TE Learning Module: Innovative Design Thinking
Teaching Guidelines

Overview

Nowadays, the pressure is on, as never before, to be creative. Both in personal and social life the needs to be able to come up with a fresh look and to solve problems, to get and keep the competitive edge, are immense. However, the burden of our lifestyles and educational approaches often push our natural creative abilities into the background.

This module is intended to reawaken the creativity in students and develop it using pragmatic techniques. Students will then leave their schools with a new enthusiasm for using creativity and practical techniques to help them be more innovative. These techniques can be used in a wide range of situations from inventing new products or processes to enhancing problem-solving and life-long learning.

Aims

Creativity is made up of two aspects, the tools to increase innovative output and, more importantly, the belief that the participant is a creative person. Although the former abounds, the latter does not; this module addresses both, from a brain-based point of view (i.e. how the brain works, how the eye takes in information and how the memory retains and recalls that information). Knowing how the brain works enables students to maximize their abilities and possibilities. This module aims at learning and teaching not only WHAT to think but HOW to think as well.

Objectives

Our core goal focuses on the most up-to-date understanding of the brain and the development of thinking and learning skills using various tools. Using this basis, we can include elements from any of the 6 TE knowledge contexts to provide a school-based TE curriculum that will give enhanced educational performance.

Upon completion of this module, students will be able to:

- Eliminate roadblocks to creative thinking
- Identify and explain the 4 essential phases of design process
- Use specific tools to boost their output of innovative ideas
- Apply pragmatic problem-solving techniques to identify the real cause of and best solutions to problems encountered in daily life

Deliverables (Learning Outcomes)

This module promotes a systematic approach to the development of thinking skills. In other words, it brings students through a step-by-step process, starting with the introduction of thinking tools and then systematically considering various thinking situations/contexts before going on to explore creativity and innovative design thinking. The result is a highly effective programme that will improve students' problem-solving capability.

Expected students' benefits:

- A creative thinking experience to learn from and develop
- The ability to apply thinking tools and techniques to coursework, study, revision and examination
- Effective note-taking and improved communication
- More effective learning
- The ability to integrate the use of whole-brain skills via design process
- Greater problem-solving capability

Contents

In this module, students will use basic thinking tools and develop skills in their use by practising them on the sort of problems that they may encounter in real life. Students will then be able to apply the tools to scenarios that they may face in their studies, at home or in the community.

Main contents of this module:

- Creativity test (quantity & quality of ideas, passive/active & negative/positive attitudes, etc.)
- Brain-based learning (right/left cortex, logical thinking, lateral thinking, memory, etc.)
- Introduction to creativity (in & out of box thinking, infinite associations, paradigm shift, radiant thinking, etc.)
- Thinking tools & problem-solving techniques (brainstorming, mind-mapping, 6 hats, etc.)
- Design process (4 essential phases, etc.)
- Case studies
- Project works

Approach

It's encouraged to implement this module at different levels with various scenarios according to students' development. It's not just restricted to basic education, but could be extended to senior secondary. Various tools and context should be used for students of different levels. For primary school, there is no formal technology subject(s). It could be implemented in extra-curricular activities or subsumed in projects.

This module will focus on the learning and teaching of design thinking methods mainly. In the class, students have to learn in context, but this doesn't imply a close relationship with their subject knowledge. Life experience is more important. To learn the ways to solve problems is the most important. Teachers must become the facilitators. They cannot develop students' thinking skills by just telling them how to do and without giving chance for solving problems individually/in teams.

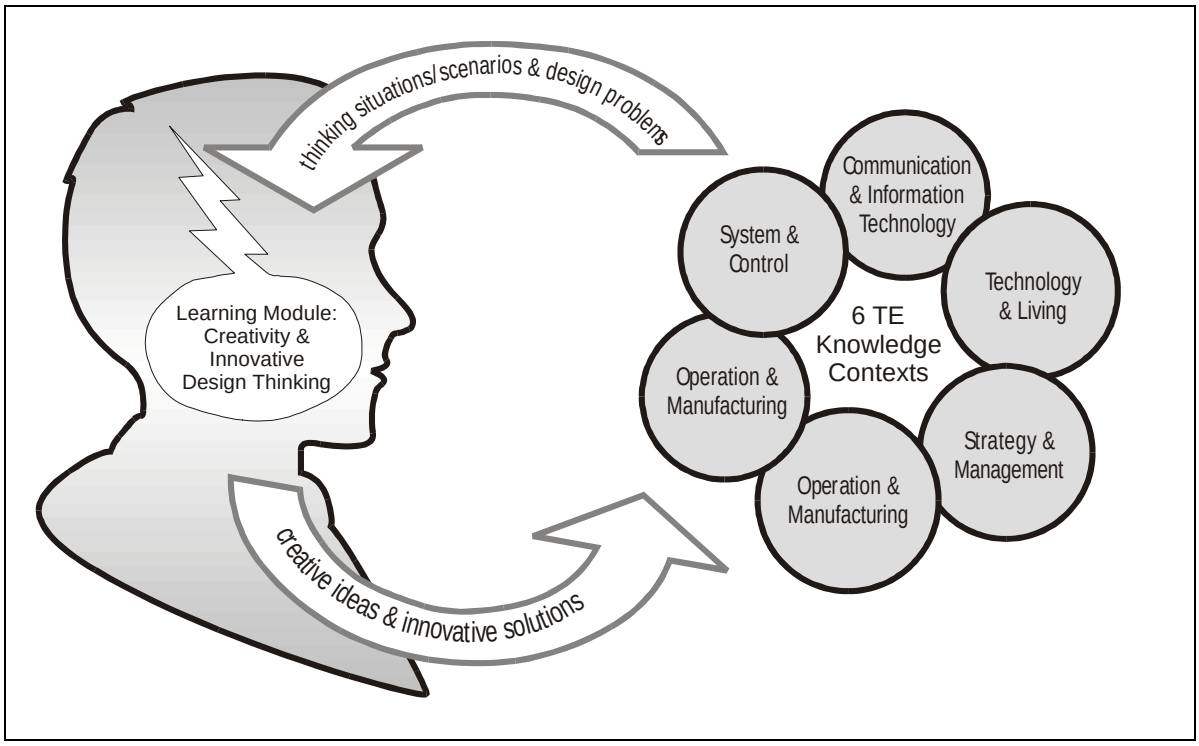
The learning and teaching activities should be designed to develop students' innovative design thinking. Teachers should encourage students to go beyond the given information, allow them time to think, strength their creative abilities, reward their imaginative efforts, value their inventive attributes, teach them productive thinking techniques and design process, and create a climate conductive to innovation.

Assessment

Three main areas will be considered in planning how assessment will take place:

1. Students' work should be assessed using a specific set of criteria.
2. Students should have the opportunity to evaluate the work of others. It is immensely valuable to learn that there are no 'wrong' answers, just different solutions that may or may not work well. This is the time to emphasize constructive criticism as well as the sharing of ideas.
3. Students should maintain some type of ongoing record, such as the 'design folder', in order to track back their progress through the activities.

Concept Map



Generic Framework

Level & Theme	Knowledge	Skills	Values & Attitudes	Remarks
KS1 (4hrs.) **In & Out of Box Thinking**	◆ how the brain works ◆ how the eye takes in information ◆ how the memory retains and recalls that information	◆ visual thinking ◆ mind-mapping ◆ attribute listing	◆ trial and error ◆ curiosity ◆ openness to new and unusual ideas	a creative thinking experience to learn from and develop…
KS2 (4hrs.) **Mastering Complexity**	◆ right/left cortex ◆ logical thinking ◆ lateral thinking	◆ 6W thinking technique ◆ brainstorming ◆ SCAMPER	◆ self-motivation ◆ self-confidence ◆ adaptability	eliminate roadblocks to creative thinking…
KS3 (4hrs.) **Effective Decision Making**	◆ creative problem-solving model ◆ divergent thinking ◆ convergent thinking	◆ DO IT ◆ 6 thinking hats method ◆ decision tree ◆ grid analysis	◆ have no fear of perfection, we can never reach it ◆ independent judgement ◆ tolerance of ambiguity	4 essential phases of design process…
KS4 (extension) **Project Planning & Management**	◆ planning cycle ◆ management methodologies	◆ action plan / Gantt chart ◆ critical path analysis ◆ cost / benefit analysis ◆ stakeholder analysis	◆ willingness to take sensible risks ◆ persistence and commitment	I hear, I forget; I see, I remember; I do, I understand…