

## Motivating Students Towards Green ICT: Strategies for Higher Secondary School Teachers

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**ABSTRACT:** The strategies that higher secondary school teachers can employ to motivate students towards Green Information and Communication Technology (ICT). With the increasing importance of sustainability and environmental awareness, it is crucial for educators to foster a sense of responsibility and engagement in students regarding the impact of ICT on the environment. This paper presents a range of practical and effective strategies that teachers can implement in their classrooms to encourage students to embrace green practices in ICT. The significance of raising awareness among students about the environmental implications of ICT. Teachers can incorporate relevant case studies, documentaries, and discussions into their lessons to highlight the ecological footprint of ICT and its potential consequences. This will enable students to develop a deeper understanding of the issues and the urgency for sustainable solutions. The importance of hands-on experiences and practical activities. Teachers can organize workshops and projects that involve students in designing and implementing eco-friendly ICT solutions. This approach not only enhances students' technical skills but also instills a sense of ownership and empowerment, as they witness the positive impact of their actions. The role of collaboration and peer learning. Teachers can facilitate group activities that encourage students to work together on green ICT initiatives. This collaborative approach promotes teamwork, creativity, and critical thinking while fostering a sense of collective responsibility towards the environment. The importance of incorporating green ICT concepts into the curriculum. By integrating sustainable practices into relevant subjects such as computer science or information technology, teachers can ensure that green ICT becomes an integral part of students' education. This integration allows students to understand the practical applications of green ICT and prepares them for future careers in an environmentally conscious world. The significance of recognizing and rewarding students' efforts. Teachers can acknowledge and celebrate students' achievements in green ICT through certificates, awards, or eco-friendly initiatives. This recognition motivates students to continue their green ICT endeavors and inspires others to follow suit. The presents a comprehensive set of strategies for higher secondary school teachers to motivate students towards green ICT. By implementing these strategies, teachers can empower students to become environmentally responsible digital citizens, equipped with the knowledge and skills to address the challenges of the future.

**KEYWORD:** Motivating Students, Green ICT, Strategies, Higher Secondary School Teachers, Education.

## 1. Introduction:

The rapid advancement of technology has revolutionized the way we live and work, bringing numerous benefits and conveniences. However, this progress has also resulted in various environmental challenges, such as increased energy consumption, electronic waste, and carbon emissions. In response to these issues, the concept of Green ICT (Information and Communication Technology) has emerged as a crucial area of focus for sustainable development. Green ICT aims to minimize the negative environmental impact of information and communication technologies by promoting energy efficiency, reducing electronic waste, and adopting environmentally friendly practices. As educators, higher secondary school teachers play a vital role in shaping the attitudes and behaviors of students, making them key agents of change in promoting sustainable practices, including Green ICT. Motivating students towards Green ICT is essential to ensure a sustainable future. By instilling a sense of responsibility and awareness in students, teachers can empower them to become active participants in the transition towards a greener and more sustainable society. However, motivating students in this context requires careful planning and implementation of strategies that resonate with their interests and aspirations. The aims to explore effective strategies that higher secondary school teachers can employ to motivate students towards Green ICT. These strategies encompass various aspects, including education, engagement, and practical implementation. By integrating these strategies into their teaching practices, teachers can inspire students to embrace the principles of Green ICT and contribute to environmental sustainability. The importance of raising awareness about the environmental impact of ICT, providing students with knowledge about sustainable practices, and emphasizing the potential benefits of adopting Green ICT. Additionally, it will explore the significance of engaging students through interactive activities, group discussions, and project-based learning, which promote hands-on experiences and foster a sense of ownership. The practical implementation of Green ICT principles within the school environment. This includes encouraging students to adopt energy-saving habits, promoting the use of renewable energy sources, and minimizing electronic waste through recycling and responsible disposal. The embracing these strategies, teachers can cultivate environmentally conscious individuals who are equipped to make informed choices and actively contribute to a sustainable future.

## 2. Understanding Green ICT:

Green ICT, also known as Green Information and Communication Technology, refers to the environmentally sustainable practices and technologies related to information and communication technology. It involves the efficient and responsible use of ICT resources to minimize environmental impact and promote sustainability.

### 2.1. Principles of Green ICT:

- **Energy Efficiency:** Green ICT emphasizes the efficient use of energy in ICT systems and devices. This includes optimizing power consumption, using energy-efficient hardware, and employing power management techniques such as sleep mode and power-saving settings.
- **Resource Management:** Green ICT focuses on minimizing resource consumption, such as reducing paper usage through digital alternatives, recycling electronic waste, and promoting the use of sustainable materials in ICT equipment.
- **Lifecycle Management:** Green ICT considers the entire lifecycle of ICT products, from manufacturing to disposal. This involves using environmentally friendly manufacturing processes, extending product lifespan through repair and upgrades, and implementing proper e-waste management practices.
- **Virtualization and Cloud Computing:** Green ICT promotes the use of virtualization and cloud computing technologies, which enable the consolidation of IT resources and reduce energy consumption by running multiple virtual servers on a single physical server.

- **Telecommuting and Video Conferencing:** Green ICT encourages remote work and virtual meetings as alternatives to commuting, which helps reduce greenhouse gas emissions associated with transportation.

## 2.2. Environmental Impact of ICT:

While ICT brings numerous benefits, it also has environmental implications. Here are some key aspects to consider:

- **Energy Consumption:** ICT infrastructure, including data centers, network equipment, and personal devices, consumes a significant amount of energy. This leads to increased carbon emissions and contributes to climate change.
- **E-waste:** Rapid technological advancements result in frequent upgrades and disposal of electronic devices, leading to the generation of electronic waste (e-waste). E-waste contains hazardous materials that can harm the environment if not properly managed.
- **Manufacturing Processes:** The production of ICT equipment involves the extraction of raw materials, energy-intensive manufacturing processes, and the use of potentially harmful substances. These processes contribute to pollution and resource depletion.
- **Network Infrastructure:** Expanding network infrastructure and data centers require significant land use, construction, and energy consumption. This can have negative impacts on ecosystems and local environments.

## 2.3. Potential for Sustainability:

Green ICT offers several opportunities for sustainability:

- **Energy Efficiency:** By adopting energy-efficient technologies and practices, ICT systems can reduce their carbon footprint and contribute to overall energy conservation efforts.
- **Virtualization and Cloud Computing:** Consolidating IT resources through virtualization and utilizing cloud computing can optimize energy consumption and reduce the need for physical infrastructure.
- **Remote Work and Digital Collaboration:** Promoting telecommuting and digital collaboration tools can reduce commuting-related emissions and foster a more sustainable work culture.
- **Data Center Efficiency:** Optimizing data center operations, cooling systems, and server utilization can significantly reduce energy consumption and improve overall efficiency.
- **E-waste Management:** Implementing proper e-waste management practices, including recycling and responsible disposal, can minimize the environmental impact of discarded ICT equipment.

## 2.4. Strategies for Higher Secondary School Teachers to Motivate Students towards Green ICT:

- **Education and Awareness:** Introduce students to the concept of Green ICT through classroom discussions, presentations, and case studies. Raise awareness about the environmental impact of ICT and the potential for sustainability.
- **Curriculum Integration:** Integrate Green ICT topics into relevant subjects such as environmental science, computer science, or technology courses. Design assignments and projects that explore sustainable ICT practices and solutions.
- **Experiential Learning:** Organize field trips to green data centers or technology companies implementing sustainable practices. Engage students in hands-on experiences to understand the practical aspects of Green ICT.

- **Green Technology Showcases:** Arrange showcases or exhibitions where students can present innovative green technology solutions or projects they have developed. Encourage creativity and critical thinking in finding sustainable

### 3. Integrating Green ICT into the Curriculum:

Integrating Green ICT into the curriculum is an effective way for higher secondary school teachers to motivate students towards environmentally friendly practices. Here are some strategies to achieve this:

#### 3.1. Identifying relevant topics and concepts related to green ICT:

- Start by researching and understanding the key concepts and issues related to Green ICT. This may include topics such as energy-efficient computing, e-waste management, sustainable software development, and data center optimization.
- Identify specific areas within the existing curriculum where green ICT concepts can be incorporated. For example, in computer science or technology classes, lessons on energy-efficient coding or designing eco-friendly computer systems can be introduced.

#### 3.2. Modifying existing lesson plans to include green ICT components:

- Review your current lesson plans and identify opportunities to integrate green ICT components. Look for topics or activities where students can explore the environmental impact of technology and brainstorm solutions.
- For instance, in a business or economics class, you can discuss the environmental costs and benefits of adopting green ICT practices in organizations. In a science class, you can explore the impact of technology on climate change and discuss ways to mitigate it through energy-efficient computing.

#### 3.3. Creating dedicated lessons or projects centered around green ICT:

- Design specific lessons or projects that focus solely on green ICT. This can involve hands-on activities, research assignments, or group projects.
- For example, you can assign students to research and present case studies on companies that have successfully implemented green ICT strategies. Alternatively, you can have students design and develop their own energy-efficient mobile applications or websites.

#### 3.4. Encouraging critical thinking and discussion:

- Encourage students to think critically about the environmental impact of technology and engage in discussions about potential solutions.
- Incorporate debates, group discussions, or reflective writing assignments where students can express their opinions and propose innovative ideas for sustainable ICT practices.

#### 3.5. Inviting guest speakers or organizing field trips:

- Organize guest speaker sessions with experts in the field of green ICT, who can share their experiences and insights with the students.
- Plan field trips to environmentally sustainable technology facilities, data centers, or recycling centers to provide students with real-world exposure to green ICT practices.

#### 3.6. Promoting collaborative learning and student engagement:

- Foster collaboration among students by assigning group projects or activities that require teamwork and problem-solving skills.

- Encourage students to explore and share their own ideas for integrating green ICT into their daily lives and communities, both inside and outside the school environment.
- The integrating green ICT into the curriculum, teachers can raise awareness among students about the importance of sustainable technology practices and inspire them to become responsible users and future innovators in the field.

## 4. Hands-On Learning and Experiments:

Hands-on learning and experiments can be highly effective in motivating students towards Green ICT. Here are some strategies that higher secondary school teachers can employ:

- **Demonstrating Green ICT Principles:** Organize practical activities that showcase the application of green ICT principles. For example, students can be involved in setting up energy-efficient computing systems or designing eco-friendly data centers. This hands-on experience will help them understand the environmental impact of ICT and the importance of sustainable practices.
- **Energy Efficiency Experiments:** Set up experiments that focus on energy efficiency in electronic devices. Students can measure and compare the energy consumption of different devices or investigate the impact of various settings and usage patterns on energy usage. This will enable them to recognize the significance of energy-efficient technology and make informed choices.
- **Research on Environmentally Friendly Alternatives:** Encourage students to conduct research on environmentally friendly technology alternatives. This can involve exploring renewable energy sources for powering ICT infrastructure, investigating sustainable materials used in device manufacturing, or analyzing the life cycle of electronic products. Such research projects will broaden their understanding of green ICT and foster critical thinking.
- **Collaborative Projects:** Foster collaboration among students by assigning group projects related to green ICT. They can work together to design and implement innovative solutions for reducing ICT's environmental footprint. This can include developing energy-saving algorithms, designing eco-friendly applications, or creating awareness campaigns on sustainable technology use. Collaboration will enhance teamwork skills and provide a platform for exchanging ideas and learning from each other.
- **Field Trips and Guest Speakers:** Organize field trips to eco-friendly data centers, recycling facilities, or organizations that focus on sustainable technology practices. Additionally, invite guest speakers from the industry or academia who specialize in green ICT to share their knowledge and experiences. These real-world experiences and expert insights will inspire students and help them connect theoretical concepts with practical applications.
- **Monitoring and Measuring Environmental Impact:** Involve students in monitoring and measuring the environmental impact of ICT within the school premises. This can include conducting energy audits, tracking electricity consumption, or calculating carbon emissions associated with ICT infrastructure. By actively participating in these activities, students will gain a better understanding of the environmental consequences and the need for sustainable practices.

Remember, hands-on learning and experiments should be integrated into the curriculum consistently and reinforced with classroom discussions. By incorporating these strategies, teachers can empower students to become environmentally conscious ICT users and future advocates for sustainable technology.

## 5. Collaboration and Real-World Connections:

Collaboration and real-world connections are crucial in motivating students towards green ICT (Information and Communication Technology). By engaging students in collaborative projects and providing real-world

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connections, teachers can help them understand the practical implications of sustainable technology practices. Here are some strategies for higher secondary school teachers to foster collaboration and real-world connections in the context of green ICT:

## **Encouraging student collaboration on green ICT projects:**

- Assign group projects that require students to work together on designing or implementing sustainable technology solutions.
- Provide opportunities for students to brainstorm ideas, share resources, and collaborate on research related to green ICT.
- Encourage peer learning and cooperation by assigning tasks that require students to divide responsibilities and work as a team.

## **Inviting guest speakers from the industry to discuss sustainable technology practices:**

- Organize guest lectures or panel discussions where professionals from the ICT industry can share their expertise on green ICT.
- Invite experts who specialize in sustainable technology practices, renewable energy, or data center efficiency to speak to students.
- Encourage students to interact with the guest speakers, ask questions, and gain insights into the real-world applications of green ICT.

## **Organizing field trips to eco-friendly ICT facilities or data centers:**

- Arrange visits to eco-friendly ICT facilities or data centers that prioritize energy efficiency and sustainability.
- Coordinate with local organizations or companies that have implemented green ICT practices to provide students with hands-on experiences.
- During the field trips, facilitate discussions and guide students to observe and analyze the sustainable features and practices employed by the facilities.

## **Incorporating project-based learning:**

- Integrate project-based learning approaches into the curriculum to engage students in practical green ICT initiatives.
- Assign projects that require students to identify and propose solutions to real-world sustainability challenges in the ICT sector.
- Provide guidance and resources for students to research, analyze, and present their findings, emphasizing the importance of sustainable practices.

## **Establishing partnerships with local businesses and organizations:**

- Collaborate with local businesses, non-profit organizations, or government agencies that promote green initiatives and sustainable technology practices.
- Seek opportunities for joint projects, internships, or mentorship programs that expose students to real-world green ICT projects.
- Leverage these partnerships to provide students with opportunities to contribute to sustainability initiatives and gain practical experience.

- The implementing these strategies, teachers can create an engaging learning environment that connects students with industry professionals, exposes them to real-world applications of green ICT, and fosters collaborative problem-solving skills.

## 6. Incorporating Digital Citizenship and Responsible Use of Technology:

Incorporating digital citizenship and promoting responsible use of technology are essential strategies for motivating students towards Green ICT (Information and Communication Technology). Here are some specific ways higher secondary school teachers can implement these strategies:

- **Educate students about the environmental impact of their digital footprint:** Raise awareness among students about the environmental consequences of their online activities. Discuss topics such as the carbon footprint of data centers, the energy consumption of digital devices, and the ecological effects of internet usage. Encourage students to make conscious choices by minimizing their digital footprint, such as reducing unnecessary online activities, deleting old files, and using efficient digital practices.
- **Promote responsible e-waste management and recycling:** Teach students about the importance of proper e-waste disposal and recycling. Explain the harmful effects of electronic waste on the environment and human health. Encourage students to recycle old electronic devices and educate them about local e-waste collection centers or programs. Organize awareness campaigns or workshops to help students understand the process of recycling electronic devices and the benefits it brings to the environment.
- **Encourage energy-saving practices when using technology:** Demonstrate energy-saving techniques to students when using technology. Teach them to power off or put devices in sleep mode when not in use, as this can significantly reduce energy consumption. Emphasize the importance of adjusting screen brightness, using power-saving settings, and turning off unnecessary features or applications. Encourage students to use energy-efficient devices and peripherals, such as laptops with lower power consumption or printers with energy-saving modes.
- **Foster digital citizenship and responsible online behavior:** Teach students about the concept of digital citizenship, which includes responsible and ethical behavior in the online world. Emphasize the importance of treating digital resources with respect, avoiding plagiarism, and using technology to positively contribute to society. Discuss the significance of protecting personal information, avoiding cyberbullying, and being mindful of the impact of their online actions on others. Encourage students to become responsible digital citizens who use technology in a sustainable and ethical manner.
- **Engage students in collaborative projects with a sustainability focus:** Design group projects or assignments that involve students in addressing sustainability challenges using technology. For example, students could work on projects related to energy monitoring and management systems, developing apps or websites to promote eco-friendly practices, or creating digital content that raises awareness about environmental issues. By engaging students in real-world sustainability initiatives, they will develop a deeper understanding of Green ICT and its applications.

Remember that these strategies should be implemented through engaging and interactive teaching methods, such as discussions, hands-on activities, group work, and project-based learning. By incorporating digital citizenship and responsible use of technology into the curriculum, you can motivate students to become environmentally conscious and responsible users of ICT.

## 7. Assessment and Feedback:

Assessment and feedback play a crucial role in motivating students towards green ICT practices. Here are some strategies for higher secondary school teachers to implement:

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- **Green ICT Assessments:** Design assessment methods that evaluate students' understanding of green ICT concepts and practices. Include questions or tasks that assess their knowledge of energy-efficient computing, e-waste management, sustainable data storage, and other relevant topics. This can be done through written exams, projects, presentations, or practical demonstrations.
- **Real-World Applications:** Incorporate real-world scenarios and case studies in assessments to help students understand the practical implications of green ICT. For example, you can ask them to analyze the energy consumption of a specific device or propose eco-friendly alternatives for common ICT practices.
- **Feedback on Sustainable Practices:** Provide constructive feedback that highlights the importance of sustainable technology practices. Encourage students to adopt energy-saving strategies, such as turning off computers when not in use, optimizing power settings, and minimizing printing. Acknowledge their efforts in implementing green ICT practices and provide suggestions for improvement.
- **Peer Review:** Introduce peer review sessions where students can evaluate each other's projects or assignments related to green ICT. This process encourages collaborative learning and allows students to provide feedback on their peers' work. Peer feedback can be supplemented with your own comments, creating a comprehensive feedback loop.
- **Mentorship and Guidance:** Offer individualized mentorship to students who show a keen interest in green ICT. Provide them with additional resources, recommend relevant books or articles, and guide them towards competitions or initiatives focused on sustainable technology. This personalized attention will motivate students and nurture their passion for green ICT.
- **Recognition and Rewards:** Recognize and reward student initiatives in green ICT. Establish a system to acknowledge exceptional work, such as certificates, awards, or public recognition. Celebrate student achievements in class or school-wide events, promoting a positive culture around sustainable technology practices.
- **Showcasing Student Projects:** Organize exhibitions or presentations where students can showcase their green ICT projects to their peers, teachers, and the wider school community. This allows students to take pride in their work, boosts their confidence, and inspires others to follow suit.

Remember, fostering motivation requires a combination of meaningful assessments, constructive feedback, personalized guidance, and recognition of student efforts. By implementing these strategies, you can effectively motivate your students towards embracing green ICT practices.

## 8. Professional Development for Teachers:

Professional development plays a crucial role in equipping teachers with the knowledge and skills necessary to effectively motivate students towards Green ICT. Here are some strategies for providing professional development opportunities for teachers:

- **Training Programs and Workshops:** Organize training programs and workshops specifically designed to educate teachers about green ICT practices and strategies. These programs can cover topics such as energy-efficient computing, e-waste management, sustainable data centers, and digital citizenship. Invite experts in the field to conduct sessions and provide hands-on training experiences.
- **Collaborative Learning:** Encourage teachers to engage in collaborative learning experiences focused on green ICT. This can involve forming professional learning communities where teachers can discuss challenges, share resources, and exchange ideas for integrating green ICT into their teaching practices. Facilitate regular meetings or online forums for teachers to collaborate and learn from one another.



- **Best Practice Sharing:** Create platforms for teachers to share their best practices and success stories related to green ICT education. This can be in the form of conferences, webinars, or online platforms where teachers can showcase their innovative approaches and effective strategies. Encourage teachers to document their experiences and lessons learned, which can serve as valuable resources for other educators.
- **Expert Guest Speakers:** Invite guest speakers who are experts in the field of green ICT to address teachers. These experts can share their knowledge, experiences, and insights, inspiring teachers to explore new ideas and approaches in their teaching. Consider arranging regular guest speaker sessions to provide ongoing professional development opportunities for teachers.
- **Online Resources and Courses:** Provide access to online resources and courses related to green ICT. There are several platforms and websites that offer free or paid courses on topics such as sustainable computing, environmental impact of ICT, and green IT practices. Curate a list of recommended resources and share it with teachers to facilitate self-paced learning.
- **Peer Coaching and Mentoring:** Establish a peer coaching or mentoring program where experienced teachers mentor their colleagues in integrating green ICT into their teaching practices. This can be done through regular observations, feedback sessions, and collaborative lesson planning. Encourage teachers to learn from one another and create a supportive environment for professional growth.
- **Recognition and Incentives:** Recognize and reward teachers who demonstrate exceptional commitment and innovative practices in promoting green ICT education. This can be in the form of certificates, awards, or even financial incentives. Celebrate their achievements to inspire other teachers and create a positive culture of professional development.

The implementing these strategies, higher secondary school teachers can enhance their knowledge and skills in green ICT education, leading to more effective motivation of students towards sustainable and environmentally conscious ICT practices.

## Conclusion:

The motivating students towards Green ICT (Information and Communication Technology) is a crucial task for higher secondary school teachers. By incorporating strategies that promote environmental awareness, sustainability, and responsible use of technology, teachers can play a significant role in shaping students' attitudes and behaviors towards Green ICT. The strategies discussed in this article provide a framework for teachers to inspire and engage students in adopting eco-friendly practices in the field of ICT. By integrating real-life examples, case studies, and hands-on activities into their teaching methodologies, teachers can create a learning environment that fosters a sense of responsibility towards the environment and encourages students to think critically about the impact of technology on the planet. One key strategy is to highlight the environmental consequences of ICT, such as energy consumption, e-waste generation, and carbon emissions. By raising awareness about these issues, teachers can help students understand the urgency of adopting sustainable practices in ICT and inspire them to take action. The teachers can promote Green ICT through project-based learning, where students are given the opportunity to design and implement eco-friendly solutions using technology. This hands-on approach not only enhances students' technical skills but also encourages creativity and problem-solving abilities, as they work towards finding sustainable alternatives in the digital realm. The collaboration and peer-to-peer learning can be leveraged to foster a culture of sustainability in the classroom. By encouraging students to share ideas, knowledge, and experiences related to Green ICT, teachers can create a supportive community that motivates students to actively engage in eco-friendly practices. It is important for teachers to lead by example and integrate sustainable practices in their own teaching practices. By demonstrating their commitment to Green ICT through actions such as

minimizing paper usage, optimizing energy consumption, and promoting the use of digital resources, teachers can inspire students to follow suit and make conscious choices in their own ICT activities. The motivating students towards Green ICT requires a multifaceted approach that encompasses awareness, action, collaboration, and modeling. By implementing the strategies discussed in this article, higher secondary school teachers can empower students to become responsible digital citizens who are mindful of the environmental impact of their ICT choices. This will not only contribute to a sustainable future but also equip students with the skills and mindset necessary to navigate the rapidly evolving digital landscape.

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