



## **SUSTAINABLE AND ECO FRIENDLY INNOVATIONS IN TEACHING LEARNING PROCESS**

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### **Abstract**

*This paper describes the eco-friendly teaching strategies and classrooms. It focuses on eco- friendly teaching learning strategies, which can reduce the use of paper. It also has explained go-green strategies for today's classrooms and suggested actions for green teaching. The goal is to highlight the importance of sustainable and eco-friendly teaching-learning process.*



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For most of us, an innovation is typically understood as the introduction of something new and useful. It is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, and services.

Being an innovative is about looking beyond what we currently do well, identifying the value-add ideas of tomorrow and putting them into practice. Similarly, innovation in education is developing and implementing new ways to improve student learning, enhance student engagement and wellbeing, and ensure successful transitions and pathways.

Sustainable and eco-friendly education is learning and teaching process that equips students, teachers, and school systems with the new knowledge and ways of thinking we need to achieve economic prosperity and responsible citizenship in restoring the health of the living systems upon which our lives depend.

Many experts have highlighted, the need of the hour to save the environment, for this purpose the role of education can play the vital role. Tomorrow's leaders need to be equipped for tomorrow's challenges, so we must adequately prepare our children for the future they will inherit. This requires a commitment in providing children with sustainable and eco-friendly education.

More innovations for sustainable and eco-friendly education in teaching-learning process is demand of an hour. For the instance, most interesting innovations, 6 exceptional Green schools in the world. These six schools are all beautiful and brilliant designs that foster smarter students while leaving a much smaller impact on the planet they will inherit.

### **The Green School**

This magnificent school campus in Bali is made entirely from sustainably harvested bamboo. The school consists of four classrooms, housing, offices, cafes, a gym, and the Heart of the School, a spiralling, multi-story building. The school also runs on clean energy systems like solar power, considering that sustainability is a core element of the children's education.

### **Project FROG**

The carefully conceived space is flooded with indirect daylight and is precisely engineered to provide plenty of clean air. The buildings are also designed to exceed energy code by 25%, keeping the school's budget intact. With the installation of optional solar arrays, the buildings can be zero energy.

### **Oaxaca School Of Plastic Arts**

It is truly organic campus that includes an earth-beamed stone walled building, ample courtyards, and native low-water plantings. Large north-facing windows provide plenty of natural light, cross-ventilation helps keep the indoor from becoming stuffy, and the massive walls minimize ambient noise.

### **Apap Open School**

This funky art school made from shipping containers in Korea. The building's yellow kinetic shape is a dynamic presence made from 8 angled converted shipping containers lifted 3 meters off the ground.

### **Herwigblankertz Vocational School**

This impressive German High School is actually an old world war II Armory transformed into a solar-powered, day lit marvel. While the structural elements remain, the new roof is covered in translucent solar panels and glass, bringing the outdoors in while producing 225 KW of clean energy. Prefab classrooms tucked inside the naturally ventilated building provide an energy-efficient space to learn in.

### **School Of Art, Design and Media**

Like a stroke of calligraphy writ large, two sweeping green roofs create a mesmerizing effect that turns the building into pure landscape. The roof is as smart as it is beautiful – the carpet of grass controls storm water by soaking up monsoon, significantly reduces cooling loads, and adds biodiversity to the school campus.

Inspiring with such innovations, children at a young age will acquire learnings in developing awareness towards environmental, building lifelong habits that could potentially make a drastic difference to the earth. Recently, the eclectic educational approach to learning outside the classroom has become very popular, this practice closely associated with problem based, project-based and personalized learning. This blend of practices presents opportunities for teachers to aim for higher goals as they implement principles of sustainability, service learning and critical, democratic education. As a result, what is experienced by students is more useful, interesting and fun than “regular” school and the work that they do means more to themselves and others in go green way.

### **Green Strategies For Today's Classrooms**

- Harness the power of solar energy
- Encourage classroom recycling efforts
- Take an 'earth day is every day' approach
- Start a classroom or school wide composting project
- Opt for natural cleaning methods in the classroom
- Promote green school supplies to students and parents
- Go digital to save paper
- Teach the value of natural resources conservation

### **Eco- Friendly Teaching Learning Strategies**

As mentioned earlier, across the world, consciously implemented changes to ensure they are actively facilitating an environmentally friendly future. Similarly, teacher can deploy variety of teaching strategies for sustainable and eco-friendly teaching learning like green teaching. "Green Teaching" can constitute a number of teaching strategies, including reducing paper or paperless teaching, reduction of energy use in the classroom, and reduction in use of classroom supplies other than paper.

- **Field Based Education**

Field-based methods work towards many different educational aims, some implicit and others explicit. Particular aims are examined, and some types of field activities are seen to be better for achieving certain aims. Types of field excursion are classified and some special learning benefits of working in the field are suggested. Field teachers set clear learning objectives and carefully plan and select the eco-friendly experiences they intend students to have, taking into account educational aims, time available, distance, student readiness, and availability of localities and resources.

- **Learner Centred Education**

Enquiry learning is a learner-centred approach that emphasises higher order thinking skills. It may take several forms, including analysis, problem solving, discovery and creative activities, both in the classroom and the community. Most importantly, students are responsible for processing the data they are working with in order to reach their own outcomes in enquiry learning.

- **Problem Based Learning**

Problem based learning is an instructional approach where students learn by solving challenging, open-ended problems. The problems are authentic tasks and are solved in socially and contextually based teams of students. The students rely on their current knowledge of the problem, identify information they need to know to solve the problem, and the strategies they use to solve the problem.

The development of thinking and problem solving skills is an important aspect of education for sustainable development, especially given the urgency of problems facing the world today.

- **Brain Storming**

Brainstorming is a process for developing creative solutions to problems. Brainstorming works by focusing on a problem, and then deliberately coming up with as many solutions as possible and by pushing the ideas as far as possible. One of the reasons it is so effective is that the brain stormers not only come up with new ideas in a session, but also spark off from associations with other people's ideas by developing and refining them.

Below are some Creative Brain storming Techniques,

1. Brain writing
2. Reverse brainstorming
- 3 Mind maps
4. Design protect zero

- **Buzz Sessions**

Buzz sessions are short participative sessions that are deliberately built into a lecture or larger group exercise in order to stimulate discussion and provide student feedback. It is eco-friendly technique where a large number of ideas, issues and recommendations can be collected in a short time. Each participant has an opportunity to speak. Active participation is stimulated for the next activity. Provides valuable information to resource persons.

- **Audio Visual Presentation**

**Webinar:** A webinar is a presentation, lecture, workshop or seminar that is transmitted over the Web using video conferencing activity. A key feature of a Webinar is its interactive elements: the ability to give, receive and discuss information in real-time. Using Webinar software participants can share audio, documents and applications with webinar attendees. This is useful when the webinar host is conducting a lecture or information session. While the presenter is speaking they can share desktop applications and documents.

**Video conferencing:** A video conference is a live, visual connection between two or more people residing in separate locations for the purpose of communication. At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

Teachers use web conferencing, telephone or skype to bring guest speakers to class, instead of having them fly or drive to campus.

For service learning classes requiring community engagement, arrange carpooling or provide public transit options to reduce car trips. Use web conferencing/Skype to reduce numbers of trips to off-site locations.

- **Cooperative And Colaborative Learning**

Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Students work through the assignment until all group members successfully understand and complete it.

- **Project-Based Learning**

Project-based learning is the instructional strategy of empowering learners to pursue content knowledge on their own and demonstrate their new understandings through a variety of presentation modes. Teachers can plan learning experiences that result in in-depth understanding of important ideas in the content. As students are driving the learning, they can draw upon their strengths and create projects that incorporate their own interests, native language, cultural background, abilities and preference for using different types of media.

### **Suggestions For Green Teaching**

Keeping the above eco-friendly teaching strategies in mind, herein some suggestions given for green teaching.

**Use an E-textbook/E-book** - Electronic versions are now available for many textbooks and other books faculty may want to use in their courses. E-books can mean anything from a pdf posted online, to an interactive website, to an app on an iPhone or iPad, to a book as purchased from a vendor such as Amazon to be read on their Kindle. Some e-books are available for viewing or "check-out" through public or university libraries. Some libraries loan e-reader devices such as Kindles or Nooks pre-loaded with a selection of e-books.

E-textbooks can mean any of the above books when used for teaching/classroom purposes, or can specifically refer to or sometimes can refer to a collection of open educational materials chosen to replace a traditional textbook.

**Use Online Resources Instead of a Textbook** - Some faculty are turning toward collections of online learning materials in place of a traditional paper textbook and take notes electronically.

**Accepting Assignments Online Instead of on Paper** –This allows to create a rubric to outline what you are looking for. Then require students to submit assignments via email. The Assignments tool allows students to upload their papers where teacher can get to know if students have submitted and which haven't.

**Giving Tests Electronically** – Class room tests can be administered via the tests and quizzes tool in any software programme. If the test is "open book," faculty do not need to worry about students accessing other materials on their laptops while taking the test. Alternatively faculty may design the test in a way that makes it difficult or impossible for students to look up the answers (questions requiring analysis, evaluation and critical thinking on topics unique to each student's situation).

**Grading Tests and Assignments Electronically** - Most question types on tests are graded automatically, based on the correct answer key entered by faculty. Short answer/essay questions on tests can be viewed and graded in the Test and Quizzes tool. Feedback to students can be entered there, as well. Use either a laptop/desktop or a tablet-style device such as an iPad to mark-up and grade the assignments.

**Reduce energy use** - In any classroom, turn off the lights if not needed, and turn off the projector and other A/V equipment when not needed.

**Reduce Paper use** - Use of paper can be reduced by, posting important documents and readings electronically. Use Word Press or other websites to post syllabi, hand-outs, class notes, and pdfs electronically rather than handling out paper copies. Use of library e-reserves to provide students with copyright-cleared access to electronic readings. Encourage students

to view these materials on their laptops or tablets rather than printing, and suggest electronic methods for note-taking such as Evernote.

**Use of Recycled Content Paper** - Many suppliers in the market started offering recycled content paper. Paper are available in 30%, 50% and 100% recycled content. For extra savings, educational institutions can opt such papers in contributing eco-friendly teaching learning process.

### **Conclusion**

To conclude, on part of any child, education is learning about the world around them, so having the right resources to show the impact of their behaviour on the larger environment is the best way to supplement teaching about the world they live in. Being an eco-friendly citizen of the world means starting with your immediate environment, and home and school are the launching points. Students those are not going green at home, can learn some eco-friendly habits in the classroom and take them home to start making changes. An extensive use of go-green items a teacher uses in class, creating eco-friendly projects for their students, use of different teaching strategies where teacher can take students to the environment and plan the lesson accordingly, as well using paperless teaching strategies in the classroom. These application of approaches contribute in achieving eco-friendly teaching learning process in real sense.

Un-arguably, sustainability and eco-friendly teaching learning process plays important factor for the sustainable future and many more innovations would be contributed in this domain in near future.

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