



Key concept

Steam and Active Learning

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CONCEPT: STEAM and Active Learning

1- BRIEF DESCRIPTION OF THE CONCEPT

STE(A)M is as exemplified throughout the project by no means passive bit within the essence of Active Learning. Active learning is any learning activity in which the student participates or interacts with the learning process itself. This is in opposition with the classic, passive absorption of information given by a teacher. Active learning techniques allows to (re)capture students attention in a lecture and to engage them in the content of the course. It tends to improve the general learning process, as students tend to remember and understand more. Permaculture and STE(A)M offers a great deal of possibilities when it comes to active learning activities.

2- Activities of the LivingStem project that may be related to this concept

From the Gamification System for ages 10-14:

Vertical Garden creation: Especially the Phase 2 'Development of the activities that are agreed upon' can be easily recorded. Also, a ceremony can follow the activity where the students are given the physical badges within this activity. The students can be asked to give a speech when they are awarded their badge where they can elaborate on the competences mentioned in page 9. These students can also be asked questions by their educator or peers. In this way they are actively learning (remembering and elaborating) on the competences achieved which are all STE(A)M related.

The Permaculture and Renewable Energy Activity: This activity is in the essence of STEAM whilst combining all 5 sciences but more importantly physics/ science. Technology Engineering and Math should be combined in

accomplishing the ultimate goal which is to create renewable energy systems. The video can be produced in the end of the construction of the system, having the several teams showing what their mechanism can do and describing what they have built, how and why, along with mistakes/ or obstacles they have faced.

The Ideal Kitchen Garden Game for ages 10-14:

The 'Ideal Kitchen Garden Game' for ages 10-14 with all its Phases A-D is inducing the children in a playful way to steps such as being thorough, being critical observers and able to record systematically in an organised way, what has been observed to come up with conclusions. These are basic, fundamental, initial steps in most of the experimental methods and within the essence of Active Learning, entailed in some of the STEM related sciences such as Engineering, Technology and Science and to a lesser extend Maths. Students can be particularly video recorded when playing the Ideal Kitchen Garden Board Game.

3- Methodology proposal for the implementation of the activity described above

A number of students (depending on the exact age and capabilities can be from 2-4 students) will be responsible for video recording (e.g as described above the Phase 2 of the 'Vertical Garden' or the tangible outcome of the 'Permaculture and Renewable Energy Activity' or the play of the 'Ideal Kitchen Garden Board Game').

The main idea is for the videos to form a synopsis of what students have learned in the prior mentioned activities which are all in the core of STE(A)M. When students are asked to summarise, an activity is a form of Active Learning and mostly metacognition which is very important as a 21st century skill.

The only trick is for student to develop a priori a concrete schedule on when to take pictures or video moments for showing the essence of the activity. For students to do this, they have to fully comprehend and finish the aforementioned activities in the Gamification System. A for the 'Ideal Kitchen Garden Board Game' it might be a good idea to film it in the second or third time played, where they have already grasped the information and the guidelines.

The video production can be done in teams of students, e.g a team of video producers (2-3 students) will be responsible to summarise the whole activity in a cropped/ processed video of no more than 1.5h. For activities that last long or have many sub-tasks the workload can be divided in several students each time but the important thing is for the production team to use a video processing software to go through the task and crop the most important information. Then the video (or if there are several parts, they should be put together in the correct order), should be available for all students via a portal.

4- Children involvement in the activity:

In any of the activities to be undertaken by the children, from the very beginning 2 of the students (preferably a strong -knowledge wise- student and a shier/not so confident/ not strong academically student) will be responsible for videotaping. Another team or the same students can also be responsible for cutting/ editing/ merging what they believe to be the most important points.

Thus, students will be involved as per the activity title in 'STEAM and Active Learning', in the recording of the video, the production (editing) of the video. The students who are not involved in the production team will have the chance to see the highlights of the module/activity/ procedure thus seeing the summary of what they have learned in the activities recorded. In this way, they will see their teacher and themselves learning/ teaching/ interacting.

After viewing the produced video, the students will then be asked to construct their own evaluation. For students to do this, it means they need to evaluate the most crucial points using their critical thinking as well as remember all the information learned through the activities. These questions can then be used for their next formal or informal assessment. Knowing that these questions set by them will be used for evaluation, puts an extra challenge for them for the questions to be well structured and reasonable and answerable etc.

5- Links between this concept and science (STEAM) and permaculture:

Basically, the production of the videos is related with:

Artistic vision. The videos need to be clear, well developed.

Technology can be considered the use of the video device and software to process it. Students might also need to familiarise with a software for editing the videos and putting sub titles or titles/ the topic to be shown each time one video capture needs to be blended with another.

The theme/ content of the videos come from activities that are based on one way or another with **permaculture** concept.