical significance' while others adhered mainly to the idea that projects should focus on helping students learn while catering to their interests.

A Timeline Describing the Evolution of Project Work

1920s	1930s & 40s	1950s	1960s to 1990s	21st Century
Educators first introduce Project Method into basic education as an activity that must have **practical social significance** in the real world.	Educators shift the focus of Project Work to **non-purposeful** projects based on the **interests of students.**	Project Work falls out of favor with educators and declines in popularity because educators cannot agree what it means.	Project Work returns but with more focus on **specific subject disciplines** rather than focusing on projects with social purpose.	Project Work splinters into multiple sub-methodologies each with a different focus.

Small Group Discussion

Directions: Discuss the following questions in your small group and try to form an opinion that your group members can all agree on. There are no correct answers to these questions but only opinions. Nevertheless, you should be able to justify your opinions if asked. Be prepared to support your opinions if asked in the large group.

Question 1: Why do you think early educators in the 1920s supporting Project Work methods at its beginning thought that it was so important for projects to have practical social significance, especially as this related to efforts to support such issues as civics and social responsibility?

Question 2: Why do you suppose that later educators (1930s and 1940s) thought that it was not so important for student projects to have practical social significance?

Question 3: Do you think that it is a good thing or a bad thing that Project Work Method has splintered into several different methodologies in the 21st Century? Explain your answer by also reflecting on the situation in Cambodian schools today.

These pictures show some of the earliest examples of project work from the 1920s and 1930s in the United States. Famous American educators such as John Dewey believed that project work should have a 'socially significant purpose' such as demonstrating how to live in a 'democratic' community or sharing the work tasks in a group equally.

HANDOUT 2a: Key Characteristics of Project Work Method and the Teacher Actions that They Imply

Let's Focus on Basic Project Work: The discussion below refers mainly to the most basic form of Project Work Method. As noted earlier, there are several types of Project Work Method that are mainly distinguished by whether the project is 'purposeful' (i.e., whether it is based on a real problem) or whether it merely reflects students' interest in a particular area of study (i.e., the project may not have significance after its completion). For purposes of this workshop, we focus on Basic Project Work, which is the easiest kind of Project Work for teachers to implement. Some its key characteristics are:

- **End of Lesson Timing:** Comes at the end of a lesson or study unit so that students can apply principles and knowledge that they have 'already' learned.
- **Need Not Be Purposeful:** Projects do not need to have purposeful significance after the project is completed.

What Are Some of the Key Traits/Characteristics of Project Work Method? The diagram below summarizes some of the key characteristics of Project Work Method:

Exercise

Directions: The list below are some of the teacher actions implied by the various characteristics of Project Work Method shown in the diagram above. Either in your groups or individually, try to classify these actions according to the methodological characteristics with which they seem to be associated. Use the matrix provided below for this classification.

Provide resources/ budget to students to make or create their projects.	Guide students in identifying the steps needed to test a hypothesis.	Provide time to students so that they can demonstrate/ explain their project.	Guide students to create a division of labor within the group so that everyone is involved in the activity.
Provide examples of how concepts and principles are used in realistic settings (e.g., lab work, demonstrations, etc.).	Guide students in the development of hypotheses to solve real problems.	Give choices of project topics to student groups that imply applied learning.	Provide time for students to meet in their groups outside of the classroom.
Guide students in the identification of clearly defined problems.	Provide guidance to students on where to find needed resources (e.g., resources to do an experiment.	Organize events in which students can demonstrate/explain their project.	Help students to plan out the steps they need to follow to complete their project.
Provide guidance students on how to use the library.	Provide guidelines for students to form their groups (e.g., self-selection, teacher-assigned, etc.)		

Project Work Method Characteristics	Implied Teacher Actions
Collaborative Learning & Group Work	▪ ▪
Applied Learning	▪ ▪
Problem-solving in Realistic Settings	▪ ▪
Encourages Research	▪ ▪
Leads to Completion of a Concrete Product	▪ ▪

HANDOUT 2b: Project Work Characteristics and the Teacher Actions That They Imply (Answers)

Project Work Method Characteristics	Implied Teacher Actions
Collaborative Learning & Group Work	▪ Provide guidelines for students to form their groups (e.g., self-selection, teacher-assigned, etc.) ▪ Guide students to create a division of labor within the group so that everyone is involved in the activity.
Applied Learning	▪ Provide examples of how concepts and principles are used in realistic settings (e.g., lab work, demonstrations, etc.). ▪ Give choices of project topics to student groups that imply applied learning.
Problem-solving in Realistic Settings	▪ Guide students in the identification of clearly defined problems. ▪ Guide students in the development of hypotheses to solve real problems. ▪ Guide students in identifying the steps needed to test a hypothesis.
Encourages Research	▪ Provide guidance students on how to use the library. ▪ Provide guidance to students on where to find needed resources (e.g., resources to do an experiment. ▪ Provide time for students to meet in their groups outside of the classroom.
Leads to Completion of a Concrete Product	▪ Provide resources/budget to students to make or create their projects. ▪ Help students to plan out the steps they need to follow to complete their project. ▪ Provide time to students so that they can demonstrate/explain their project. ▪ Organize events in which students can demonstrate/explain their project.

HANDOUT 2c: Comparing Project Work Method with More Traditional Teaching Methods

Project Work Method has been promoted by educators as an effective means to help students use thinking skills at the higher levels of Bloom's Taxonomy (e.g., Creation, Evaluation, Analysis). Such skills are highly important for workers in 21st Century society.

Traditional Teaching on the other hand is discouraged in the 21st Century Classroom because it relies heavily on teacher-centered techniques such as lecturing, which usually denies students the opportunity to apply what they learn.

Nevertheless, each method of teaching has its advantages and disadvantages.

Exercise:

Directions: Based on what you know so far about Project Work and Traditional Teaching Methodologies, work with your group to organize the various advantages and disadvantages listed below into the matrix provided. Reproduce this matrix on a large sheet of poster paper so that your group can present your analysis to the large group.

Reduces the role of lecturing in teaching	Promotes deeper understanding of concepts	Difficult for many teachers to understand and apply	Many teachers are highly familiar with this method of teaching
Few opportunities for applied learning	Results in shallow understanding of concepts	Allows students to interact together and work as a team	Requires extensive planning
Easier to evaluate student learning	Can be used easily in large classes	Builds student confidence	Encourages student research
Does little to build the confidence of students	A great deal of content can be covered very quickly	Promotes opportunities to apply learned principles	The amount of content that can be covered is narrow
Only works well in small classes	Difficult to evaluate student learning	Relies heavily on lecturing and rote learning	Encourages creative thinking
Requires fewer resources	Time efficient	Resource Intensive	Time Intensive
Discourages creative thinking	Does little to promote collaborative learning		

Project Work & Traditional Teaching Methods: Advantages and Disadvantages

	Project Work Teaching Method	Traditional Teaching Methods
Advantages	▪ ▪ ▪ ▪ ▪	▪ ▪ ▪ ▪ ▪
Disadvantages	▪ ▪ ▪ ▪ ▪	▪ ▪ ▪ ▪ ▪

HANDOUT 2d: Advantages & Disadvantages of Project Work and Traditional Teaching Methods (Answers)

	Project Work Teaching Method	Traditional Teaching Methods
Advantages	▪ Encourages creative thinking ▪ Reduces the role of lecturing in teaching ▪ Allows students to interact together and work as a team ▪ Encourages student research ▪ Promotes opportunities to apply learned principles ▪ Builds student confidence ▪ Promotes deeper understanding of concepts	▪ Many teachers are highly familiar with this method of teaching ▪ Time efficient ▪ Requires fewer resources ▪ Easier to evaluate student learning ▪ A great deal of content can be covered very quickly ▪ Can be used easily in large classes
Disadvantages	▪ Time Intensive ▪ Resource Intensive ▪ Requires extensive planning ▪ Difficult for many teachers to understand and apply ▪ Difficult to evaluate student learning ▪ The amount of content that can be covered is narrow ▪ Only works well in small classes	▪ Discourages creative thinking ▪ Relies heavily on lecturing ▪ Few opportunities for applied learning ▪ Does little to build the confidence of students ▪ Results in shallow understanding of concepts ▪ Does little to promote collaborative learning

HANDOUT 3a: What Is the Relationship between Constructivism and Project Work?

Key Question: Are Constructivism and Project Work the same?

Many teachers get confused by the similarity between Constructivism[1] and Project Work. You may already have discussed some of the key characteristics of Project Work in your groups. Now consider the definition of Constructivism below and see how this compares with what you know about Project Work Method.

Constructivism Defined

Constructivism is 'an approach to learning that holds that people actively 'construct' or make their own knowledge and that reality is determined by the experiences of the learner.' This experiential reality may be formed by pre-existing knowledge of the learner or research that he/she undertakes as part of a classroom assignment. New knowledge created by a student may take many forms including a project, a presentation, a document, a play, or other products that reflect a creative process of reflection.

Based on this definition, we can make some key observations about Constructivism:

- Students learn through a process of creative reflection on personal experience and research information.
- A student uses his/her own pre-existing experience and/or that of others to create new knowledge.
- A student may also use information from research combined with his/her own experience to create new knowledge.
- The product that a student creates reflects his/her view of reality such as the solution to a problem relevant to the student's surroundings.

If the above statement is the definition of Constructivism, is it therefore the same thing as Project Work Method?

- Clearly, there are many similarities between Constructivism and Project Work Method including the idea of collaborative reflection, the need for student research, and the creation of knowledge products such as projects.
- Nevertheless, Constructivism is a much broader framework that has elements that do not necessarily describe Project Work, such as the importance of the student to define reality on his/her own.
- In conclusion, Constructivism is a broader approach that subsumes Project Work, as well as several other methodologies.

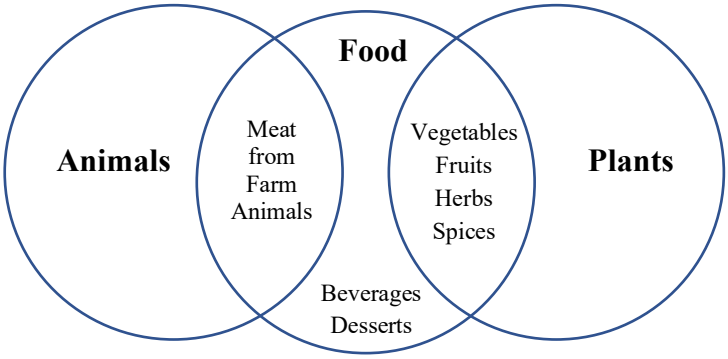
[1] To learn more about Constructivism, please use the following link: http://www.kapekh.org/files/report_file/166-en.pdf

Conclusion: The discussion above paints a picture of overlapping elements between Constructivism, which is a broad framework or approach to teaching & learning, and Project Work Method, which is a more narrow framework encompassing a more limited set of teaching/learning techniques.

Do you think you can use a Venn Diagram to illustrate the idea above?

What is a Venn Diagram?

A Venn diagram **uses overlapping circles or other shapes to illustrate the logical relationships between two or more sets of items**. Often, they serve to graphically organize things, highlighting how the items are similar and different. Review the example below that organizes the interconnections between the elements listed in the box.



Elements to Organize:
- Animals
- Plants
- Food
- Vegetables
- Fruits
- Herbs
- Spices
- Beverages
- Desserts
- Meat from Farm Animals

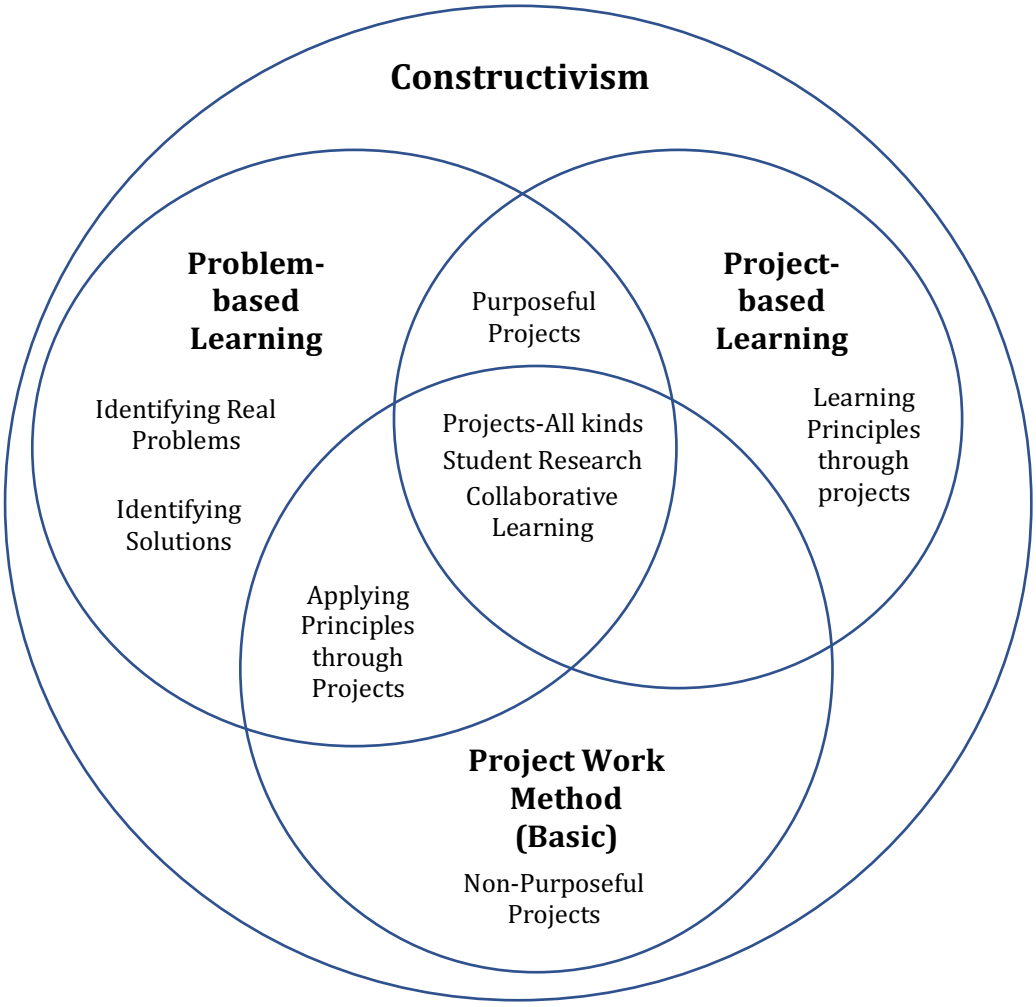
Exercise

Directions: For this exercise, you will require a sheet of poster paper and one or more marker pens. Draw a Venn Diagram on the poster paper to organize your knowledge about the different teaching and learning approaches and methods that you have learned about so far. Your diagram may include key concepts such as those suggested in the box below or you may add your own. Remember that the purpose of the Venn Diagram is to indicate what characteristics are shared by an item and which are not. It is also important that a Venn Diagram can have 2, 3, 4, or even more circles depending on the number of elements to organize.

Elements to Organize	
• Constructivism • Project Work Method (Basic) • Project-based Learning • Problem-based Learning • Student Research • Collaborative Learning • Projects of all kinds Purposeful Projects	• Non-purposeful Projects • Identifying real problems • Finding solutions to problems • Learning principles through projects • Applying principles through projects • Other?

HANDOUT 3b: Sample Venn Diagram Illustrating Relationships between Constructivism, Related Teaching Methods, and Techniques

List Your Elements to Organize:	
• Constructivism • Project Work Method (Basic) • Project-based Learning • Problem-based Learning • Student Research • Collaborative Learning • Projects of all kinds	• Purposeful Projects • Non-purposeful Projects • Identifying real problems • Finding solutions to problems • Learning principles through projects • Applying principles through projects • Other?

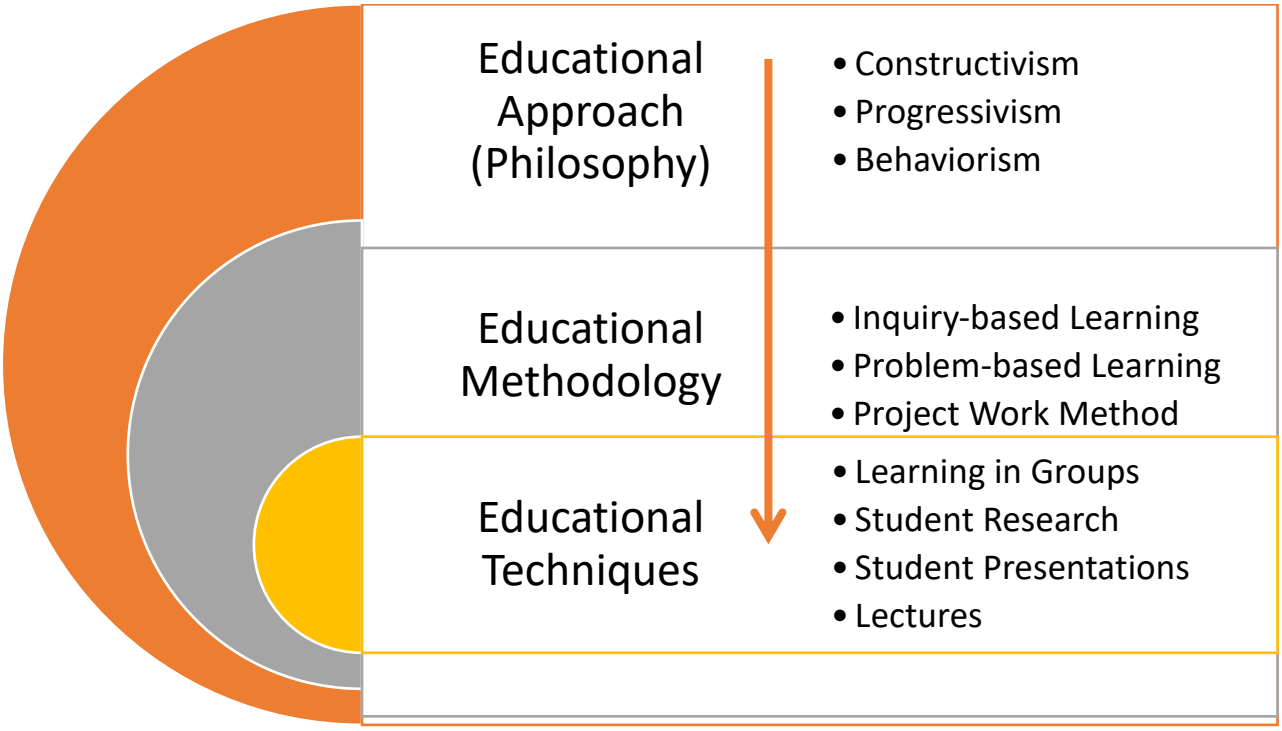


Note

Readers should note that the Venn Diagram analysis provided above is one interpretation of the differences and similarities between some of the Constructivist methodologies that we have reviewed thus far. There may be other interpretations including the one that you and your group has developed. How is your diagram the same as the one above? How is it different? Try to justify any differences by explaining how you did your analysis and why you classified concepts the way you did.

HANDOUT 3c: Achieving a Common Understanding of Educational Terms such as Approaches, Methodologies, & Techniques[2]

Introduction: The terms educational **approach, methodology**, and **technique** are often used interchangeably among educators. This can sometimes lead to confusion and misunderstandings during discussions. In order to be clear about the meaning of various terms used to describe educational systems of ideas as well as methods of teaching & learning, MoEYS has suggested the following hierarchy of terms and definitions to help ensure that everyone has a common understanding what these terms mean. Please review the diagram provided below to help ensure that everyone in your group also has a common understanding of these terms.



The Definition of Approach, Methodology, and Technique

Educational Approach refers to a philosophy of teaching and learning that is comprised of abstract principles that guide the development of specific methodologies. An Approach may encompass numerous methodologies.

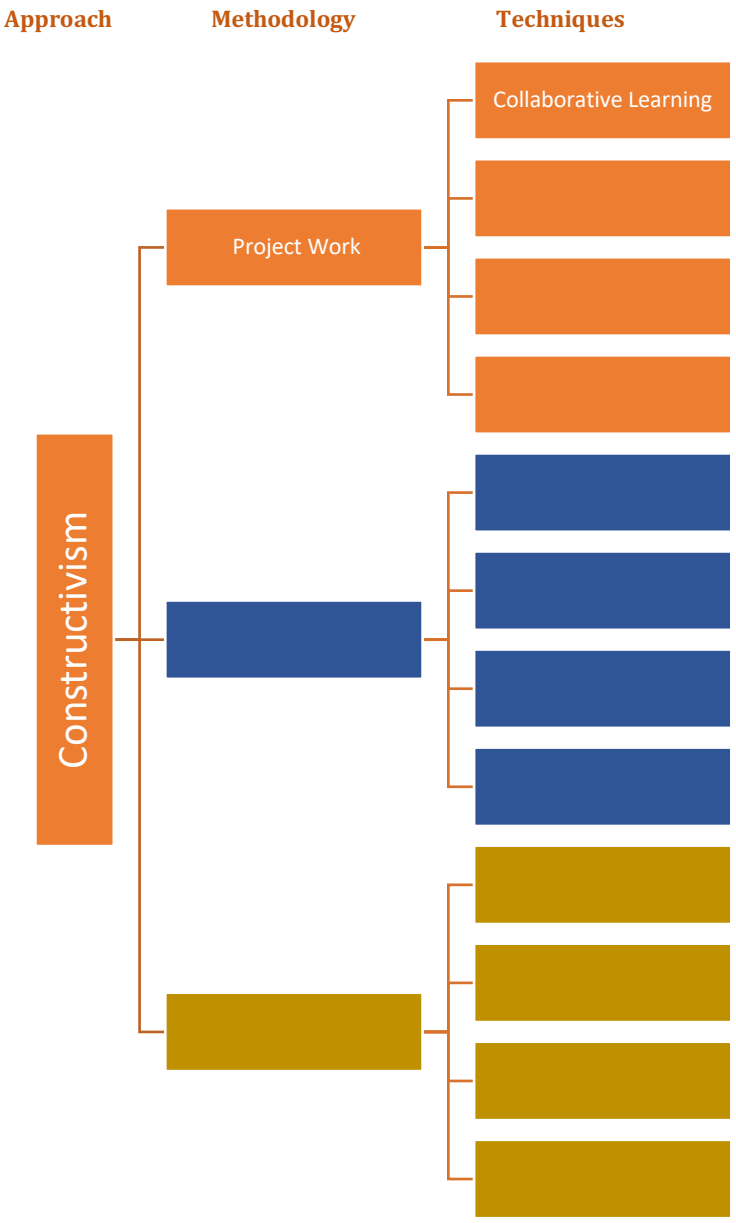
Educational Methodology refers to the collective system of techniques, practices, and procedures that a teacher uses to teach. Methodologies are based on interpretations of specific philosophical approaches to teaching & learning.

Educational Techniques are the specific skills and actions that teachers employ (e.g., questioning, assigning student projects, organizing students into groups, etc.) as part of a broader methodology.

[2] To learn more about different Approaches, Methods, and Techniques, please refer to the following link: http://www.kapekh.org/files/report_file/346-en.pdf

Special Explanatory Notes:

- **Constructivism** is one of the most prominent approaches to teaching and learning in the 21st Century because of its focus on **'knowledge creation'** and **'learning to learn.'**
- There are multiple teaching methods that utilize constructivist principles such as Project Work (Basic), Project-based Learning, Problem-based Learning, & Inquiry-based Learning. All these methods are considered examples of Constructivism.
- While each of the teaching methods that use constructivist principles are different in distinct ways, they often share some many of the same techniques such as collaborative learning, projects, and student research.



Directions: Based on the above discussion on the differences between Approach, Methodology, and Technique as well as what you know about Constructivism and the various methods of teaching that subscribe to this approach, complete the diagram provided to the left by filling in examples of other methodologies and the techniques that they employ. You may research this on the internet as a group as you complete the diagram. Please remember that different methods may use many of the same techniques but have one or more techniques that distinguish it from other methodologies. Be prepared to present and justify your analysis to the large group.

HANDOUT 3d: What Do We Mean by a Hybridized Approach to Teaching & Learning?

Introduction to Hybridized Teaching Approach

Sometimes, educators become very rigid in their thinking about using one teaching method or another. They sometimes argue over whether teaching this way or that way subscribes perfectly to their favorite method of teaching, whether that method is Project-based Learning, Problem-based Learning, etc.

A much better of way approaching teaching and learning is to realize that it is possible to borrow elements of different methodologies and combine them together in a way that best meets the actual context in a school. This context may be influenced by the size of a teacher's class, how much access to resources exists, the amount of time available, etc. Combining different methods of teaching to meet the context is referred to as **'Hybridized' Teaching.**

Using a hybridized approach to teaching will promote a stronger awareness among teachers of 'why' they are using a particular teaching method rather than mechanically adhering to a rigid prescription to use one particular methodology or another.

Questions for Discussion

3. Can you think of specific factors in a learning setting that may require a hybridized approach to teaching and learning? When citing factors, try to think about the conditions that you as teachers face every day in your classrooms.
4. What do you think are the advantages and disadvantages of a hybridized pedagogical approach to promote Constructivist Learning? Explain whether you think that the advantages outweigh the disadvantages or vice versa.

Exercise

Directions: Review some of the methodologies named below that each exemplify Constructivist Learning. The matrix provides a brief description of each method as well as some of the key techniques used to implement it. Now, imagine that you are teaching in the context described at the top of the matrix. If you wanted to use project work as your key method, how might you use some of the other methods described to 'hybridize' your teaching method. Use the space provided to describe what your hybridized approach might look like.

Teaching Context: A classroom in a rural setting has a very large class size of almost 50 students. These students have never encountered self-directed learning before and have limited research skills. The learning objective that the teacher wants to achieve is as follows:

- Students can identify problems related to the environment in their community.
- Students can do simple projects that help to address some of the problems they identify.

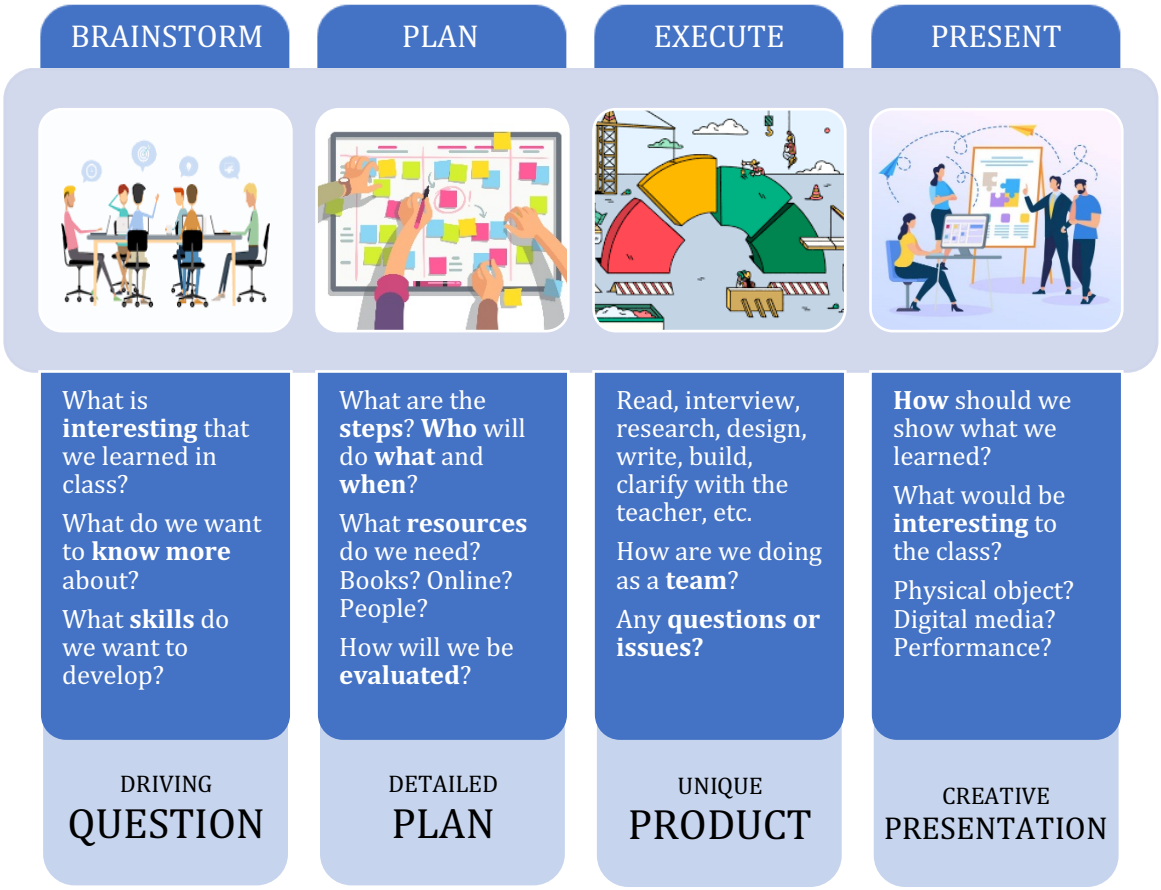
PHILOSOPHICAL APPROACH: Constructivism

Constructivism is 'an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner'

Methodological Exemplars	Techniques Associated with Each Method	Describe Your Hybridized Method
Project Work Method requires students to undertake a project that demonstrates that they understand specific principles learned in class. The project may be suggested by the teacher or determined by the students; however, the project should be planned and executed by students themselves either individually or in groups.	▪ Project identification ▪ Students work in groups or individually to plan and organize the project. ▪ Group members should not exceed 6 students per group. ▪ Students determine a role for each person in the group to execute the project. ▪ Student research ▪ Student presentation	
Inquiry-based Learning Method is a form of active learning that starts by posing questions, problems or scenarios. It contrasts with traditional education, which generally relies on the teacher presenting facts and their own knowledge about the subject.	▪ Student identification of questions they want answered ▪ Student research ▪ Student presentation ▪ Student Reflection on processes that worked/did not work	
Problem-based Learning Method is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts.	▪ Step 1: Explore the issue and identify the problem. ▪ Step 2: Students state what is known. ▪ Step 3: Students define the issues ▪ Step 4: Students research knowledge ▪ Step 5: Investigate solutions ▪ Step 6: Present and support the chosen solution. ▪ Step 7: Students review their performance.	

HANDOUT 4a: Project Work Process Overview

The following is an overview of the four steps for Project Work.



- **Driving Question:** This is a question that students are **curious** about. It **motivates** them to want to dig in more, to research, to create something new. The question should not be something you can use Google.com to find an answer to. It should require **critical thinking**.
- **Detailed Plan:** A **step-by-step**, time-ordered task list which describes in detail what needs to happen to complete the project work. Following a plan keeps team member **expectations** clear, **deadlines** obvious, and actions organized around a shared **objective**.
- **Unique Product:** The execution of the work starts with **research** of various sorts (books/articles, internet, interviews, surveys, etc.) which is **geared toward** some sort of **product**: something written, a physical creation, performance, digital media production, etc.
- **Creative Presentation:** The culmination of a project is its presentation **to the class and perhaps beyond**. "Presentation" could mean a live event or an observed display. It will always require the team members **explain** to the class their project and its outcome.

HANDOUT 4b: Bloom's Taxonomy

Review the skill categories of Bloom's Taxonomy. Note that project work aims to utilize and develop students' higher-order thinking (top 3-4 skills).

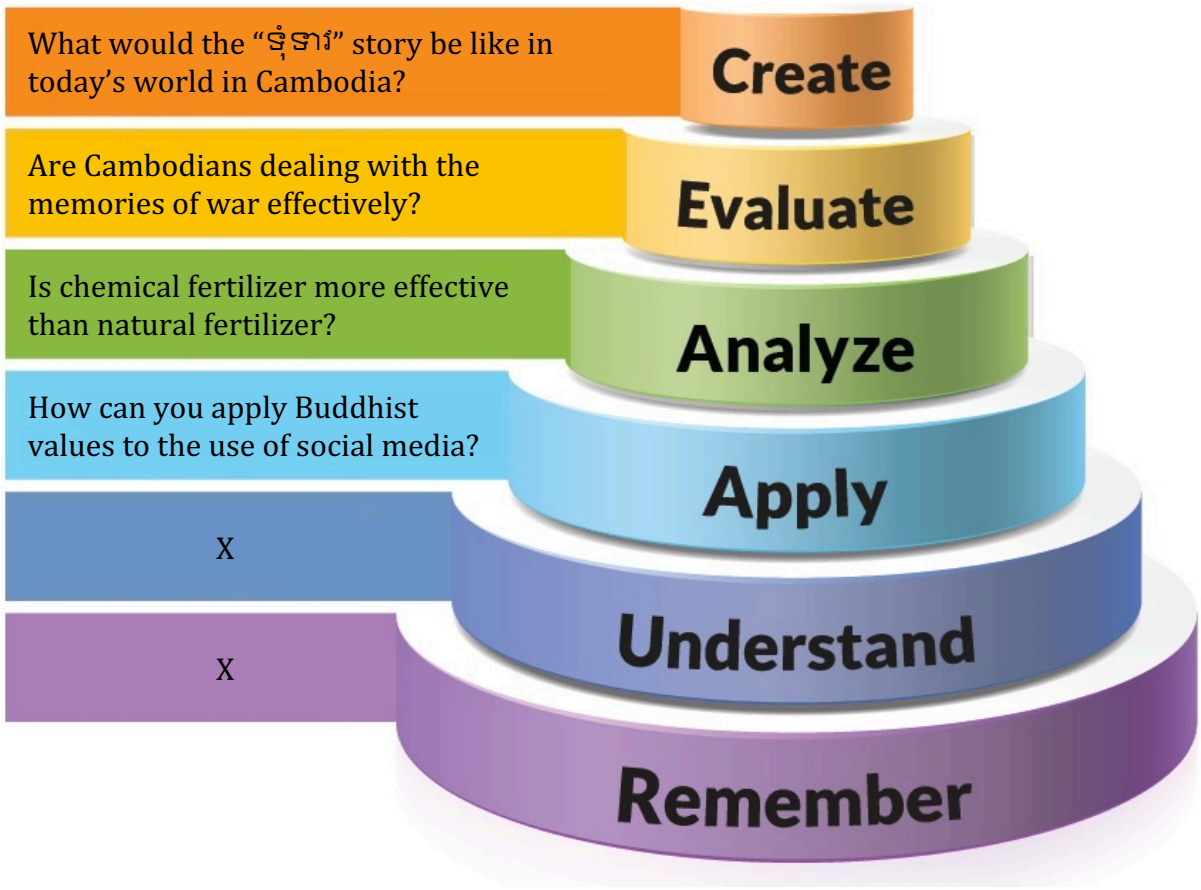
In your group, consider the following questions about the Angkor period in Cambodia's history. In the right column, write which Bloom's Taxonomy skill is required to answer the question or do the task.

Question/task	Skill required
Do you think it is true that the time of the Angkor Empire was the best time in the history of Cambodia? Why?	
Write a summary of the early history of Cambodia using your own words.	
Design a government (laws, policies) and culture which has the characteristics of the Angkor Kingdom, but which thrives and does not fall. What would that look like?	
What were the names of the two states that the Chenla Kingdom was divided into?	
If Cambodia's leaders today used the same strategy as Jayavarman II, what might they do?	
Why did the Angkor Kingdom fall?	

HANDOUT 4c: Identifying a Driving Question

Students will work together in developing a question that will shape their project. This question and the answering of this question will meet the following requirements:

- **Move beyond the classroom curriculum:** While the curriculum is the starting point for student inquiry, students' driving questions should **extend beyond** what they learn in their textbook.
- **Utilize 21st century life skills:** While the process of *doing* project work should guarantee that students use life skills, students should be conscious of **choosing a driving question which will lead to work that uses those skills**. These include communication, problem solving, creativity, computing, etc.
- **Require higher order thinking:** Project work should utilize **critical thinking skills**, e.g., application, analysis, evaluation, creation. The purpose of projects is not to help students merely remember and understand concepts studied in class. Below are some driving questions in Khmer literature, history, chemistry, and civics which use the higher-level skills of Bloom's Taxonomy.



HANDOUT 4d: Role Play: The Brainstorm Session

The following is a team's brainstorming session for a Khmer Literature project. The teacher has asked them to write up their Driving Question and explain how that uses higher-level thinking skills and will require them to exercise life skills too.

Panha: So what do you guys think? What's something you've liked so far in class this year?

Sopheap: Well, I know it is an old story and maybe it is different from today's reality, but I really love ទុំទាវ. But I think we can come up with a Driving Question that requires analysis like "Who is the most virtuous character in the story?" What do you think?

Samnang: Sure, that would certainly require some analysis of each character's traits. We could each take a character to analyze on our own and then collaborate and come to a consensus about who we think is most virtuous.

Sreyleak: Yea, life skills! Our teacher would be so proud, Samnang. Also, we'd have to form an opinion and defend our idea. That uses the skill of evaluation for sure.

Samnang: That's cool, guys. But what would we do for our creation, our final "product"? A report and maybe a lecture?

Makara: I suppose but, honestly, that sounds kind of boring. I'm really interested in developing my presentation skills—like how to be a dynamic and engaging speaker. This is something I'll need for the future, I think… And, you know, ទុំទាវ is such an old story. It seems like it doesn't relate to our lives.

Sopheap: I guess you are right, Makara… I wonder what a ទុំទាវ story would be like today…?

Panha: That's a cool idea: "ទុំទាវ for the 21st Century"!

Makara: Ha, yeah! We could write a play and do it for the class. Maybe even for the other classes as well. For sure, we have to practice our communication and collaborations skills to pull that off.

Sreyleak: I think we've got it, guys. Our Driving Question: "What would the ទុំទាវ story be like if written today?" We'd have to analyze characters and culture from that time, apply that to today, and create something new: a ទុំទាវ play!

HANDOUT 4e: Making a Project Plan

Getting organized is a critical component of a successful project. Students need to know clearly:

- What are the steps we need to take to do the project?
- What resources are needed for each task?
- Who is responsible for each task?
- What are the deadlines for each step of the project?

In your group, choose one of the driving questions you discussed. Consider a creative project you can do to answer your question. Draw up a plan below. Assume that the project is due in three months from today.

Task	Resources Needed	Person's responsible	Deadline

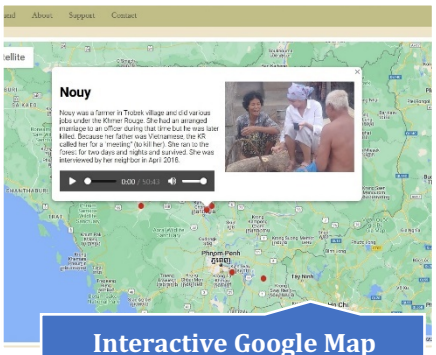
HANDOUT 4f: Presenting a Project

It is important that student presentations of their project be built into the schedule. Being able to explain the concepts related to their project and practicing communication skills in delivering that information is nearly as important as the execution stage of Project Work.

There are many possible ways for students to present their work. This is an opportunity for them to be creative. Consider the four example driving questions above and how those projects might be executed and presented.

In-class performance

"ធុំ ធាវ for the 21st Century"



Interactive Google Map

Audio interviews with elders presented in a custom website.

Display and presentation

Students show plants and explain experiment method and results.

Presentation and debate

Debate the team's "Social Media Ethical Guidelines for Buddhists".

HANDOUT 5a: Active versus Observed Presentations

The final step of the Project Work process is developing and undertaking a Creative Presentation. Presentations can be separated into two types:

- **Active presentation:** Students present or lead a live, in-person event or activity.
- **Observed presentation:** Student work is viewable by other students, teachers, staff, parents, etc. without the team present.

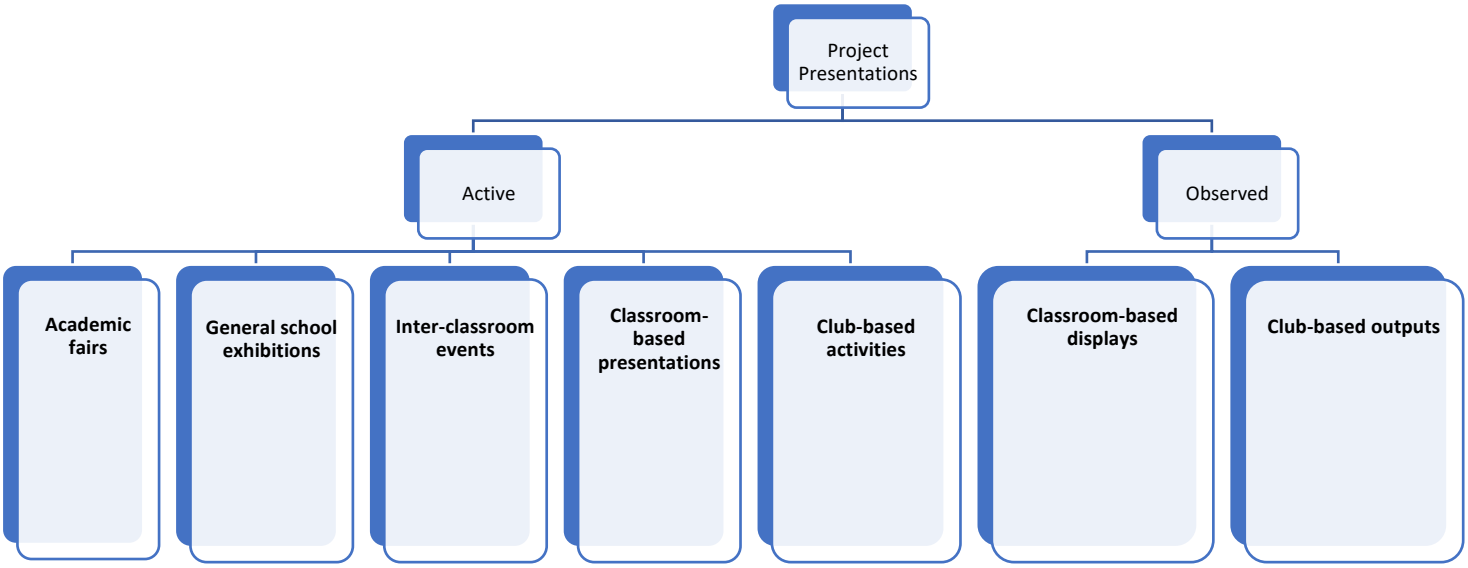
Consider the following presentations and think about what type they are:

1. **Bulletin board display** in the classroom of survey results and analysis of student transportation project;
2. **Whole-school science fair** where students set up posters and stand by them as viewers walk by, check out the projects, and ask teams questions about their work;
3. Student-designed Khmer literature **journal** with student essays and poems displayed in a glass case in the library for visitors to read**;**
4. **Group lecture and slideshow** in class about team's experiment with fertilizers;
5. Live **debate** among class members about the creating and following of Buddhist social media guidelines created by the team;
6. Public **computer** in ICT room where library visitors can see Google interactive map showing Khmer Rouge survivor interviews;
7. In-class **interviews** with street seller visitors about their lives and experiences doing their job in the city;
8. "ទំនៅ for the 21st Century" **play** for the whole school.

Fill in the table below with 1, 2,3, 4, 5, 6, 7, and 8 putting the numbers in the correct column depending on the type of presentation.

Active Presentation	Observed Presentation

Below is one way to categorize active and observed project presentations with examples of each category below the category title.



F3.5It should be noted that many of these presentations can fall into multiple categories. Some projects might even utilize an active presentation and also include an observed presentation. For example, a timeline might involve an active component, e.g., students speaking about their time period to the class, and a passive component, e.g., students and others viewing the timeline shown in a public place in the school at any time during the school day.

See the table below for some examples of how these presentations might be done in several contexts.

Examples	**Active Projects**					**Observed Projects**	
	Academic fairs	General school exhibitions	Inter-classroom events	Classroom-based presentations	Club-based activities	Classroom-based displays	Club-based display
Lecture							
Debate							
Science fair							
Timeline							
Map							
Publication							
Bulletin board							

HANDOUT 5b: Characteristics of Active and Observed Presentations

How do you know what sort of project presentation(s) you should require of students to do for the project that you assign them?

Consider the following factors which affect whether to require an active or observed presentation (or either) presentation. Write what considerations there are for each factor. See the first example regarding time.

Factors	Active Presentation	Observed Presentation
Amount of **time** available in class for students to present their project	If there is very little time in class for teams to present their project work live, an active presentation might not be wise or possible.	An observed presentation like a poster or other display can be put up and left in a classroom or public space for students to view *on their own time*.
Need for **interactivity** between project team and project presentation viewers		
Physical space available for project presentation		
How **widely** should the project presentation be viewed, e.g., teacher only, full class, multiple classes, school admin, visitors		
Shared **technology** required for project presentation		
Wow effect. Need/desire for projects to trigger motivation, enthusiasm, and/or a general positive emotional experience for teams and viewers		

HANDOUT 5c: Implementing Active and Observed Presentations

The following are examples of how project presentations might work in practice.

Observed Project Presentation Examples

Given the time pressures of teachers and students to move through the secondary school curriculum, it might be difficult to incorporate many project presentations into the regular class time. This is when Observed Project Presentations can be helpful. The following are some examples of these such project presentations.

Bulletin Board Project

Using bulletin boards is an effective way for students to dive deeper into a particular topic that was studied during a monthly subject unit. In the absence of a classroom bulletin board, teachers can designate a wall space for student exhibits. Each month, a different team would develop a project about a particular theme and post the elements of their exhibit on the designated project wall space.

Students setting up their bulletin board project materials. See other images of bulletin boards here: https://tinyurl.com/PWBulletinBoard.

Computer-based Project

There is a host of online, free software products which students can use to make creative web content. Students can transform and extend student textbook content into interactive web pages and tools and share with their classmates. In the image, a student checks out his classmate's custom Google Map showing the locations, bios, and audio recordings of student interviews with their relatives who were Khmer Rouge survivors. The application even allows other students to contribute content so the site can grow over time.

Students could listen to audio of their classmates interviewing their grandparents about their life during the time of the Khmer Rouge.

Magazine/journal/pamphlet

Students might create a written product as part of a project. Humanities courses lend themselves well to creating projects that require various sorts of writing—creative stories/poems, essays, articles, etc. For example, a physical literary journal featuring student poems and short stories could be exhibited in the library. The phone app, *Khmer Writer*, allows Cambodian students digitally publish their writing to a wide audience.

The Nou Hach Literary Journal*. A team of Khmer Literature students might lead the production of a literary journal with stories and poems from classmates.*

The smartphone app, Khmer Writer*, developed by NGO Aide et Action Cambodia, allows users to digitally publish their writing for the public.*

Timeline Project

A timeline is a visual representation of key events within a particular historical period. They can summarize events of various sorts, e.g., history of Cambodia, rise and fall of empires, changes in economic systems through time, technology through the ages, etc. These event types can overlap to see how different sorts of events happen together and perhaps might be causally related. Event cards can include text or images or a combination.

Timeline representation of content can be helpful to students who are visual learners. Also, timelines can be made accessible to visually impaired students. In the timeline in the image on the right, incense sticks are used to mark centuries and toothpicks decades. All timeline events have the braille equivalent next to the timeline event card. Accessibility could also be accomplished by using an online timeline creator tool and web-hosted timeline of which there are many available, some without cost.

Student reads timeline event content in braille.

Logistically, teams can be divided by spans of time, event types, or some other division. A timeline project could be observed and include invitations to classroom visitors and/or it could include an active component where teams give a presentation of their time period or events and fill in details.

This timeline stretched around three classroom walls and was built week by week, month by month, as new periods in Cambodian history were covered in class. It included event cards, biographical sketches, statistical data presented via graphs and charts, and a map. It was a much-visited classroom.

Map Project

Making a map can be fun, challenging, and helpful in remembering countries, cities, bodies of water, or any type of geographical information. Also, transforming a small and/or digital map into a large, physical one can be a mathematical and engineering feat.

In the project below, a grid was drawn on an A4-sized image of Southeast Asia. Each student team was given one rectangle on that paper along with a large piece of poster paper. Together, students transformed the small map on the A4 paper into one that stretched across the entire classroom. They had to use ratios and clever self-designed mathematical methods to get the shapes and positioning right. Also, they had to collaborate with teams who were responsible for neighboring rectangles to make sure country borders joined together properly. This tactile work aids students who learn best by engaging physically with materials.

This Southeast Asia map was covered in a thick plastic sheet and taped to the ground where it remained all semester. As new countries were introduced or events which required discussing geography, the teacher and students went to the back of the classroom to visit the Map Project.

Active Project Presentation Examples

In some cases, projects are best presented in an “active”, live way and, indeed, some projects can only be presented this way. For instance, the "ชู้ for the 21st Century" play is best done in real time for a live audience though it could be made into a video. However, playing a simulation game with students to explore inter-cultural dynamics would only work live. The following are some examples of live presentations.

Group Lecture Presentation

While this is likely the most common live presentation of a team’s project work, it is also the most likely to be used in an employment context. At most businesses and organizations, employees give presentations to teams, departments, and the whole organization. Skills doing these types of presentations are highly transferable after graduation. Having listeners do peer evaluations ensures they participate and pay attention.

In the best presentations using a slideshow, team members know their content well so they can face the audience and speak naturally without looking at the wall.

Game or Role Play

Sometimes as part of a student project, a team may want to actively engage their fellow students in a game or role play to illustrate something about the content they wish to convey. For instance, a group who does a project about some aspect of culture can use the BaFá BaFá cross-cultural simulation. For this activity, students are broken into two ethnic groups, each given a different set of cultural rules or mores for their group. The groups interact with each other in several stages and in so doing participants learn how their biases affect perception and attitudes. Engaging their peers in a game or role play allows a team to both deliver their content and let their fellow classmates discover it for themselves.

In the BaFá BaFá simulation, groups have periods of cross-cultural engagement and in-group meetings where they discuss the actions and practices of the other group.

Debate

Debate groups can mingle members of the team giving the presentation with other students in the class. The topic should be engaging and both sides defensible. Groups should not be told the side they are defending prior to the debate.

Students may wish to do a presentation which utilizes two different methods. Presenting a controversial topic can be followed with a student debate about this topic as a way to dig deeper into student beliefs and justifications for those beliefs. Debates can use different formats but typically they involve several rounds with breaks for discussion among team members. Having debate listeners utilize the break times to write up their own assessments of debate team's arguments and presentation style keeps non-debate participants engaged in the activity.

Panel / Interview

One team's presentation involved bringing in external participants from different religious traditions. Team members asked questions of the guests and gave time for other students to engage with the visitors.

In some instances, having a panel made up of external participants or interviewing an outside person or persons might fit the content well. For instance, a project about world religions would be made very interesting if the team organized an inter-religious dialogue with persons representing different religions. Bringing in external visitors who practice those faiths would be ideal. Interviews with experts or people who have direct experience with the team's topic might be an appropriate way to explore a topic. A live interview would allow non-team members to ask questions of the guest.

School Fair

A school fair is a special event wherein multiple projects (typically projects done by all students in the school) are presented at the same time. Students construct a poster or standing placard which describes their project and stand with that display.

The active presentation part of the event involves students' engagement with visitors to their display. The team stands with the display as other students, teachers, administrators, parents, etc. walk by. Students give a brief explanation of their project and answer the questions asked by the visitor. Having external visitors is a critical component of a fair as it makes a connection with the community and generates enthusiasm among students.

Parent takes a photo of the construction of a student at the science fair at an NGS school.

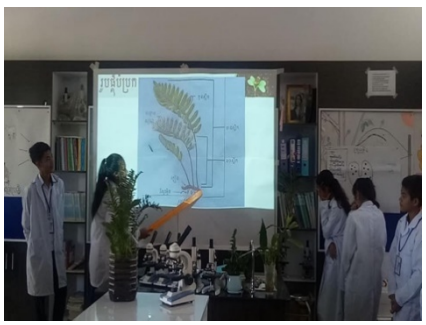
Science projects are very conducive to this type of event as students can display something that they have built, the results of an experiment, etc. Also, this kind of presentation grabs the attention of a passerby who will engage with the students.

Student models of environmentally responsible homes utilize modern techniques and materials to create a structure which uses minimal power.

HANDOUT 6a: The Role of Specific School Facilities and Organizational Structures in Supporting Project Work

Introduction: Project Work activities cannot occur effectively in an institutional vacuum. There are many ways that Facilities and the Organizational Structures in a school can support the implementation of Project Work activities. In this case, **Physical Facilities** refer to places such as Libraries, Labs, and Classrooms; **Organizational Structures** refer to such things as Student Clubs, Parent Associations, etc. Let's take a few examples of how Facilities and various Organizational Structures can support Projects:

PHYSICAL FACILITIES

Libraries can support Project Work with:	▪ Search engines and documents for research ▪ Audio-visual facilities for presentations ▪ 'Maker Spaces' for group meetings where students can work together	  
Classrooms can support Project Work with:	▪ Bulletin boards where projects and exhibits can be displayed. ▪ Working areas for students ▪ Space for presentations, especially if they have LCD Projectors	  

Science & ICT Labs can support Project Work with:	▪ Materials & equipment for research activities ▪ Workstations that can be used to develop PowerPoint Presentations & reports ▪ Facilities that can be used for internet access, and printing of relevant pictures and documents.   
Meeting Halls can support Project Work by:	▪ Providing a large space so that projects can be shared with multiple classes. ▪ Providing a space where students can rehearse plays, panel discussions, and other 'Active' Presentations ▪ Providing facilities for student-made videos and presentations  

ORGANIZATIONAL STRUCTURES

Student Clubs can support Project Work by:	▪ Bringing like-minded students together to work outside of class ▪ Providing special access to teachers for guidance ▪ Providing access to special club budgets	  
School Management Committee can support Project Work by:	▪ Providing Operating Budget for Project Work materials. ▪ Coordinating the organization of school-wide events such as Project Fairs ▪ Working with School Support Committees to reach out to parents ▪ Accommodating the establishment of student clubs by assigning teachers and giving budgets	 
Parent Associations can support Project Work by:	▪ Reaching out to parents to attend special project fair events ▪ Providing budget for project fairs	

Exercise

Directions: Pick two Facilities/Organizational Structures that are listed above and describe how these facilities operate at your school, focusing on any service deficits that they may have that would limit their ability to support Project Work activities, as described in the handout. After identifying the operational deficits, indicate how your school might take action to strengthen the Facility or Organizational Structure to make it more effective in supporting Project Work activities. You may do this activity as a small group or individually.

Facility or Organizational Structure	What Are the Operational Deficits at Your School(s)?	How Can the Facility or Organizational Structure be Strengthened?

HANDOUT 6b: Definitions of Project Work Activities and the Institutional Arrangements That Can Facilitate Them

This list of project activities below provides some common examples of **Project Work activities** and useful definitions of projects students might create/do when they seek to create new knowledge products.

Directions: Review each project activity along with the definitions provided above and try to identify the organizational and institutional arrangements that need to be in place for the activity to occur effectively. Groups need only choose 'two' Project Work activities for their analysis. An example is done for you.

Project Work Activities	Required Institutional Requirements to Facilitate Specific Project Work Activities
 **Science Projects:** A science project is an investigation using the scientific method to discover the answer to a scientific problem.	▪ Provisions for a science teacher who volunteers to advise a science club ▪ Budget for scientific materials ▪ Enough time: Either extracurricular or an extended school day ▪ Institutional willingness to accommodate the formation of a science club including access to budgetary resources ▪ Internet access in library or classrooms to do research

 **Group Work Project:** In such projects, students work together in groups to complete assessments and assignments. Group work aims to prepare students with collaborative skills needed for the professional world. Here, individual work is broken into parts and steps that students work through together.	
 **Exhibitions:** The term exhibition refers to projects, presentations, or products through which students "exhibit" what they have learned, usually as a way of demonstrating whether and to what degree they have achieved expected learning standards or learning objectives.	
 **Presentations:** After completing a project, a presentation is a channel for students to share with others what they have learned. It is also a chance to challenge and expand on their understanding of the topic by having others ask questions.	

 **Book Reports:** A book report is an objective summary of the main ideas and arguments that a book's author has presented. Students choose books to read and then report on the book's content and quality.	
 **Online Research Discoveries:** Discovery research is a term for studies, across a breadth of disciplines, that lead to new knowledge and insights into life, health and well-being. The discoveries can be documented in the form of a report or presentation.	
 **Field Trip Reports:** A field trip report is a document that describes, summarizes, and explains the things that have been done during a field trip.	

 **Science Lab Task Work:** Students work on small tasks that usually involve preparation, setup, and clean-up of materials for labs. A report on a particular experiment is usually required.	
 **Book Club Publications:** Students working in a Book Club may write their own stories and print them on their own or they may combine everyone's writings into a single publication called an anthology. Book Clubs may sell their books during Project Fairs and use the funds for the printing of new books written in subsequent years.	
 **Public Speaking Projects:** Public speaking projects involve talking with confidence in front of a group of people, usually with some preparation. It can be in front of people that the student knows or a crowd of strangers. Public speaking projects may occur in one's native language or in a foreign language to build skill in speaking that language. Projects are often recorded on video so that students can see themselves speak and critically assess their performance.	

HANDOUT 7a: Creating Effective and Balanced Project Work Teams

Teams versus Groups

In Project Work, a critical part of the setup is to establish a team to work together on a project. Why a *team* and not simply a *group* of students? Consider these similarities and differences between groups and teams.[3]

	Group	Team
Priorities	Individuals have separate priorities but are joined by common experiences/interests.	Members share the same priorities.
Goals	Members have individual goals.	Goal(s) are shared among the team members.
Work	Members generally work separately.	Members work together.
Accountability	Member accountable to him/herself (and the teacher).	Member accountable to him/herself *and* to team members (and the teacher).
Leadership	Usually there is one leader who assigns tasks.	Leader (or leaders) is a Facilitator who helps people collaborate to meet goals.
Product	Members create separate outputs.	Members create a collective output.

It is clear that in the case of an academic environment where students are working on deepening their knowledge *and* building skills like critical thinking, inquiry, analysis, reflection, discovery, collaboration, etc., a team structure is best for Project Work. Students who work closely together, with a shared goal and creating a single product, are more likely to build these critical 21st Century skills.

[3] Herrity, J. (2022, December 23). *Group vs. Team: What's the Difference?* Retrieved February 1, 2023, from https://www.indeed.com/career-advice/career-development/group-vs-team.

Team Roles

Every teacher has seen and every student has experienced working on a project that has been unpleasant or has failed due to the poor composition of the team. What are some examples? Perhaps there are…

- Too many freeloaders and the team simply cannot get the work done;
- Too many detail-oriented members, but no organizer to put everything together;
- Personality conflicts which make the experience difficult for all.

These risks can be mitigated if the teacher reflects carefully on student characteristics and the requisite roles for an effective team.

Researcher and management consultant, Dr. Meredith Belbin, defined nine roles needed for a well-functioning team.[4] These are separated into three categories: action-oriented, thought-oriented members, people-oriented team members.[5] A healthy team includes members who assume these roles.

ACTION-ORIENTED

IMPLEMENTER
Practical, maintains order, brings ideas to bloom, disciplined.

DRIVER
Drives team forward, natural leader, quick during crises.

FINISHER
Detail-oriented, seeks high quality, usually introverted.

THOUGHT-ORIENTED

MONITOR
Strategist, has advanced knowledge, assesses ideas.

INNOVATOR
Creative, brainstorms privately then share, usually works alone.

SPECIALIST
In-depth knowledge in particular area, works better alone.

PEOPLE-ORIENTED

INVESTIGATOR
Explores new opportunities, natural people networker.

TEAMWORKER
Supportive, good listener, creates group harmony, adaptable.

COORDINATOR
Communicator, motivator, collaborator, trustworthy.

[4] Belbin, M. R. (2010). *Management Teams: Why They Succeed or Fail.* Butterworth-Heinemann.
[5] Team Asana (2021, August 16). *Team roles: 9 types to create a balanced team.* Retrieved February 1, 2023, from https://asana.com/resources/team-roles.

Diversity of Roles

In a school setting, the necessity of these roles becomes clear. A team made up of similar students might get along well but the result can be disastrous.

For example, the following team configurations can be problematic for students:

- **One category only:** If only thought-oriented students are in a team, for example, they might never bring their ideas together and move forward in an organized fashion. They might also lack communication which is critical.
- **Missing one role:** Evening missing one role can be a problem. If a team has no one playing the role of Finisher, they may have a product which is well thought through, built in a collaborative way, organized and driven by effective members, but it may not be of the highest quality it could have been.

Teachers can:

- Get intimate knowledge of student strengths, interests, and personalities.
- Be strategic when building student teams for Project Work.
- Ensure that each team has at least one student who can play a role or roles in each of the three main categories—action-oriented, thought-oriented, and people-oriented.

Stretch Projects

Students are still developing in many ways. A teacher might recognize that, while a student might not be a skilled Investigator, he shows a natural tendency in a social setting to be a networker. Another student might not have the confidence to be an Implementor but she has the skill to do so. Teachers can intentionally direct students into these roles to foster growth, making the activity a "stretch project" for the students—an opportunity to develop.

HANDOUT 7b: Role Play: Who's Who?

The following is a conversation among five students who have just formed a team to do a project about reducing the use of Styrofoam in Cambodia. Assign each person in your group to play one part and read the conversation like a play.

Panha: I'm super excited to do this project with you guys. Maybe first we should make a Facebook group so that we can all talk to each other easily about the project.

Sopheap: I can set that up. Also, I'll share out a Google Drive folder so we can put any article s, videos, photos, or other content in there. Does everyone have a Google account? Let's hook up online with Google Meet if everyone is too busy to meet in person.

Samnang: I think everyone's got a Google account. No problem. I'm most interested in figuring out a plan for mak ing an environmentally-friendly meal box that's still affordable. One way we can do it is to look at what is already out there and then try to make something better.

Sreyleak: There are only three companies in Cambodia that make biodegradable meal boxes and all operate out of Phnom Penh and supply generally up-market restaurants. When they interviewed Cambodian owners of regular restaurants, 88% said they'd use paper boxes but only 8% said that they would do that if they increased costs.

Samnang: Interesting, Sreyleak. I wonder about using a paper-based box but coating it with that material they are not using in some stores… it looks like plastic but isn't…

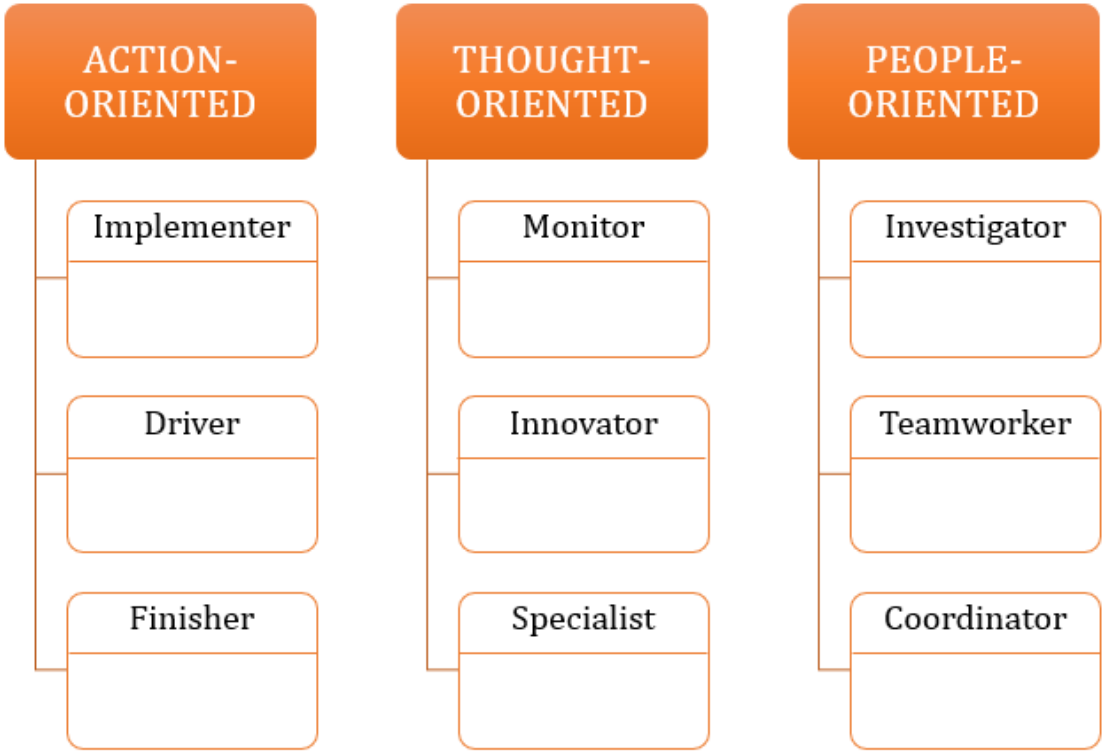
Makara: My brother-in-law works at a place that produces bamboo straws and paper-based boxes for restaurants. I can ask him about their products and what they cost. Oh, and there's an event coming up which showcases eco-friendly companies in Cambodia. I think they're live-streaming the panel discussion. Samnang and Sreyleak, are you guys free to check that out?

Sopheap: Yeah, think about it Samnang and Sreyleak. That is really fantastic, guys. It seems like we have already got some great ideas floating around. I'm excited to be working with you! And, I'm super excited about the idea of visiting Bokor Mountain and not having to climb over piles of Styrofoam meal boxes.

[*laughter among the group*]

Panha: Yes, indeed. I think to get things organized, how about I make up a list of tasks and then we can discuss who will do what. Have you ever used Trello? It's a helpful tool for collaborating with other people to do a project…

Write student names in the boxes below and discuss among yourselves why you think that the student is likely to or appropriate to play the role specified. Note that students can play multiple roles in a group.



Discussion Questions

In your group, discuss the following questions which relate to the role play.

- For each role, why do you think the selected student is appropriate for that role? Discuss what clues in the conversation led you to believe that s/he would perform that role effectively.
- Based on what you know about the student members of the team, what parts of the project will come easy to them? What sorts of activities will they likely be able to perform well?
- Similarly, what sorts of activities might be a challenge for the team based on the members? Why do you think that might be challenging? And, what can the team members do to mitigate against that/those becoming an issue?
- Should the teacher do anything to ensure the proper functioning of the team? If so, what should s/he do? If not, why do you think that the teacher should have a hands-off approach?

HANDOUT 7c: Students Reflect on Teamwork

Purpose of Team Self-Reflection

Students reflecting on the *processes* that were a part of their efforts is an important component of the Project Work enterprise. Sometimes this reflection bears as much or more fruit than the doing of the project itself. This reflection includes thinking about how students worked *as part of a team*.

> In the future, when student team members become organization team members, corporation team members, or family "team members", this sort of meta-analysis will likely pay dividends.

Reflection Topics

Either as a team or individually, challenge students to reflect on how their team worked together:

- Who played what roles?
- What worked well?
- What were the challenges in working as a team?
- What would they do differently next time?

Require this Team Self-Reflection and include it as part of student assessment. This can also help teachers suss out which students may have shirked their duties, where conflicts arose, or other challenges that may affect grading or perhaps require intervention.

Reflection Worksheet: Below is an example of a reflection worksheet given to a team after project completion. Instead of this or in addition to it, individual students could be given a similar form and report the contribution of team members, including themselves, on a 1 to 5 scale. Usually, differences in student effort are made plain when students are asked, anonymously, to rate team members.

Project title: _____
Team members: _____

Roles and responsibilities: For each team member, write what their role was and what they contributed to the process and to the final product.

Name	Team member's role and contributions

Think about how you worked together as a team. What went well?

What didn't go well?

What would you change the next time you worked together on a project?

HANDOUT 8a: The Kinds of Resources Schools Should Provide to Facilitate Project Work

Introduction: Teachers often ask whether it is possible to organize Project Work at their school with few or no resources. The answer to this question is that it might be possible, but that it would likely be very difficult and probably not very effective. When a school commits to supporting Project Work activities as the Ministry of Education, Youth, and Sport is asking schools to do, it should understand that it must find resources of several kinds to support these activities. The more resources that are available, the more likely it is that your students will be able to produce innovative and creative projects, assuming that there is also good management of these resources.

Project resources can take many shapes and may include people, material things, or technology, among others. The list below is provided to help schools think about the kinds of resources that they should ideally have at their disposal to support the implementation of Project Work activities.

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Human Resources:

- Refers to the need for technical **guidance** that teachers can provide to students to do their projects.
- Human resources also include the **experiences and brainpower** that students themselves can bring to a project.
- Can also refer to **external resource persons** that are brought in for panel discussions or projects that require outside expertise.

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Material Resources:

- Refers usually to the **stationery materials** such as paper, marker pens, scissors, etc. that may be needed to set up an exhibition or print documents.
- Materials may also refer to **specialized items** such as chemicals, test tubes, magnets, batteries, mechanical parts, maps, etc. that may be required to produce a project, do an experiment, or carry out a special activity.
- Materials can also refer to **raw materials** that are collected from the surrounding environment such as plants, soil, rocks, etc. to complete a project.

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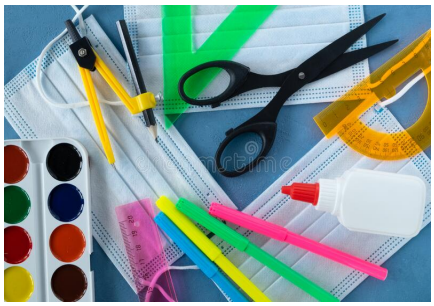
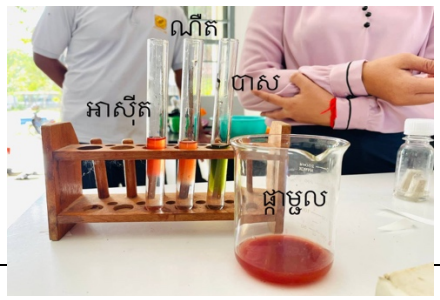
<td> 
  </td>
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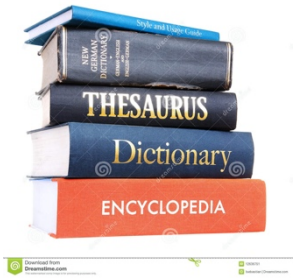
Reference Materials:

- Usually refers to documentation such as **background documents** for research, as well as maps, dictionaries, encyclopedias, etc.
- Nowadays, reference materials often take an **electronic form** that is generated by search engines.

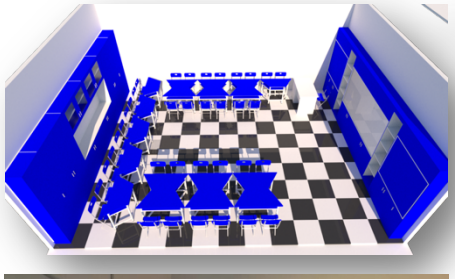


Equipment Resources:

- Refers to **specialized tools and devices** that may be needed to undertake experiments such as microscopes, scales, measurement devices, etc.
- Can also refer to **electronic devices** such as computers, tablets, smartphones, printers, etc. for typing, printing, research, etc.
- Other important electronic devices that may be used for **audio-visual** purposes include LCD projectors, televisions, cameras, speakers, tape recorders, etc.

Spatial Resources

- Such resources refer to the **design of classrooms** so that there are special spaces reserved in the classroom projects such as bulletin boards for student exhibitions, free spaces in the middle of the classroom for demonstrations, screens for presentations, etc.
- Project Work also requires **large spaces** to display student projects during school-wide events such Project Work Fairs.
- Spatial resources can also refer to large spaces that can be provided by **large halls** for student presentations.
- Spatial resources also include **specialized facilities** at the school such as libraries, science labs, ICT labs, etc. where students can work together on their projects while accessing the special services of these facilities (e.g., doing experiments, conducting research, etc.



Budgetary Resources

- Budgetary resources refer to **financial resources** that schools and parents can make available to teachers and students to buy materials for their projects. Budgetary resources can come from the School Operating Fund or SOF (provided by government) or from donations provided by parents and local communities.

Time Resources:

- Time resources refer to **the flexibility of school timetables** to accommodate Project Work activities, which tend to be time intensive. This could take the form of extended school days or the willingness of a school to block all the hours for a specific subject like Chemistry into one time slot of 90 minutes (e.g., put two 45-minute periods together).
- The availability of time for Project Work also extends to the existence of **institutional space for extracurricular activities** whereby students can meet outside of classroom time.

Technological Resources

- Technological resources can take the form of **search engines** for students to undertake research such as a wired library with one or more workstations.
- Such resources can also refer to **electronic applications** that students use to create 'knowledge products' such as word processing apps (e.g., MS Word), presentation apps (e.g., PowerPoint), etc.
- Another form of technological resource that facilitates Project Work refers to **electronic communication channels** that promote collaborative learning such as email, meeting platforms (e.g., Zoom), or social media (e.g., Messenger, Telegram, etc.).
- Technological resources overlap with equipment resources and may also include any number of **electronic devices** such as printers, laptops, tablets, smartphones, etc.

Exercise: Rate Your School for Project Work Resources

Directions: Now that you have an understanding of the resources needed to implement Project Work activities, try to work with your group to rate your school(s) in terms of the resource availability to support Project Work. Some sample questions are provided under each Resource Category to help you make an assessment based on the scale provided below. If you find that you are answering 'no' to most of the questions for a Resource Category, then the rating will likely be a low number. But if you are answering 'yes' then the rating will be higher. For any Resource Categories where your rating is less than 3, write down a few ideas in the right-hand column of the table below about how the situation can be improved. That is, what can your school do to make the situation more accommodating of Project Work implementation.

Resource Rating Scale: 1 (Bad Situation) – 5 (Good Situation)

Resource Category	My Rating	How can my school improve its resource situation to support Project Work?
1. Human Resources: • Do teachers know how to implement Project Work? • Are teachers willing to volunteer to work with student clubs? • Do my students have a mindset where they are open to doing project work activities?		
2. Material Resources: • Do classes have adequate access to stationery supplies? • Are science labs well-equipped with supplies/materials? • Do clubs have access to materials to do activities?		
3. Equipment Resources: • Are science labs well-equipped with microscopes, scales, etc. • Are there electronic workstations in the library? • Do classes have access to printers? • Is there an ICT lab where students can access computers?		

Resource Category	My Rating	How can my school improve its resource situation to support Project Work?
4. Reference Materials: • Does the school have access to dictionaries, encyclopedias, maps, etc. • Are there search engines for research?		
5. Spatial Resources: • Do classrooms have bulletin boards? • Are classes set up to facilitate student presentations? • Are there large halls for students to meet and present projects? • Is there space to organize project fairs? • Are libraries configured so students have a place to work independently?		
6. Time Resources: • Is the school timetable flexible? • Can class hours be combined? • Are there provisions in place that encourage extra-curricular student meetings?		
7. Budgetary Resources: • Do schools allocate some part of the School Operating Funds for student projects? • Do parent groups and communities ever donate funds for project fairs?		
8. Technological Resources: • Is the school wired so there is access to search engines? • Are student and teacher groups connected by social media? • Is there access to search engines in the library? • Do students know how to use knowledge creation apps such as MS Word and PowerPoint? • Is there easy access to workstations, printers, etc.		

HANDOUT 8b: Case Study Analysis on Managing Resources

Directions: Read the case study below about a school that supports Project Work and indicate the resources implied in each paragraph.

Case Study Narrative	Kinds of Resources Allocated
(1) Prek Thom High School has made a strong commitment to supporting Project Work activities. Each year when the school develops its School Improvement Plan, the School Management Committee ensures that there is at least 6 million riels from the School Operating Fund (SOF) that is allocated for School Fairs and Club or Classroom-based projects. Sometimes this budget is supplemented even further with donations made by the School Support Committee.	• _____ • _____ • _____ • _____
(2) Teachers at the school are committed to project work and volunteer to work with student clubs on club-based projects. Students in turn welcome the opportunity to work independently. 	• _____ • _____ • _____ • _____
(3) The Annual Project Work Fair is a big event at the school and hundreds of parents attend the event, which is usually organized in the central yard of the school. The school provides at least $20 for each student project and there are at least 50 projects made by students each year. Altogether, the fair takes about 2 months to prepare. Student groups work on their projects after class. Students use school budgets to buy materials as well as collecting raw materials in the local environment. Sometimes students even use their own budgets that they get from their parents.	• _____ • _____ • _____ • _____
(4) In order to facilitate project work at classroom level, the school has installed an LCD Projector in every classroom so that students can easily do project presentations. Teachers also break their classes into 5 or 6 groups and assign one group to develop a bulletin board exhibit on a topic from a study unit that the whole class has studied. At the end of 6 weeks, the exhibit is removed, and another group does their exhibit throughout the year until all groups have done an exhibit. Each classroom has a special place for bulletin boards to facilitate this project work. Students must develop their exhibits outside of the classroom during their free time.	• _____ • _____ • _____ • _____
(5) Students at Prek Thom HS also have free access to libraries, science labs, and ICT labs throughout the day to do their projects. The libraries and classrooms are all wired so there is ready access to search engines to do research. Students also have full access to all reference materials in the library and workstations that are connected to printers. Student groups are also linked to each other on social media, so it is easy to communicate and work collaboratively on their projects.	• _____ • _____ • _____ • _____

HANDOUT 8c: Organizing the Resources for a Project Fair

Introduction: The Project Fair is probably the biggest Project Work Event that a school can organize. It is also the most resource-intensive activity that a school can do when implementing Project Work activities. As the name implies, Project Fairs are mechanisms through which students can share with parents and other classmates the projects that they have researched and created. Presentations at fairs generally involve 'Active' Presentations by students because students are required to 'explain' them. Presenting projects in a fair environment is an exciting activity for students and builds their confidence and love of learning. Project Work Fairs are school-wide events involving every student and every teacher in the school.

Variations to Consider in Organizing a Project Fair: There are many variations that can be considered in organizing a Project Fair. Here are some things for schools to consider when organizing a Project Fair:

1. **General or Subject-specific Fairs:** Fairs can either have a subject-specific theme such as a 'Science Fair' or they can be General Project Fairs in which students do a project reflecting their favorite subject and where projects from all subjects can be found.

2. **Day Show or Night Show:** In many countries, schools organize their Project Fairs in the early evening, as it is difficult for parents to take time off from work to come to see a Project Fair in the daytime. In Cambodia, schools prefer to do Project Fairs in the daytime because it is difficult to travel in the evening. Do whatever makes most sense for your school.

3. **Prizes or No Prizes:** In some Project Fairs, the organizers like to give awards to students to provide recognition to the most amazing projects. Other schools prefer not to give prizes so that the event is not too competitive, and all students can enjoy each other's projects without being fearful of 'winning' or 'losing.' This is up to each school to decide.

Key Steps to Follow When Organizing the Project Fair: There are numerous documents online that schools can review to help them organize a Project Fair. Here are some very brief guidelines about how to effectively organize the resources needed for a successful fair.[6]

Step 1 (Planning): The school allocates some amount of budget for a Project Fair during the School Improvement Process at the beginning of the year.

Step 2 (Set up a Coordination Committee): The school forms a coordinating committee that will manage budgets, coordinate communication with all teachers/students, organize a space for the project, do outreach to parents and local officials to join the fair, set a date for the fair, and other important administrative matters.

Step 3 (Choosing Project Topics): Teachers announce to students to choose a project that they want to work on. If some students are unsure of a good project to do, teachers may suggest topics of interest and help them to do the research for it.

Step 4 (Form Student Groups): Students form their groups and start preparing their projects. The group members may be classmates from within a class or they may be inter-classroom groups if the project is club-based. Both are acceptable.

Step 5: (Project Preparation): Usually, it takes students about 2 months to fully research and prepare their projects. Students divide the labor of project preparation among themselves including research tasks, project assembly, documentation, etc.

Step 6 (Materials List Preparation): Students and teachers make a list of all the materials that they think they will need for the project. Teachers take these lists and convey them to the Coordinating Committee, which provides a budget to each teacher to buy the needed materials. If the requested budget is not available, teachers/students are asked to reduce their materials request accordingly to work within the available budget.

Step 7 (Project Tracking): Students report to teachers any projects that they have already started (e.g., in a club) that will also be displayed at the fair. Teachers report the names of all projects to the Coordinating

[6] https://www.spps.org/cms/lib/MN01910242/Centricity/Domain/3019/science_fair_planning_guide.pdf

Committee. When making these reports to the Coordinating Committee, teachers need to indicate the project name, subject, lead teacher, students' names, gender, grade, and other relevant information.

Step 8 (Project Review Meeting): Some time before the fair, the School Manager calls a meeting of all teachers to review the projects that will be displayed at the fair. Challenges and issues are reviewed and resolved.

Step 9 (Procurements): The Coordinating Committee organizes all central procurements such as tent rental, seating, food and refreshments for guests, banner, etc.

Step 10 (Organizing Project Placement): The Coordinating Committee develops a floor plan for the placement of all projects and exhibits (see example provided below). Usually, a wide-open space within the school compound is identified. Projects are usually organized according to the subject of the project. Sometimes, projects involving a performance are all put together while those student groups selling things are placed altogether in their own space as well.

Step 11 (Agenda & Welcoming Speeches): Schools make a clear agenda for the Project Fair Event. Often, events may last from 7 AM to 7 PM. The agenda calls for students to organize their projects in the stated location according to the floorplan between 7 to 8 AM. Parents then start to join the event for opening speeches by guests of honor. Usually this takes 1 to 2 hours.

Step 12 (Project Displays): After the completion of speeches and welcoming ceremony, visitors view the projects organized by students. Students track the number of people who view their project by asking visitors to sign a viewer list so that schools can track the most popular projects.

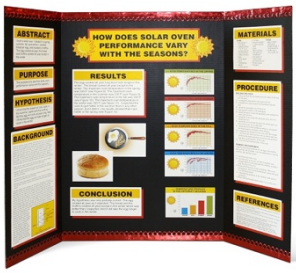

⇦Tracking List

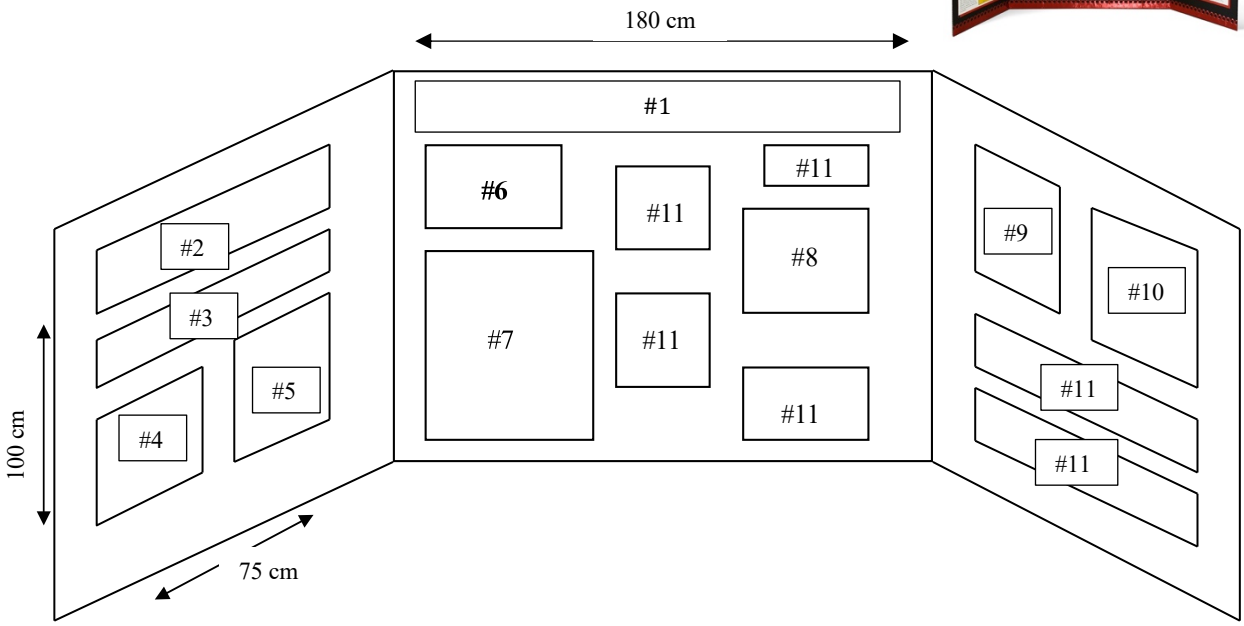
Step 13 (Special Performances): In the late afternoon, there may be special performances by clubs such as Drama Club, Judo Club, Short Films made by students, etc.

Closure: At 7 PM, students start to clean up the school compound and begin disassembling their projects. Some may be kept for permanent display in classrooms, library, etc. while others may be taken home by the students.

Example of Project Floor Plan for Project Fair: The floor plan provided below demonstrates how a school in Kandal Province organized the locations of different project groups within the school compound.

How to Set Up a Project Exhibit: The display shown below provides some guidance to students and teachers about how to display a project at a Project Fair. It is only a suggestion but may provide some ideas to students about how to organize their project displays.





#1. **Title** (name of project)
#2. **Purpose:** Reason for the project – what is your 'driving question,' what do you want to find out in your project? What is it that you have discovered or done that you would like to demonstrate?
#3. **Hypothesis/Principles under Investigation:** If you are doing a science project, you may develop a hypothesis you want to test. If you are simply building something to better understand how a principle works, explain the principle you are investigating. For example, you may want to better understand the principle of capillary action in plants, the principle of hydraulics in machines, the principle of flight, etc.
#4. **A report** of your research on the subject.
#5. **Books and Resources:** A list of the books you read and websites you used. Also list your inter views.
#6. **Materials:** a list of the supplies that you used for your project.
#7. **Procedure:** The steps or directions that you used to conduct an experiment or build your project.
#8. **Variables:** The parts of the experiment that will stay the same and the what will be tested to get the results.
#8. **Results:** Graphs or charts showing what happened after you conducted your experiment or did you investigation of a principle.
#9. **Conclusion:** Tell what happened during your experiment or demonstration. Did it work? Were you right about your hypothesis? What did you learn?
#10. **Application:** Explain how your experiment relates to the real world.
#11. **Pictures** that demonstrate the ideas you learned during the project.

Documenting the Project: As part of the project development process in a Project Fair, each group should be advised to document how they did their project. If the project is an experiment, then **hypotheses, data, findings**, and conclusions should be included in a report. If the project is about a principle such as how to write a Haiku Poem, climate change, mathematical formula, etc. then there should be documentation indicating the **Goals** of the Project, **Introduction** to the Topic, the **Materials/Procedures** used in implementation, and Conclusions.

Some examples of how students should document their projects are provided below:

សាលាមៀនជំនាន់ថ្មីវិទ្យាល័យព្រែកលៀប

Project **គីមីវិទ្យា**

ថ្នាក់ទី 9P1 ឆ្នាំសិក្សា 2021-2021

ប្រធានបទ៖

កំណក្រាមសាច់ជូរសនិងសាច់ជូរខៀវ

សមាជិក៖

- គីមម៉េងលាំង
- ហ៊ែលចាន់ម៉ី
- ឡាយសេងឆាយ
- អេងកណ្ហិកា

ដឹកនាំដោយ អ្នកគ្រូ ឃុន សុកន្ត្រា

I. **គោលបំណង**

គោលបំណងដែលក្រុមយើងខ្ញុំលើកយកកំណក្រាមនេះព្រោះ

→ចង់បង្ហាញពីវិធីញែកល្បាយដោយប្រើប្រាស់វិធីកំណក្រាម

→ចង់ឲអ្នកទស្សនាប្លែកភ្នែកនិងចាប់អារម្មណ៍ការធ្វើកំណក្រាមសាច់ជូសរនិងសាច់ជូខៀវដែរមានរាងស្រស់ស្អាតពណ៌ស្រស់ៗដូចទៅនឹងគ្រឿស្គាល់ពិត។

II. **សេចក្តីផ្តើម**

→និយមន័យកំណក្រាម ជាការញែកអង្គធាតុរឹងដែលបែកធាតុក្រោយអំពើកម្តៅចេញពីល្បាយស្មើសាច់។

→ឧទាហរណ៍ ការញែកស្ករចេញពីទឹកស្ករ។ គេដុតឱ្យទឹកស្ករពុះរហូតដល់វា ខាប់ រួចដាក់អង្គធាតុរឹងមួយក្នុងទឹកស្ករខាប់នោះ ។មួយរយៈក្រោយមក គេសង្កេតឃើញក្រាមស្ករ តោងព័ទ្ធជុំវិញអង្គធាតុរឹងនោះ។

II.សម្ភារ និងសារធាតុគីមី

ឧបករណ៍	សារធាតុគីមី
• កែវប៊ែរ៉ូស៊ែ	• សាច់ជូរខៀវ
• ចង្កឹះកែវ	• សាច់ជូស
• បន្ទះអាម៉ុង	• ទឹក
• ចង្ក្រានកម្តៅ	• លក្ខពណ៌
• ឈើ	
• ខ្សែ	
• ជញ្ជីងអេឡិចត្រូនិក	

III.**ដំណើរការពិសោធន៍**

→ពិសោធន៍ទី១:យកសាច់ជូជាក់ក្នុងកែវប៊ែរ៉ូស៊ែយកសាច់ជូទៅថ្លឹងលើជញ្ជីងអេឡិចត្រូនិចh200gហើយ

ដាក់ទឹក400mlយកចង្ក្រានហ្គាសរួចយកបន្ទះអាម៉ុងដាក់លើចង្ក្រានហ្គាសនឹងដាក់កែវប៊ែរ៉ូស៊ែពីលើ

→បន្ទាប់មកដាក់ទឹក 400ml ហើយ ដាក់ សាច់ជូរខៀវចូល និងយកចង្កឹះកែវមកកូរវា អោយរលាយទង់ដែងសូផាត(សាច់ជូរខៀវ)

→បន្ទាប់មកទុកវាអោយត្រជាក់ហើយចាក់ វាចូលកំប៉ុងមួយ រួចក៏យកខ្សែចងជាមួយ ឈើទម្លាក់ចូលទង់ដែងសូផាតហើយទុក វាបីទៅបួនយប់។

→ចំណាំ:ចំពោះសាច់ជូសរយើងធ្វើដូចសាច់ជូខៀវ ដែរ។ តែទម្រង់របស់វាខុសពីសាច់ជូខៀវ។

សាលាជំនាន់ថ្មីវិទ្យាល័យព្រែកលៀប

Project គីមីវិទ្យា

ថ្នាក់ទី ៩P2 ឆ្នាំសិក្សា 2021-2022

ប្រធានបទ៖

ចំហេះស្ករ

សមាជិក៖

1. ធុចឌុន សំណាង
2. ឆាយ លាងហួរ
3. វង្ស សុភ័ក្រដាវិត
4. ឈុន គឹង្គម៉េង
5. ធុន រតនា
6. វាសនា បញ្ញា
7. អាង បារាំង
8. គុប សំណាង

ដឹកនាំដោយ អ្នកគ្រូ ឃុន សុកន្ត្រា

I. **គោលបំណង**

បង្ហាញពីប្រតិកម្មចំហេះក្នុងសារពាង្គកាយ។

II. **សេចក្តីផ្តើម**

ប្រតិកម្មជាមួយអុកស៊ីសែនមានកាយកម្តៅហៅថា "ចំហេះ"។ ក្នុងសារពាង្គកាយរបស់មនុស្សយើងក៏កើតមានប្រតិកម្មចំហេះដែរគឺប្រតិកម្មចំហេះរវាងអាហារដែលយើងបរិភោគជាមួយឧស្ម័នដែលយើងដកដង្ហើម។ ដូចនេះក្រុមយើងខ្ញុំចង់ធ្វើពិសោធន៍បង្ហាញពីប្រតិកម្មចំហេះរវាងស្ករនិងអុកស៊ីសែនដែលតំណាងឲ្យប្រតិកម្មចំហេះអាហារក្នុងសារពាង្គកាយ។

III. **សម្ភារ និងសារធាតុគីមី**

សម្ភារៈ	សារធាតុគីមី
ជើងទម្រ	ប៉ូតាស្យូមក្លរ៉ាត
បំពង់សាក	ជុំស្ករស
ចង្កៀងអាល់កុល	
ដៃកកេះ	
ជង្កៀប	
ប្រដាបលកៀបបំពង់សាក	

IV. **ដំណើរការពិសោធន៍**

យកបំពង់សាកគៀបជាប់ជាមួយជើងទម្រ រួចដាក់ក្រាម(ចំនួន ចូលក្នុងបំពង់សាក បន្ទាប់មកយកចង្កៀងអាល់កុលមកដុតកម្តៅរហូតទាល់តែក្រាម(រលាយអស់ ហើយយកជុំស្ករទម្លាក់ចូលក្នុងបំពង់សាករួចសង្កេតមើល។

$$2KClO_3 \xrightarrow{heat} 2KCl + 3O_2$$

$$C_{12}H_{22}O_{11} + 12O_2 \longrightarrow 12CO_2 + 11H_2O + Energy$$

V. **ពិភាក្សា និងសន្និដ្ឋាន**

តាមរយៈពិសោធន៍ខាងលើនេះបានបង្ហាញពីប្រតិកម្មចំហេះសព្វក្នុងសាពាង្គកាយបានត្រឹមត្រូវ ។

សូមអរគុណ

Judging Student Projects in a Project Fair: We mentioned previously that it is up to a school whether it wants to have a competitive element in the Project Fair in which student projects receive awards.

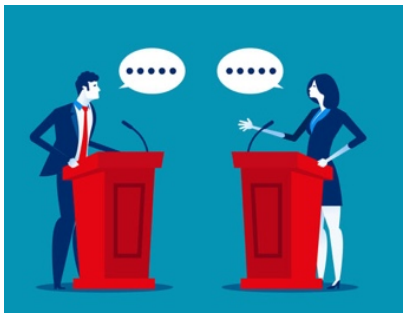
If your school does decide to have project awards, those judging projects should use a system of clear criteria to make their judgements. This will ensure that all judges are using the same standard (which will strengthen reliability) and that the judgements are based on clear and transparent criteria, which will prevent accusations of bias. An example of an evaluative tool is provided below:

Criteria & Explanation		Points
1. Display is **well-organized**	➔	2 Points
2. The exhibit clearly states **Title, Purpose,** and the **Hypothesis Tested** or the **Principle** that was researched.	➔	2 Points
3. There is a citation of at least **3 sources** that were researched during the project.	➔	2 Points
4. **Experimental Procedures** or the **Steps Used to Assemble** the project are well documented. (see example above)	➔	2 Points
5. Students are able to provide a **clear explanation of their exhibit** using technical terms appropriate to their grade level. Explanations should be shared by multiple members of the group to show that all were equally engaged in developing the exhibit.	➔	4 Points
6. All students are able to adequately **answer questions** about their exhibit.	➔	3 Points
7. **Conclusions** about the findings are well explained both verbally and in the form of documentation.	➔	3 Points
8. Students are able to explain practical **connections between their project and real life.**	➔	2 Points
Total Points Possible		**20 Points**

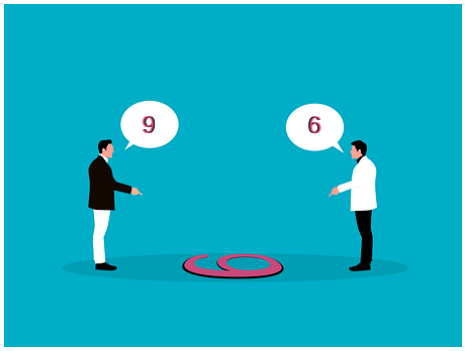
When using the assessment tool above, judges will need to devise some evaluative guides to interpret the data that they generate. Here is an example,

- **1st Prize:** Highest Score; **2nd Prize:** Second Highest Score; **3rd Prize:** Third Highest Score
- Any score over 12 gets a **Certificate of Praise**

Exercise: Pro and Anti-Project Fair Debate



Background: Project Fairs are a great activity to help students use their creative powers to better understand specific principles and ideas. The sad reality, however, is that few schools in Cambodia actually ever organize Project Fairs even though everyone gives lip service to the idea that it is a wonderful activity to do. The reasons that schools do not organize Project Fairs are often left unsaid. The purpose of the present exercise is to get the 'pros' and unspoken 'cons' of organizing Project Fairs out into the open where all participants can consider the real obstacles to replicating a Project Fair at their school.



Directions: The present exercise is designed to be 'fun' where participants will be allowed to say outrageous things that they might not ordinarily say in public. Participants may not necessarily believe these outrageous things but are playing what we call 'Devil's Advocate.' Being a Devil's Advocate is a process where someone says things that are not popular or politically correct but says them not because he/she actually believes these ideas but because they want to get them out into public for people to discuss them.

The Facilitator will organize two opposing two groups who debate the pros and cons of Project Work Fairs. For this purpose, about 6 persons should volunteer to form the two debate teams one of which will argue the pros of Project Work (3 persons) while another team will argue the cons (3 persons). The con group will be the Devil's Advocate.

While the debate is going on, the participants listening should jot down what they understand to be the 'pros' and 'cons' of organizing Project Fairs using the table below. When the mock debate is over, participants should be prepared to discuss whether they have an opinion for one view or another and whether any of the anti-Project Fair arguments are valid.

What are the Pros and Cons of organizing Project Fairs?	
PROS	**CONS**
•	•
•	•
•	•
•	•

HANDOUT 8d: Project Work & Useful Technological Tools[7] (Optional)

How Does Technology Promote Project Work?

The rapid evolution of technology in the 21st Century has changed the way students learn in three important ways. Each of these ways aligns perfectly with some of the key traits of Project Work that we have discussed previously. These three changes include:

- A revolution in communication has made **electronic communication** through social media much easier than ever before. Now students can practice collaborative learning without even being at their school.
- The invention of **search engines** linked to the internet (e.g., *Google*) has made research easier than ever and less dependent on access to hard copy books.
- The creation of advanced **word processing** applications such as *MS Word* and **presentation applications** such as *MS PowerPoint* has greatly facilitated the creation of knowledge products.

Each of these technological tools are important resources that can greatly facilitate Project Work activities.

Learning is Social: If children develop best in social or group settings, then the use of technology to connect rather than separate students from one another can be highly effective. Based on this principle, a teacher using the Project Work Method should, therefore, create a context for learning in which students can become engaged in interesting activities that encourage and facilitate learning. The teacher does not simply stand by, however, and watch children explore and discover. Instead, the teacher may often guide students as they approach a 'driving question' or a problem that they have identified; teachers may also encourage students to work in groups to think about issues and questions, and support them with encouragement and advice as they solve problems, adventures, and challenges that are rooted in real life situations that are both interesting to students and satisfying in terms of the result of their work.

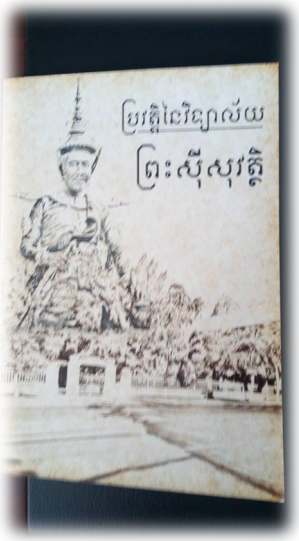
[7] http://viking.coe.uh.edu/~ichen/ebook/et-it/social.htm

Technological Tools & Social Constructivism

Technology provides essential tools with which to accomplish the goals of a Project Work classroom. Below are a few examples of the way information technology can support Project Work learning:

- ***Telecommunication Tools*** such as e-mail and social media provide a means for dialogue, discussion, and debate -- interactivity that leads to the social construction of meaning. In this regard, it is important to remember that Project Work is an example of Constructivism in which the 'reality of a context' is defined by the learner. Students can talk with other students, teachers, and professionals in communities far from their classroom. Telecommunications tools can also provide students access to many different types of information resources that help them understand both their culture and the culture of others.
- ***Word Processing and Presentation Applications:*** Word Processing apps allow students to develop professional reports and documents quickly and efficiently. Together with presentation applications such as PowerPoint, students can develop multi-media presentations in their groups where they work together in teams to produce creative products to share with the class. Schools should make LCD projectors available to both teachers and students for this purpose.

- ***Online Workstations with Access to Search Engines in the Library:*** Creating easily accessible workstations in the library is another means through which students can work together on analytical tasks. The workstations may be used to conduct research and provide a source of useful pictures and diagrams.



- ***Networked writing programs*** provide a unique platform for collaborative writing. Students can write for real audiences who respond instantly and who participate in a collective writing activity.
- ***Electronic Simulations*** can make learning meaningful by situating something to be learned in the context of a "real world" activity such as running a nuclear power plant, writing up "breaking" stories for a newspaper, or dealing with the pollution problems of local waterways.

Exercise

Directions: Review the list of technology tools below with your group and rate how difficult each one would be to do at your school. Rate what you think the difficulty of using each tool at your school using a scale of 1 (Easy) to 5 (Difficult). For the tool that you think is easier to use, explain why and how you might use this tool at your school.

Difficulty Rating: 1 (Easy) – 5 (Difficult)

Technology Tool	**Difficulty Rating**	**Choose the tool(s) that you think would be easiest to use at your school; what is it about this tool that you think is easier; and how would you use it for Project Work at your school? You may limit your explanation to only 1 or 2 tools.**
Telecommunication tools		
PowerPoint Presentations:		
Online Workstations with Access to Search Engines in the Library:		
Networked writing programs		
Electronic Simulations		

HANDOUT 9a: Projects by Subject Area

Below are possible projects for each of the subject areas. *Add your own examples in the right column.*

Subject Area	Example Project	Your Example Project
Khmer Literature	Created an edition of a Khmer literature journal with student-submitted stories and poems.	
Mathematics	Designed and built a model of a skateboard halfpipe describing dimensions, areas, and cost of materials for all components.	
Science	Created a low-cost compost bin for use in urban areas from free, readily available materials.	
History	Wrote a fictional story about the "history" of Cambodia if the French had not established a Protectorate.	
Social Sciences	Followed street sellers for one day and crate a digital photo journal of their lives and activities.	
Geography	Created an ASEAN map showing imports and exports in a visually compelling way.	
Civics	Grade 12 students ran a workshop for grade 6 students about responsible use of the Internet.	
Foreign Language	Started a program where students are paired with others in foreign countries to practice communicating.	
Computer	Built a computer bot to handle student administrative questions about the grade 12 exam.	
Arts & Crafts	Built a student graffiti wall and organized a school urban art contest.	
Library	Conducted a secondary student training on how to read a book out loud with a child.	
Physical Education	Created a game for students with visual impairment which will help their physical dexterity.	
Home Economics	Planned a picnic during Khmer New Year which created zero waste.	

HANDOUT 9b: Possible Project Outputs by Subject Area

Below are possible Creative Products which could come out of projects in various subject areas. *Add additional Creative Products as desired.*

Creative Product	Khmer Literature	Mathematics	Science	History	Social Sciences	Geography	Computer	Civics	Arts & Crafts	Library	Physical Education	Home Economics
Lecture				2								
Poster			3									
Written product								4				
Digital Slideshow												
Other digital product				2								
Physical construction												
Experiment display			3									
Play / production	1											
Debate								4				

Write some ideas for projects (5, 6, ...12) and label the Creative Products they might render. Included are examples from a previous session.

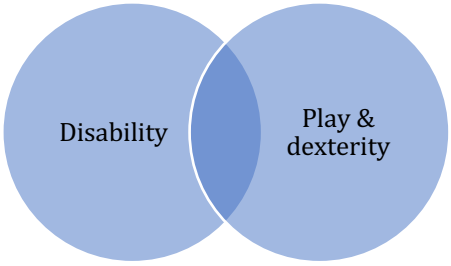
#	Project
1	"ចុំមារ for the 21st Century"
2	“Now We Bear Fruit: Sharing Stories 1975-1979” Google map
3	Natural versus Chemical Fertilizer
4	“Social Media Ethical Guidelines for Buddhists”
5	
6	

#	Project
7	
8	
9	
10	
11	
12	

HANDOUT 9c: Cross-Subject Area Projects

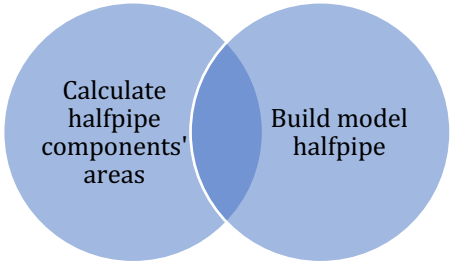
Write on the lines (1, 2) the subject areas that are involved in the four example projects. Add two projects of your own at the bottom and fill in the details like the examples shown.

Project: Created a game for students with visual impairment which will help their physical dexterity.



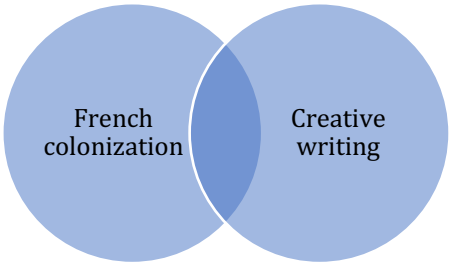
1. _____
2. _____

Project: Designed and built a model skateboard halfpipe describing dimensions, areas, and cost of materials for all components.



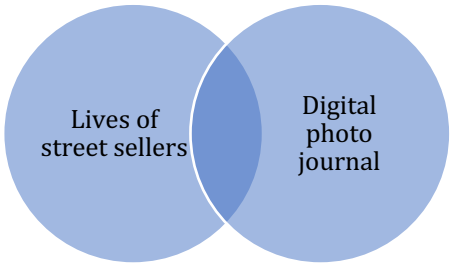
1. _____
2. _____

Project: Wrote a fictional story about the "history" of Cambodia if the French had not established a Protectorate.



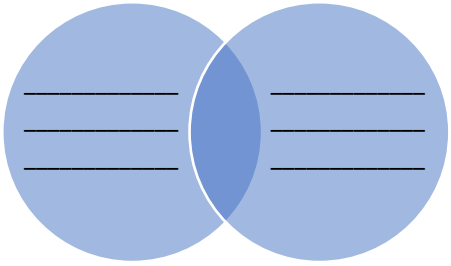
1. _____
2. _____

Project: Followed street sellers for one day and created a digital photo journal of their lives and activities.



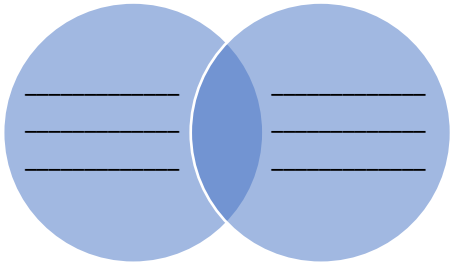
1. _____
2. _____

Project: _____
_____
_____
_____



1. _____
2. _____

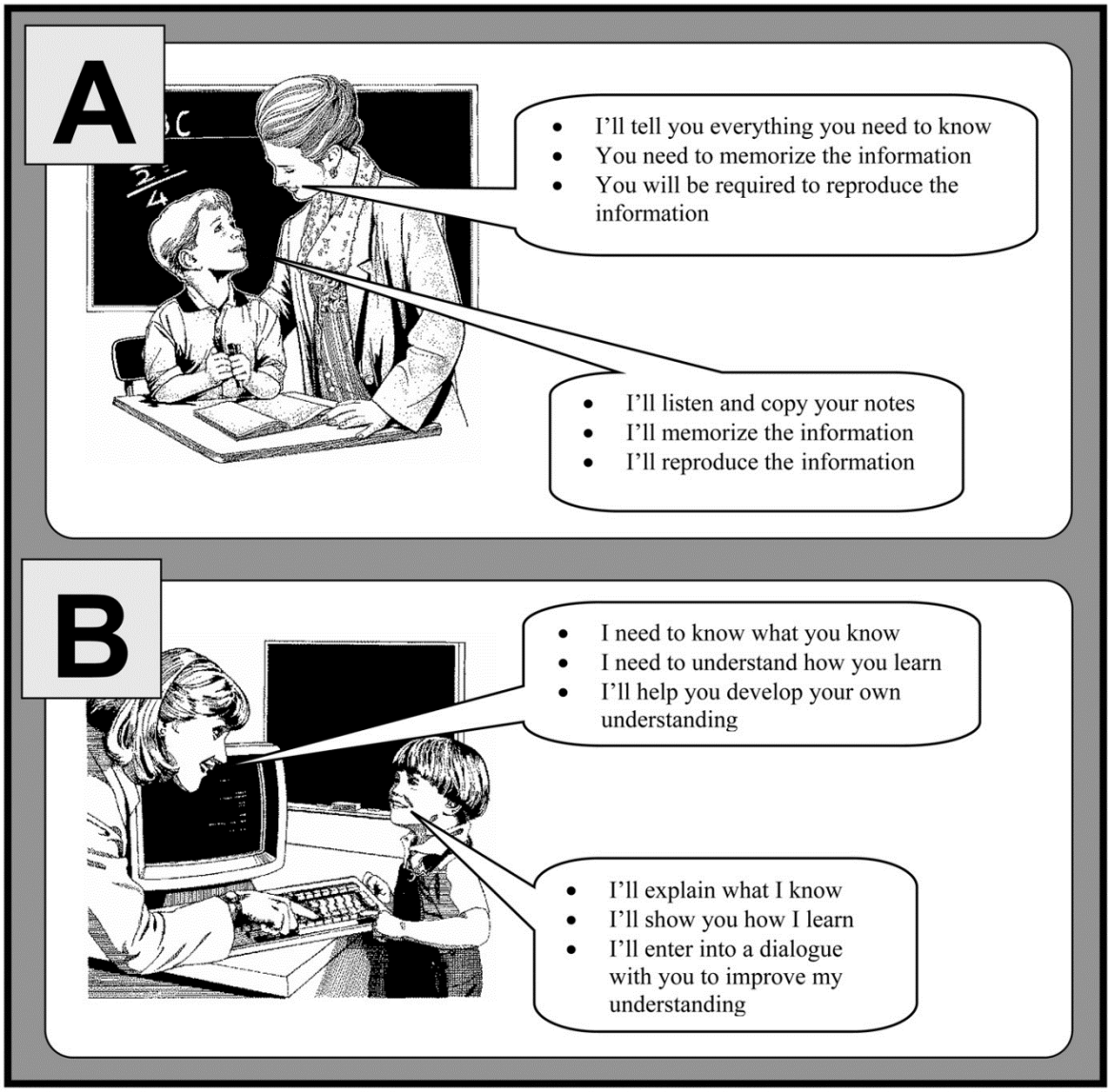
Project: _____
_____
_____
_____



1. _____
2. _____

HANDOUT 10a: Contrasting Evaluation of Traditional Learning and Project Work Learning

Directions: Read the dialogue below and participate in a discussion with your group to answer the questions below:



Discussion Questions

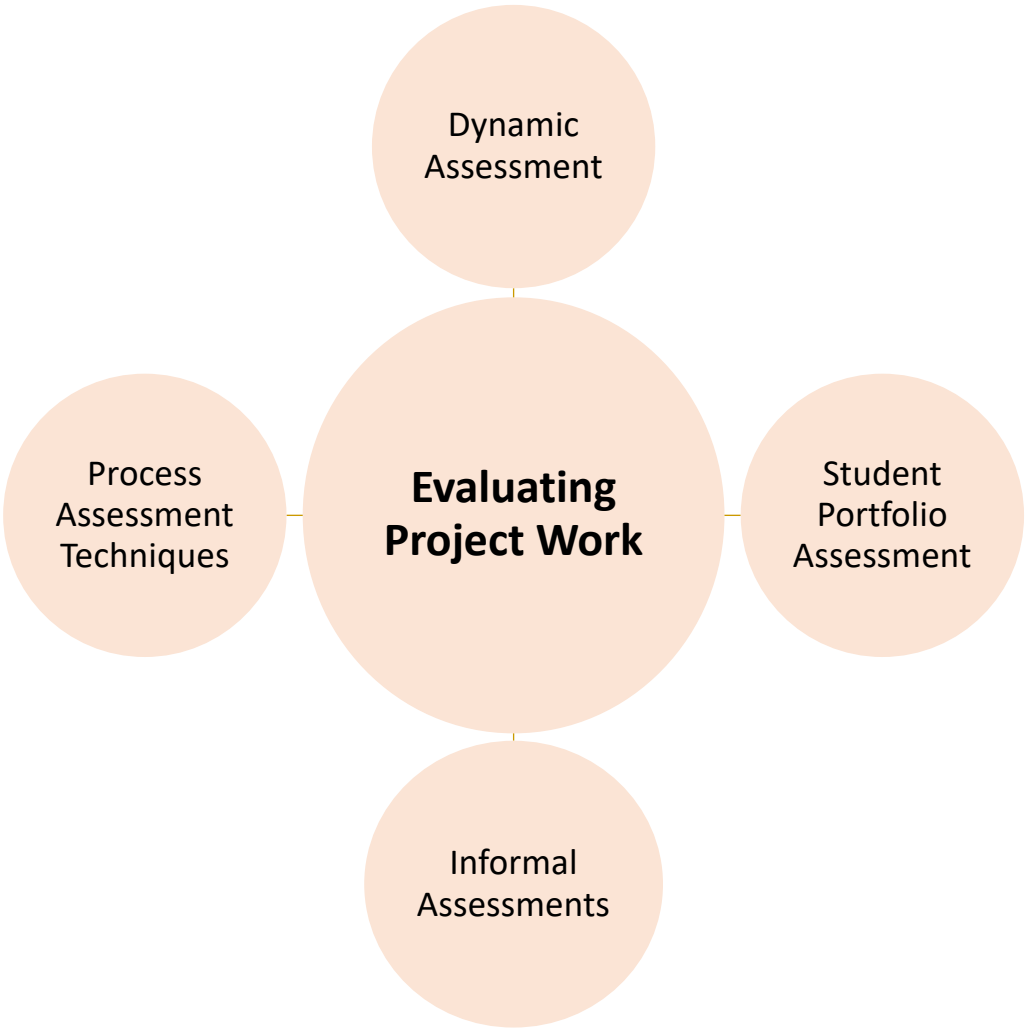
1. What levels of thinking are implied in the evaluation implied in Picture A? in Picture B? Use Bloom's Taxonomy to frame your answers.
2. List the advantages and disadvantages of the evaluation strategies implied in both Picture A and Picture B.
3. Why do you think teachers in Cambodia do not often use the evaluation strategies implied in Picture B?

HANDOUT 10b: Evaluation Strategies in a Project Work Learning Environment

Some Key Ideas

- During evaluation, teachers using Project Work are usually more interested in assessing 'how' children arrived at a conclusion or answer rather than the answer itself.
- The process of learning is as important as the learning product itself.
- Traditional assessment and standardized tests do not work well for evaluating Project Work.
- Since most schools must work in a context where formal tests are unavoidable, teachers must be creative in synthesizing new assessment techniques into the existing system.

Some useful strategies for evaluating Project Work



Specific Techniques for Evaluation[8]

Project Work Learning Theorists recommend FOUR different strategies for evaluating students in an environment where they are producing projects. These strategies often overlap in their approach but are also unique in specific ways.

- **Dynamic Assessment:** This approach suggests that teachers incorporate assessment into the teaching process where possible. Technologies are available for incorporating continuous, "dynamic assessment" into learning materials (e.g., social media, email, etc.). Assessment can then be easily integrated into meaningful learning experiences and not tacked on at the end. This type of assessment requires teachers to directly interact with students during the evaluation process.
- **Portfolio Review:** In this technique, teachers critique and discuss learning products grounded in authentic contexts, including student portfolios, projects, compositions, performances, and take-home tests. Use of work products can complement more traditional measures of knowledge acquisition and understanding.
- **Process-oriented Assessment:** In this technique, teachers evaluate processes as well as products. Some of the strategies implied by this technique include: debriefings, checklists, interviews, group discussions, knowledge telling, co-investigation, and post-mortems of problem-solving activities.
- **Informal Assessment:** Informal assessments refer primarily to teacher observations of eye contact, body language, facial expressions, and work performance. These observations can complement formal assessments as a basis for instructional adjustments.

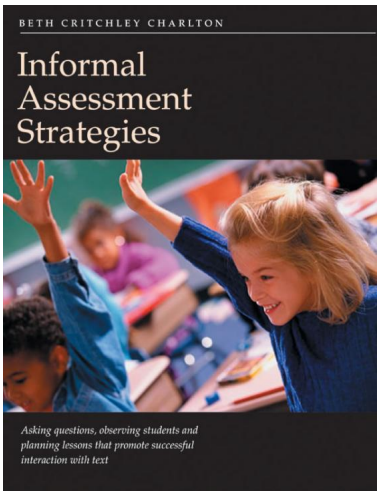
How to evaluate?

Constructivism calls for the elimination of grades and standardized testing.

[8] https://etad.usask.ca/802papers/Skaalid/eval.html

HANDOUT 10c: Concrete Examples of Evaluation Strategies Used to Assess Constructivist Learning

Assessment Strategy	Examples & Explanation
Dynamic Assessment 	▪ **Example:** Science group assignment where students must design their own experiment to demonstrate a specific principle learned in class. Teachers evaluate by interacting with students during the process to gauge their teamwork and understanding. ▪ **Teacher's Role:** o Interact with students to determine how well they work together as a team. o Determine whether students could undertake the research necessary. o Interview students to determine how they arrived at their final product. o Review social media or email communications to determine students' depth of understanding within the group. o Teachers should take notes of all of their interactions and use these formatively to help students later.
Portfolio Review 	▪ **Example:** Students must individually write a series of poems in Khmer using multiple poetic styles. Teachers evaluate by reviewing products and talking with students AFTER their portfolio products have been completed. ▪ **Teacher's Role:** o Provide materials for students to store/compile their poems. o Allow students to work on their projects outside of class. o Suggest resource materials to help students do their projects. o Review literary products with students and ask questions about how they determined content, what was easy, difficult, etc. o Assign a grade based on both the product and interactive interviews with students.

Assessment Strategy	Examples & Explanation
Process-oriented Assessment 	▪ **Example:** Students create a Math Project that exemplifies certain key principles in a particular unit. The Project will be displayed on a classroom bulletin board. The teacher meets with students periodically to discuss the project and make assessment accordingly. ▪ **Teacher's Role:** o The teacher should provide the broad parameters of the project to the students but allow them to determine the form content will take. o The teacher holds periodic discussions with students to see how they are progressing with the project. o The teacher uses a *checklist* to note down progress and challenges and includes these observations in the final assessment of the project.
Informal Assessment 	▪ **Example:** The teacher invites students to have a debate in English on a topic that they select. In addition to observing how well each debate team argues their particular side of the argument, the teacher makes conscious observations of students' facial expressions, energy levels, and engagement. ▪ **Teacher's Role** o The teacher observes the debate that was assigned to students. o In addition to a checklist that she may use to evaluate the use of appropriate debating techniques, she also makes conscious notes about students' facial expressions, energy levels, and engagement. o Informal observations are then combined with more formal process-oriented evaluation criteria (e.g., checklist scores) to make an overall assessment of students' learning and performance.

Small Group Discussion

In your small groups, contribute to a discussion about the similarities and differences between the various assessment strategies described in the table above. Then, complete the table provided below that summarizes how these techniques are similar and how they are different from each other.

Factor	**Dynamic Assessment**	**Portfolio Review**	**Process-oriented**	**Informal Assessment**
Timing (e.g., before, during, end of task)				
Product Focus (e.g., high, low, etc.)				
Process Focus (e.g., high, low, etc.)				
Teacher Interaction (e.g., high, low, etc.)				
Use of Formal Assessment Techniques (e.g., checklists, tests, etc.)				

5. SUGGESTED READING

1. Herrity, J. (2022, December 23). *Group vs. Team: What's the Difference?* Retrieved February 1, 2023, from https://www.indeed.com/career-advice/career-development/group-vs-team.
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7. Team Asana (2021). *Team roles: 9 types to create a balanced team.* Retrieved February 1, 2023, from https://asana.com/resources/team-roles.