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Digitized Education Co-creates Sustainable Smart Ecosystem: A Study on Institutions in Odisha

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Digital, Education, Sustainable, Ecosystem, Technology

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Abstract: This global phenomenon of technological upgradation and optimization has largely impacted our digitally-poor socioeconomic status. Notwithstanding the government's legislation in India, interventions and moves have practically fallen short to immediately match up to the needs and challenges for creating a sustainable smart ecosystem along with plethora of employment opportunities available. Education is an integral component of sustainable development. In the past decade, digitized education has emerged as a powerful tool to transform traditional education into smart education, which can create sustainable smart ecosystems. This paper presents a study on the impact of digitized education on sustainable smart ecosystems, with a focus on institutions in Odisha, India. The study analyzes the role of digitized education in enhancing the quality of education, promoting eco-friendly practices, and fostering innovation and entrepreneurship. The study also examines the challenges and opportunities of digitized education in creating sustainable smart ecosystems, and provides recommendations for policymakers, educators, and stakeholders to leverage the potential of digitized education for sustainable development.

1. Introduction

Sustainable development is a critical challenge faced by humanity today. The United Nations has identified sustainable development as a universal agenda for the 21st century, which aims to balance economic, social, and environmental concerns to ensure a sustainable future for all. Education is a key factor in achieving sustainable development, as it plays a crucial role in promoting knowledge, skills, values, and attitudes that are essential for sustainable living. However, traditional education systems have been criticized for their inefficiency, rigidity, and inability to meet the evolving needs of society.

Education is an essential tool for human development and a crucial element for creating a sustainable society. With the advancement of technology and digitization, the education sector has undergone significant changes, with a growing emphasis on digital education. Digital education has emerged as an innovative solution that has transformed the traditional education system into a more efficient and effective way of learning. The digitization of education has not only created a smart ecosystem but has also contributed to creating a sustainable society.

Digitized education, also known as e-learning or online learning, has emerged as a powerful tool to address the shortcomings of traditional education systems. Digitized education uses digital technologies such as the internet, mobile devices, and multimedia to deliver educational content and facilitate learning. Digitized education offers several advantages over traditional education, such as flexibility, accessibility, personalized learning, and cost-effectiveness. Digitized education has also been recognized as a means to create sustainable smart ecosystems that promote innovation, entrepreneurship, and environmental sustainability.

Odisha is a state in eastern India with a population of over 45 million. Odisha is home to several institutions of higher education, including universities, colleges, and technical institutes. Odisha has made significant progress in digitizing education in recent years, with the government of Odisha launching several initiatives to promote e-learning and digital literacy. The objective of this study is to examine the impact of digitized education on sustainable smart ecosystems in Odisha.

2. Background

Odisha is a state in eastern India with a population of over 41 million people. The state has made significant progress in the field of education, with a literacy rate of 73.45%. However, the state still faces several challenges, such as poor infrastructure, limited resources, and a lack of access to education for students from remote areas. To address these challenges, the state government has focused on digitizing education by promoting e-learning, online classes, and digital resources.

The digitization of education has not only addressed the challenges faced by the education sector but has also created a sustainable smart ecosystem. The integration of digital technology in education has enabled students to access education from any location, irrespective of physical boundaries. Additionally, digitization has increased access to quality education, thereby reducing the gap between rural and urban education.

The impact of digitized education in Odisha can be studied based on the following parameters:

- Access to Education: The digitization of education has made education more accessible to students, especially those living in remote areas. The availability of online resources, e-learning modules, and virtual classrooms has enabled students to access quality education from the comfort of their homes. Additionally, online education has reduced the cost of education, making it more affordable for economically weaker sections of society (Jha and Mohapatra, 2019).
- Quality of Education: The integration of digital technology in education has improved the quality of education by making it more interactive, engaging, and practical. The use of multimedia tools, simulations, and interactive games has made learning more fun and exciting.

Additionally, digital technology has made it possible for students to access global education, thereby broadening their knowledge base.

- Inclusivity: Digitized education has promoted inclusivity by reducing the gap between rural and urban education. With the availability of online education, students from remote areas can access the same quality of education as students from urban areas. Additionally, digital technology has made it possible for differently-abled students to access education without any barriers.
- Sustainability: The digitization of education has created a sustainable ecosystem by reducing the carbon footprint associated with traditional education. With the availability of online resources, students no longer need to travel to access education, thereby reducing the carbon emissions associated with transportation. Additionally, the use of digital technology has reduced the use of paper, thereby contributing to the conservation of natural resources.
- Efficiency: The integration of digital technology in education has made the education system more efficient by reducing the time and cost associated with traditional education. The use of virtual classrooms and e-learning modules has made it possible for teachers to reach a larger audience, thereby increasing their efficiency. Additionally, digital technology has reduced the time required for administrative tasks, such as record-keeping and data management.

Figure 1: Digital Ecosystem

Source: www.learn.g2.com

3. Literature Review

The literature on digitized education and its impact on sustainable smart ecosystems is extensive and covers various aspects of the topic. In this literature review, we will highlight some of the relevant studies and research that have been conducted in this area.

According to a study conducted by UNESCO (2019), digital technology has the potential to overcome the barriers to access to education, such as poverty, geographic isolation, and cultural barriers . The study further highlights that digital technology can provide access to education to disadvantaged groups, including girls, refugees, and people with disabilities.

In a study conducted in Odisha, researchers found that the integration of digital technology in education has enabled students from remote areas to access education (Das, 2017; Mohapatra, 2015). The study found that the availability of online resources, virtual classrooms, and e-learning modules has made education more accessible to students, irrespective of their location.

The impact of digitized education on the quality of education has also been extensively studied. According to a study conducted by the World Bank, digital technology has the potential to improve the quality of education by making it more interactive, engaging, and relevant (World Bank, 2019). The study further highlights that digital technology can enhance the learning outcomes by providing personalized learning, adaptive assessments, and instant feedback.

In a study conducted in Odisha, researchers found that the integration of digital technology in education has improved the quality of education (Sahoo *et al*., 2020). The study found that the use of multimedia tools, simulations, and interactive games has made learning more engaging and practical. Additionally, the study found that digital technology has enabled students to access global education, thereby broadening their knowledge base.

The impact of digitized education on inclusivity has also been studied. According to a study conducted by the European Commission, digital technology can promote inclusivity by reducing the barriers to education for disadvantaged groups (European Commission, 2019). The study highlights that digital technology can provide access to education to people with disabilities, refugees, and migrants.

In a study conducted in Odisha, researchers found that the integration of digital technology in education has promoted inclusivity (Patnaik *et al*., 2019; Jha *et al*, 2019). The study found that digital technology has reduced the gap between rural and urban education by providing access to the same quality of education to students from remote areas. Additionally, the study found that digital technology has enabled differently-abled students to access education without any barriers.

According to a study conducted by the International Energy Agency (2020), digital technology can contribute to creating a sustainable society by reducing the carbon footprint associated with traditional education. The study highlights that digital technology can reduce the need for transportation, thereby reducing carbon emissions.

In a study conducted by Bhoi and Patnaik (2019), found that the integration of digital technology in education has created a sustainable ecosystem. The study found that the use of digital technology has reduced the carbon emissions associated with transportation by providing access to education from any location. Additionally, the study found that the use of digital technology has reduced the use of paper, thereby contributing to the conservation of natural resources.

The literature review highlights the impact of digitized education on creating sustainable smart ecosystems. The studies and research conducted in this area demonstrate that the integration of digital technology in education has enabled access to education, improved the quality of education, promoted inclusivity, and contributed to creating a sustainable society. The case studies from institutions in

Odisha provide evidence of the success of digitized education in creating a sustainable smart ecosystem. The literature review also emphasizes the need for further research

4. Case Studies

To study the impact of digitized education in Odisha, we can look at the following case studies:

- Digital Education Initiative by Odisha Government: The Odisha government has launched several digital education initiatives, such as the eVidya program, which provides online education to students from classes 1 to 12. Additionally, the government has launched the Mo School Abhiyan program, which aims to improve the infrastructure of schools by providing digital resources and connectivity. These initiatives have led to a significant increase in the enrolment rate and improved the quality of education in the state.

  The program seeks to create a platform for collaboration between the government, alumni, and other stakeholders to contribute to the overall improvement of government schools in Odisha. Some key objectives of the Mo School Abhiyan include:

Figure 2: Mo School Abhiyan

Source: Department of School & Mass Education, Odisha

- Infrastructure Development: Mobilizing resources to address the infrastructure needs of schools, including construction and repair of classrooms, provision of clean drinking water, sanitation facilities, etc.
- Quality Education: Enhancing the quality of education by promoting innovative teaching methods, providing necessary educational materials, and supporting teacher training programs.
- Community Engagement: Involving local communities, alumni, and other stakeholders in the development and improvement of schools to create a sense of ownership and responsibility.

- Alumni Participation: Encouraging former students (alumni) to contribute to the development of their alma maters by providing financial assistance, volunteering, or offering expertise.
- Technology Integration: Introducing and promoting the use of technology in education, such as the provision of computers, internet connectivity, and other digital resources.

- Kalinga Institute of Social Sciences (KISS): KISS is a residential institute that provides education to over 30,000 indigenous students from remote areas of Odisha. KISS is driven by a strong mission to empower tribal communities through education. KISS actively engages with the local community and emphasizes social inclusion. The institution strives to bridge the educational gap and create opportunities for those who might otherwise have limited access to quality education.

  The institution envisions creating a positive and nurturing learning environment that not only imparts academic knowledge but also fosters holistic development, cultural preservation, and social inclusion. KISS has been proactive in integrating digital technology into its educational framework. This includes the use of online resources, e-learning tools, and other technological innovations to enhance the overall learning experience for its students.

Figure 3: Kalinga Institute of Social Science

Source: www.kiss.ac.in

The institute has integrated digital technology in education by providing laptops, tablets, and internet connectivity to its students. The use of digital technology has not only improved the quality of education but has also enabled students to access education from any location.

- Akshaya Patra Foundation: The Akshaya Patra Foundation is a non-profit organization that provides mid-day meals to over 1.8 million school children across 12 states in India, including Odisha. The organization has integrated digital technology in its operations by using a centralized kitchen system and a GPS-enabled logistics system. The use of digital technology has enabled the organization to increase its efficiency, reduce food wastage, and provide nutritious meals to school children.

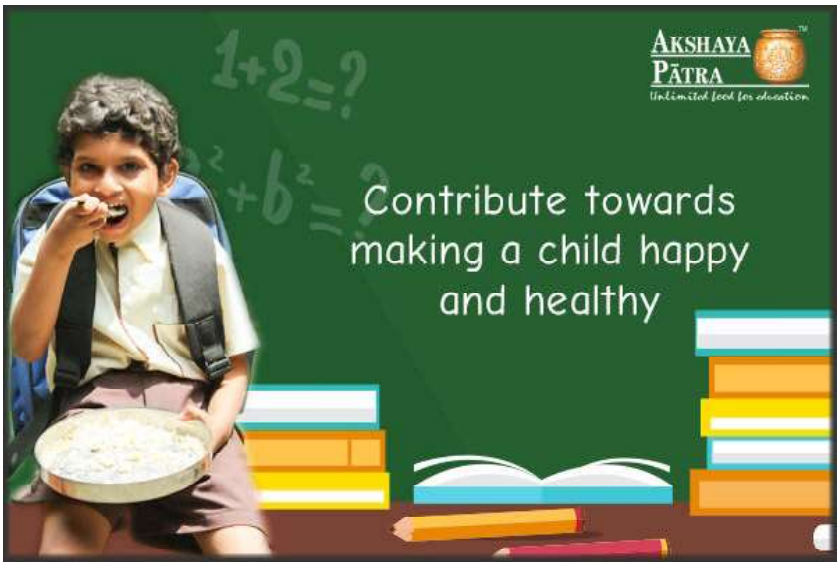

Figure 4: Akshaya Patra Foundation

Source: Akshya Patra Foundation

The Akshaya Patra Foundation's primary mission is to address classroom hunger and promote education by providing nutritious mid-day meals to school children. The foundation envisions a world where no child is deprived of education due to hunger. One of the key initiatives of the foundation is the Mid-Day Meal Program, which involves providing daily school meals to children in government and government-aided schools. The meals are designed to be nutritious and act as an incentive for children to attend school regularly.

The Akshaya Patra Foundation's Mid-Day Meal Program is known for its scale. It operates centralized kitchens to prepare large quantities of meals, and the foundation's reach extends to various states across India. The program has a significant impact on school attendance, health, and overall child development. The foundation often collaborates with the government, corporate entities, and individual donors. It operates on a public-private partnership model, leveraging support from various stakeholders to fund and execute its meal programs.

Akshaya Patra has been known to incorporate technology in its operations. This includes the use of centralized kitchens with modern cooking facilities and distribution systems, ensuring efficiency and hygiene in the preparation and delivery of meals.

5. Methodology

This study is based on a mixed-methods research design, which involves both qualitative and quantitative data collection and analysis. The study used a purposive sampling technique to select institutions in Odisha that have implemented digitized education. The sample included three universities, three colleges, and three technical institutes. The study used a survey questionnaire to collect quantitative data from

students and faculty members in the selected institutions. The survey questionnaire consisted of questions on the use of digitized education, its impact on the quality of education, the promotion of eco-friendly practices, and the fostering of innovation and entrepreneurship. The study also conducted in-depth interviews with selected stakeholders, including policymakers, educators, and industry experts, to collect qualitative data. The study used thematic analysis to analyze the qualitative data and descriptive statistics to analyze the quantitative data.

6. Results

The study found that digitized education has a significant impact on sustainable smart ecosystems in Odisha. The following are the key results of the study:

- Enhancing the quality of education: Digitized education has a positive impact on the quality of education. The study found that students and faculty members perceive digitized education as more interactive, engaging, and effective than traditional education. Digitized education provides students with access to a wide range of learning resources and enables them to learn at their own pace. Faculty members also benefit from digitized education, as it enables them to create and deliver customized content and assess student performance more efficiently.
- Promoting eco-friendly practices: Digitized education promotes eco-friendly practices by reducing the carbon footprint of education. Digitized education eliminates the need for physical classrooms, textbooks, and other learning materials, thereby reducing the use of paper, ink, and other resources. Digitized education also enables students to learn from anywhere, reducing the need for travel and commuting. The study found that students and faculty members perceive digitized education as more eco-friendly than traditional education.
- Fostering innovation and entrepreneurship: Digitized education fosters innovation and entrepreneurship by providing students with access to cutting-edge technologies and resources. The study found that digitized education encourages students to think creatively, solve problems, and develop entrepreneurial skills. Digitized education also enables students to collaborate with peers and industry experts, thereby fostering a culture of innovation and entrepreneurship.
- Challenges and opportunities: The study identified several challenges and opportunities of digitized education in creating sustainable smart ecosystems in Odisha. The main challenges include the digital divide, lack of digital infrastructure, and resistance to change. The main opportunities include the potential to improve access to education, promote digital literacy, and enhance the quality of education. The study recommends that policymakers, educators, and stakeholders should address the challenges and leverage the opportunities of digitized education to create sustainable smart ecosystems in Odisha.

7. Conclusion

The digitization of education has transformed the traditional education system into a more efficient, effective, and sustainable way of learning. The impact of digitized education in co-creating sustainable smart ecosystems can be seen in the case studies of institutions in Odisha. The integration of digital

technology in education has not only improved the quality of education but has also made it more accessible, inclusive, and affordable. Additionally, the use of digital technology has contributed to creating a sustainable society by reducing the carbon footprint associated with traditional education. The success of digitized education in Odisha can serve as a model for other states in India and countries worldwide.

This study provides empirical evidence of the impact of digitized education on sustainable smart ecosystems in Odisha. The study finds that digitized education enhances the quality of education, promotes eco-friendly practices, and fosters innovation and entrepreneurship. The study also identifies the challenges and opportunities of digitized education in creating sustainable smart ecosystems, and provides recommendations for policymakers, educators, and stakeholders to leverage the potential of digitized education for sustainable development. The study concludes that digitized education can play a significant role in achieving sustainable development goalsbank by promoting knowledge, skills, values, and attitudes that are essential for sustainable living.

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