



# The Role of Ecological and Digital Leadership in Improving School Performance

Nita Fitriana<sup>1\*</sup>, Lukia Zuraida<sup>2</sup>

1,2 Sekolah Tinggi Ilmu Ekonomi Widya Wiwaha

\*Correspondence: Nita Fitriana  
Email: [nitafitriana@stieww.ac.id](mailto:nitafitriana@stieww.ac.id)

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**Abstract:** *The advancement of technology and environmental issues has become a major challenge in the education sector. Schools are required to adopt digital transformation while simultaneously implementing sustainability principles. This study analyzes the role of ecological leadership and digital leadership in improving the performance of Sekolah Cendekia BAZNAS (SCB). This research employs a qualitative case study approach, collecting data through observations, in-depth interviews, and document analysis. The findings reveal that ecological leadership at SCB is manifested in environmental policies, innovative programs such as the "Kebun Sehat" and Biofloc fish farming, as well as active participation in the Adiwiyata Program. Meanwhile, digital leadership is reflected in the utilization of technology for communication, digital learning, and data-driven school management. The implementation of these leadership styles has led to improvements in school accreditation, student achievements, and overall educational management effectiveness. This study implies that the synergy between ecological and digital leadership can serve as a strategic leadership model in modern education, focusing not only on academic excellence but also on fostering environmental awareness and digital literacy within the school community.*

**Keywords:** *Ecological Leadership, Digital Leadership, School Performance, Sustainability, Digital Transformation.*

## Introduction

In recent decades there have been significant changes in various aspects of life including social, economic, and political across countries as a result of technological advances (Arts et al., 2021) (Yahaya et al., 2021) (Atoyan et al., 2023). In addition, environmental issues such as pollution, climate change, sustainability of natural resources are increasingly becoming a global concern (Dwivedi et al., 2022) (Oecd.org, 2020) (Zhang, 2024). In contemporary education, these two phenomena, the technological era and environmental issues, have become major concerns.

Teaching and learning activities and communication, both inside and outside the school environment, have been transformed by advances in information and communication technology (ICT). Due to the wide availability of the internet, teachers and students can access a wide range of diverse and up-to-date educational resources. The policy of including technology as part of the curriculum has increased students' abilities in creativity, problem solving and teamwork. However, in the context of this growing technology adoption, concerns about the environmental impact of the use and production of digital devices are becoming increasingly relevant.

Striking a balance between utilizing digital advancements to improve the quality of education and managing the environmental issues is an important challenge to be faced. With the increasing use of electronic devices in school environments, it is important to consider how the education sector can integrate sustainability principles and promote environmentally friendly practices. For example, efforts to utilize e-waste and harness renewable energy sources in education operations can be crucial steps to ensure that digital transformation in education is not only academically beneficial but also contributes to environmental conservation. Schools are important places to build environmental awareness and promote sustainable behaviour among students and the school community. Teaching about the environment and sustainability becomes an integral part of cross-curricular learning.

Sekolah Cendekia Baznas (SCB) is a secondary school with a vision to become a model Islamic school that builds character and optimizes the potential of students. To achieve this vision, one of SCB's missions is to develop IT-based and environmentally friendly learning innovations (BAZNAS, n.d.). Currently, SCB has achieved various academic and non-academic achievements such as having an "A" Accreditation, Adiwiyata School, and Sekolah Penggerak. SCB is a school managed and facilitated by Badan Amil Zakat Nasional through zakat, infaq and sadaqah (ZIS) funds.

In line with SCB's vision, the role of leadership is crucial in managing the challenges and opportunities offered by the digital age and environmental issues. Ecological leadership emphasizes the importance of awareness and action on environmental issues in the context of education. Leaders who apply this principle will integrate sustainability into school policies, managerial practices and curriculum (Quddus et al., 2020). Digital leadership refers to the ability and commitment to utilize digital technology effectively to improve learning and school administration. Strong leaders in this aspect are able to lead digital transformation in schools, facilitate access to technology for all members of the educational community, and promote innovation in teaching methods.

This study aims to analyze the contribution of ecological and digital leadership to improving the performance of Sekolah Cendekia Baznas. Specifically, the objectives of this study are to (1) identify the practice of ecological leadership in Sekolah Cendekia Baznas, (2) identify the practice of digital leadership in Sekolah Cendekia Baznas, (3) outline the impact of these two types of leadership on the performance of Sekolah Cendekia Baznas.

## **Research Method**

### ***Ecological Leadership***

The role of ecological leadership in creating environmentally cultured schools is as: (1) educator; (2) manager; (3) innovator; (4) motivator; and (5) figure. The role of ecological leadership as an educator shows a mechanism to provide environmental value education through three models: a) knowledge (through socialization and publication of ecological and health subjects); b) habits (through the use of educational culture in learning habits) and c) improvement. The role of ecological leadership as a manager is seen in: a) formulation of environmentally friendly school policies; b) motivating students to become

environmental leaders, and supervising staff at school (Asbari et al., 2020) (Wahidin et al., 2020) (Jihaduddin et al., 2020). The role of Ecological Leader as an innovator is seen in the form of creative environmentally friendly facilities (Pramono et al., 2020) (Desky et al., 2020). The principal's role as a motivator is shown by motivating school members to actively participate in environmentally oriented education activities and creating a school-centred cultural atmosphere. Meanwhile, the role of ecological leadership as a figure is shown by a good attitude towards the environment, so that the principal is identified as a role model for environmentally cultured schools.

### ***Digital Leadership***

A digital leader is someone who is able to utilize information technology to achieve common goals in an organization. Digital is also known as e-leadership which occurs when work is done through information technology, particularly the use of the internet. According to (Asbari et al., 2020) (Bernarto et al., 2020) (Jihaduddin et al., 2020), there are characteristics of e-leadership that distinguish it from traditional leadership. Firstly, in terms of e-leadership communication, it requires the use of electronic media to communicate with team members. The use of social networks such as LINE, Facebook, Instagram, Twitter, and others can be used as communication media. Secondly, an e-leader must have the ability to think and collaborate without the limitations of time, space, and cultural barriers that make direct supervision and interaction unnecessary. Communication through information technology allows leaders to communicate effectively and efficiently with many employees. Thirdly, digital leaders have the ability to effectively monitor and manage virtual work. Leaders must have the ability to manage and monitor the virtual work done by employees. This is to ascertain whether employees are performing their duties and functions well and whether they understand the directions given. It is also to ensure that the targets set can be achieved.

Digital leadership is identified with leaders who can adapt to an ever-changing and evolving technological environment. According to (Vizano et al., 2020) (Pramono et al., 2020) (Desky et al., 2020), rapid technological developments require leaders and employees to adapt to changes in order to achieve organizational goals. Not only that, but digital leaders must also be formed with the thinking and ability to solve problems and be able to maintain relationships between members and between teams. Digital leadership can shape future leaders who can bring success to organizations in the era of technological development.

### **School performance**

School performance assessment to this day is generally conducted through school accreditation. School accreditation in secondary education units is conducted through BAN S/M (BAN-S/M, n.d.). This is in accordance with Government Regulation No. 19 of 2005, concerning National Education Standards, article 86, paragraph (1) which states that the government conducts accreditation at every level and unit of education to determine the feasibility of the program and/or unit of education. Based on this provision, Ahmad Topan states that school accreditation aims to: (a) determine the eligibility level of education

programmes and/or units in providing education services; and (b) obtain an overview of school performance (Topan, n.d.).

In addition to school accreditation, a number of performance assessment instruments can be used to assess the quality of performance of education units such as various quality awards at local, national and global levels, Balance Scorecards, multidimensional output models, dashboards, service chains, BCG Matrix and Total Quality Control (TQM)(Quddus et al., 2020).

## Research Method

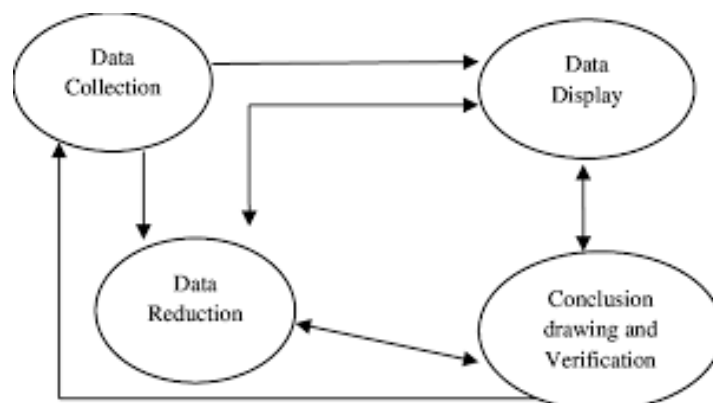
The focus of this research is an exploration of the role of Ecological and Digital Leadership and its implications for the performance of Sekolah Cendekia Baznas. This research seeks to provide an overview of how the application of Ecological and Digital Leadership in improving school performance. Therefore, the use of qualitative research with case study method can accommodate the purpose. The case study approach helps understand a process, examines the background of the case which cannot be done with a quantitative approach and examines matters relating to the respondents studied in a natural situation.

This research was conducted at Sekolah Cendekia Baznas Bogor. This location was chosen based on several considerations, including: (a) Sekolah Cendekia Baznas Bogor has a vision to become an IT-based and environmentally friendly school, (b). has land and agricultural and fishery activities. (c) in the last 8 years it has won various awards both academic and non-academic.

This research uses two data. The first is primary data obtained through observation and in-depth interviews. The second is secondary data obtained through literature sources, books, school documents and school online media.

Data analysis in this study used the Miles and Huberman model data analysis technique, with the following steps:

1. Data collection
2. Data reduction
3. Data display
4. verifying



**Figure 1:** Case Study Data Analysis Model

Data validity tests in qualitative research include credibility, transferability, dependability, and confirmability tests. In this study, data validity testing was carried out by emphasizing the credibility test. Testing the credibility of qualitative research data can be done, among others, by extending observation, increasing versatility in research, triangulation, negative case analysis and member check (Sugiyono, 2013)

## Result and Discussion

### The role of the principal in Ecological Leadership

Based on the results of the study, in the practice of ecological leadership, the role of the principal is reflected in the following points:

a. Formulating Policy

Environmental issues have been the main focus of SCB since the change of principal in 2021. This change of principal brought significant changes, including the reformulation of SCB's Vision and Mission, which was driven by various factors, such as: The COVID-19 pandemic, environmental crises, and the school's core principle: "The best human beings are those who are beneficial to others, and similarly, the best schools are those that are beneficial to everyone." With these factors in mind, the concept of "environmental care" was integrated into SCB's Vision and Mission, which began to be implemented in 2021. This Vision and Mission led SCB to implement the Adiwiyata program. Adiwiyata is a program by the Ministry of Environment aimed at fostering knowledge and awareness among school communities in efforts to preserve the environment.

b. Conducting Supervision

The school principal is actively involved in the implementation, monitoring, and evaluation of these policies. The principal regularly participates in implementing environmental care policies such as routine community service activities, large-scale community service events, managing healthy gardens and fish ponds, conducting field monitoring of environmental programs such as dormitory and school cleanliness and waste management, and conducting periodic evaluations to assess the success of policies and identify programs requiring improvement.

c. Providing education and facilitating the development of an environmentally conscious culture.

The SCB principal plays an important role in disseminating knowledge about environmental awareness and instilling this culture in everyday life. The principal educates students about environmental awareness by integrating environmental knowledge into learning materials and implementing environmental knowledge in real activities such as fish pond management and composting, which are incorporated into science lessons. In addition, through activities such as seminars, training, or panel discussions, the principal educates students, teachers, and educational staff about current environmental issues and the importance of implementing environmentally friendly actions in daily life. Outside of school, the SCB principal is also active in spreading knowledge about environmental awareness

when attending various invitations outside of school. The principal also utilizes his personal social media to expand the reach of education and information about environmental awareness.

d. Implementing environmentally friendly innovations

In collaboration with various internal and external parties, SCB currently has three products resulting from environmentally friendly innovations: the Adiwiyata Healthy Garden, the Mushroom House, and the Fish Pond. These products are used for the daily needs of students, and during harvest season, the produce is also marketed to the surrounding community.

e. Providing Motivation Through Achievements and Recognition

The school principal actively accompanies and participates in every environmentally conscious activity, such as the development of the Adiwiyata program, environmental cadres, school environmental cleanliness, and the utilization of school green spaces. The school's involvement also encourages SCB community to promote environmental awareness outside the school through the School Social Responsibilities (SSR) program, which involves all school elements in greening the environment around the school.

### **The principal's role in Digital Leadership**

Based on research findings, the following are various electronic and digital media products utilized by the principal in performing their functions:

- a. Use of WhatsApp and Instagram as the primary social media platforms for the school principal.
- b. The school principal utilizes technology to create digital school products such as: Smart Card, Multimedia Cendekia, and Cendekia Learning Centre, Digital Literacy Team Pena Cendekia, OSIS OCEANS, and Innovative GTK.
- c. The Information and Communication Technologies (ICT) program as part of the six pillars of SCB education. The ICT pillar facilitates digital transformation in various school operational activities.
- d. Establishing national and international collaborations.
- e. Utilizing technology platforms such as: Merdeka Mengajar Platform (PMM), Sustainable Professional Development Management Information System (SIMPKB), and Performance Contract Performance Appraisal (PCPA).

## **Discussion**

### **Ecological Leadership Practices in Improving School Performance**

Ecological Leadership practices implemented by principals emphasise environmental value-based leadership, involving community empowerment and sustainability-oriented decision-making. In the context of SCB, the principal manifests this value through 4 role (Quddus et al., 2020) namely as manager, educator, innovator and motivator. The following is a detailed explanation of each role:

#### **A. Manager Policy**

Environmental issues have been the main focus of SCB since the change of principal in 2021. This change of principal brought significant changes, including the reformulation of SCB's Vision-Mission which was driven by various factors, such as:

- a. Covid-19 pandemic.
- b. Environmental crisis.
- c. The main principal of the school: 'The best human being is the one who benefits others, and so is the school, that the best school is the one that benefits everyone.'

With these factors in mind, the concept of 'caring for the environment' has been integrated into SCB's vision and mission, which has been implemented since 2021, leading SCB to implement the Adiwiyata programme. Adiwiyata is a programme of the Ministry of Environment in order to encourage the creation of knowledge and awareness of school community in environmental conservation efforts.

Principals as managers have an important role in formulating and implementing environmental policies, as well as encouraging school members to behave environmentally (Susanto, 2020) (Arina et al., 2023) (Indonesia.go.id, n.d.). Moreover, leaders who have a strong environmental vision play a key role in driving green innovation and improving the environmental performance of organizations (He et al., 2023).

### **Supervisor**

The principal not only plays a role in setting policies, but are also actively involved in implementing, monitoring and evaluating these policies. The school principal routinely:

- a. Involved in implementing the environmental care policy such as routine community service, grand community service, healthy garden and fish pond management.
- b. Conducts field monitoring of environmental programmes, such as the cleanliness of the dormitory and school environment and waste management.
- c. Conducts periodic evaluations to assess the success of the policy and identify programmes that require improvement.
- d. Provides constructive feedback to the environmental staff so that they can continuously improve their performance.

As a supervisor, it is important for the principal to ensure compliance with the environmental regulations that have been put in place and encourage environmentally friendly practices in the school environment (Lumintang, 2014).

### **Educator**

The role of the principal in ecological leadership is not only to make policies and implement environmentally friendly practices, but also to educate and facilitate the establishment of a culture of environmental care in the school environment. SCB principal plays an important role in disseminating knowledge about environmental stewardship and

instilling this culture in daily life. The role of the principal as an educator in environmental leadership is seen in two main aspects, namely knowledge and habituation.

### **A. Knowledge on Environmental Care**

SCB principal plays an active role in socializing knowledge on environmental care both internal and external of school. The process of socializing this knowledge is done with a systematic and comprehensive approach, utilizing various channels and opportunities available.

#### **a. internal**

At the internal level, the principal actively facilitates various school events, both regular and incidental, as a means to socialize environmental issues to all school members. These events are not only a means to provide theoretical knowledge, but also a space for hands-on practice that can deepen the school community's understanding of the importance of caring for the environment. Through activities such as seminars, trainings or panel discussions, principal utilizes this opportunity to educate students, teachers and education personnel about current environmental issues and the importance of implementing environmentally friendly actions in daily life.

#### **b. External**

Beside internal, SCB principal is also active in spreading knowledge about environmental awareness when attending various invitations outside the school. Whether as a speaker or participant, the principal utilizes these opportunities to contribute to wider forums, sharing the school's experiences and initiatives related to environmental education. In this way, the principal not only increases the knowledge of environmental care within the school community, but also extends its impact beyond the school and collaborates with other institutions or communities that share a similar commitment to environmental care.

#### **c. Use of Social Media**

In addition to disseminating knowledge inside and outside the school, principal also utilizes his personal social media to extend the reach of education and information. The use of social media allows principal to reach a wider audience, including parents, the general public, and those interested in environmental issues. Through these platforms, principal shares information, articles and initiatives related to environmental awareness undertaken by the school, as well as invite more people to get involved in environmental conservation efforts.

### **B. Habituation of Environmental Care**

Habituation to environmental knowledge in schools is carried out with two main approaches, theoretically and practically, whose aim is to form a strong culture of environmental care among school members.

#### **a. Theoretical approach**

The theoretical approach is conducted through environmentally orientated learning. The principal said that environmental knowledge is integrated into learning materials. Knowledge about sustainability, natural resource management and the impact of environmental damage are part of the curriculum. The principal ensures that teachers are given a deep understanding of the importance of integrating environmental issues into their learning materials. In this way, students not only learn theories related to the environment but also gain insight into the importance of concrete actions that can be taken to maintain the sustainability of the earth.

b. Practical approach

A practical approach is also very important to establish a sustainable environmental care culture in schools. In this case, the principal encourages the implementation of theoretical knowledge through real activities that can be done at school. One example is the management of fish ponds and composting which are made part of learning in science subjects. This practical approach gives students the opportunity to be directly involved in environmental management, practising environmentally and friendly ways, as well as understanding the natural cycle and the importance of maintaining the ecosystem. Through this practical approach, students are not only taught about environmental concepts in theory, but also given the opportunity to see the direct impact of their actions on the environment. This experience is crucial in shaping students' ecological character and awareness, which will impact the way they act towards the environment outside of school.

By using various channels, both internal and external to the school as well as utilising social media, principals ensure that environmental issues become an integral part of school life. Habituation to environmental care through theoretical and practical approaches has a significant impact in shaping a culture of environmental care among school members, which is expected to be passed on to the wider community (He et al., 2023). The role of school principal as environmental educator and leader is crucial in creating a generation that is more concerned and responsible for environmental conservation.

### **Innovator**

Ecological leadership in the modern era demands innovation that not only provides solutions to environmental problems, but also builds awareness and active participation from the community, including the younger generation. SCB, as a boarding school, has implemented an innovative approach in meeting students' food needs through the concept of 'from students, for students, by students'. This strategy demonstrates how educational institutions can serve as agents of change that integrate aspects of learning, sustainability and food self-sufficiency.

#### **A. Eco-friendly Innovation**

SCB successfully created environment-based innovations by involving various internal and external parties. The three main innovations developed are:

- a. **Kebun Sehat:** The garden is not only a source of fresh vegetables for students, but also serves as a living laboratory for learning organic farming techniques, small land utilization, and the importance of sustainability in food production.
- b. **Rumah Jamur:** Rumah Jamur provides nutritious food that is cultivated in an Eco-friendly way. Students learn mushroom cultivation techniques, production management, and how to create economic value from the harvest.
- c. **Kolam Ikan:** This pond supports the diversification of students' protein food sources as well as being a learning tool about the biofloc fish farming system

## **B. Collaboration as the Key to Innovation**

SCB applies the principle of collaboration as an important element in the success of this programme. Collaboration involves not only students and educators, but also external parties such as the Environmental Agency, Education Agency, Universities, local communities, environmental experts, and non-governmental organisations. This collaboration strengthens the institution's capacity to develop innovations, while creating an inclusive and empowering learning ecosystem.

## **C. Environment-based Learning**

These innovations are an integral part of SCB's environment-based learning. By actively involving students in the entire process - from planning, to implementation, to evaluation - SCB is shaping a younger generation with a deep understanding of sustainability, social responsibility, and self-reliance (Guruinovatif.id, n.d.)(Karangdowo, n.d.).

## **D. Sustainability Impact**

These programs have a double impact: first, meeting students' food needs in a sustainable manner; second, internalizing sustainability values in students' daily lives. In the long term, this strategy is expected to become a model for other educational institutions in implementing innovation-based environmental leadership.

The innovation developed by SCB shows how the role of the principal as an innovator in ecological leadership can have a significant impact. By integrating the concept of sustainability in education, SCB has succeeded in creating a young generation that is not only environmentally conscious, but also capable of becoming agents of change in society. Effective leaders in managing sustainability not only improve organizational performance but also ensure that the organization becomes a change agent in global sustainability (Shafait & Huang, 2024).

## **Motivator**

Ecological leadership is not only about technical innovations or work programmes, but also involves a leader's ability to motivate and mobilize his community. In the context of Sekolah Cendekia Baznas, the principal's role as a motivator is key in the successful

implementation of the Adiwiyata Programme and other environmental initiatives, including the School Social Responsibilities (SSR) programme.

The principal's role as a motivator in ecological leadership can be seen in the following aspects:

#### **A. Program Adiwiyata Motivation**

The Adiwiyata Programme is a national initiative that aims to create environmentally oriented schools through the implementation of environmentally friendly policies, resource management, and sustainability-oriented learning. To achieve the success of the Adiwiyata Programme, the motivator role of the principal functions in a variety of ways:

- a. Inspiring Adiwiyata Member: The principal not only acts as a director but also as an inspirer who motivates students to become environmental cadres. These students will later educate their peers about the importance of caring for the environment.
- b. Encouraging Active Participation: By motivating students, teachers, and staff to actively participate in activities such as cleaning the school environment, plant farming, and fish ponds, the principal creates a culture of environmental care at SCB.

#### **B. Collective Motivation through Achievement and Recognition**

The achievement of the Provincial Adiwiyata award provided a significant morale boost to the entire SCB community. The principal leverages this achievement to:

- a. Motivate the Academic Community: The provincial achievement is a tangible proof of collective success that motivates the SCB community to continue improving their efforts towards National Adiwiyata.
- b. Expanding the Scope of the Programme: By directing this motivation, the principal encouraged the implementation of the School Social Responsibilities (SSR) programme, which involves all elements of the school in greening the environment around the school. SSR is a clear evidence of how SCB integrates environmental values into school social responsibility. The programme involves students, teachers and staff in greening the environment around the school, promoting the value of ecological leadership based on collaboration and participation.

The principal's role as a motivator has had various positive impacts, including: increasing environmental awareness, not only in the school environment but also in the surrounding community, forming an environmentally conscious generation through Adiwiyata members who are fully supported by the principal and strengthening the school's identity as an educational institution that has an emphasis on environmental management (Budiman et al., 2022) (Sri Chairiyah et al., 2024).

**Figur**

The principal as an inspirational figure in ecological leadership, provides examples and role models of environmental behaviour to the school community, so that the principal becomes a role model in environmental culture. The role model of environmental care is shown through the principal's involvement in the implementation of all environmental activities, both internal and external to the school (Azmi et al., 2018). Effective leadership in nurturing character values is done through modelling, as the principal acts as a role model for the school community. Thus, principals who consistently demonstrate environmental care behaviour can strengthen the environmental culture in schools and inspire all school members to actively participate in protecting and preserving the environment.

**Digital Leadership Practices in Improving School Performance**

The digital leadership practices implemented by the school principals can be seen from three main aspects: the use of electronic and digital media, the ability to think and collaborate unlimitedly, and the ability to manage and monitor virtual work. The following is a detailed explanation of each aspect:

**A. The Use of Electronic and Digital Media**

Principal utilizes electronic and digital media to support his professional roles, especially in facilitating communication and coordination. This is done by using WhatsApp and Instagram as the main social media. The use of these media aims to: convey positive values (good value), provide education to school and community members, facilitate virtual socialization to expand the range of communication and as a form of showing self-existence.

By utilising WhatsApp and Instagram, the principal demonstrates his ability to utilize digital technology as an efficient, transparent and inclusive communication tool. Digital leaders are able to utilize technology to build closer relationships with stakeholders. In this case, the principal's use of social media reflects the principle of effective e-leadership. (Avolio et al., 2014) (AlAjmi, 2022).

**B. The Ability to Think and Collaborate Unlimitedly**

The advancement of the digital era presents both challenges and opportunities for school principal in carrying out his leadership duties. Principal demonstrates digital leadership practices that are not only adaptive to technological changes, but also able to encourage school members to be innovative, creative and collaborative. The following are the steps taken by the principal in carrying out his role:

**a. Technological Adaptation**

before encouraging teachers, staff, and students to innovate, SCB principal had already improved his digital literacy. This step is in line with the principle of lead by example, which emphasises the importance of leadership in technology adoption. Digital technologies such as video conferencing platforms, cloud-based applications and social media are used to optimise communication and collaboration within the internal (teachers, staff and students) and external (collaborative partners) areas.

## **b. The Use of digital technology**

The principal utilises technology to support various activities, including:

### **i. Smart Card**

This technology serves multiple functions as a student card, library member, payment instrument (e-money), and creating efficiency in school operations.

### **ii. Multimedia Cendekia and Cendekia Learning Center**

The platform provides digital learning materials to support interactive and self-directed learning for students.

### **iii. Digital Literasi Pena Cendekia Team**

The programme aims to improve the digital literacy of students and teachers through training, digital content production, and creative competitions.

### **iv. Osis OCEANS**

Osis OCEANS facilitates technology-based student activities to encourage creativity and innovation.

### **v. Innovative GTK**

Innovative GTK is an event to improve the competence of teachers and education personnel in learning innovation.

## **c. Kolaborasi Eksternal**

### **i. National and International Partnerships**

SCB collaborates with universities, government agencies and private companies to support technology-based activities.

### **ii. Global Co-operation**

The Sister School programme with a school in Malaysia reflects the principal's global vision to expand insights and build international networks.

The digital leadership of SCB principal demonstrates success in integrating technology with leadership strategies. This practice not only increases efficiency and innovation within the school but also creates a collaborative atmosphere across borders, both national and international (Tagscherer & Carbon, 2023).

## **C. The Ability to Manage Virtual Work Effectively**

Since the COVID-19 pandemic, digital transformation has become a major necessity in various educational institutions, including Sekolah Cendekia BAZNAS (SCB). Principal plays a role in effectively monitoring and managing virtual work through the utilization of technology, which is integrated in SCB's education pillar called Information and Communication Technologies (ICT). This ICT pillar supports sustainable digital transformation, particularly in monitoring, evaluating and improving the performance of school members. The principal's ability to manage virtual work can be seen in the following aspects effectively:

### **a. ICT Integration in School Vision and Mission**

- b. ICT is included as part of SCB's six pillars of education, demonstrating the school's commitment to technology as an integral element in management and teaching and learning activities. The ICT pillar facilitates digital transformation in various school operations.
- c. **The Use of Technology Platforms**
  - i. **Merdeka Mengajar Platform**

This platform is used for principal performance assessment, teacher performance assessment and supports principals in identifying professional development needs for teachers.
  - ii. **Sistem Informasi Manajemen Pengembangan Keprofesian Berkelanjutan (SIMPKB)**

This platform serves to comprehensively monitor and evaluate the mobilizing schools programme and helps to ensure alignment of the programme with school goals.
  - iii. **Performance Contract Performance Appraisal (PCPA)**

This platform serves as an objective measurement tool to evaluate individual performance based on clear and measurable indicators.

### **Technology-based Evaluation Process**

Various technology platforms are used in Sekolah Cendekia Baznas with the aim of: monitoring the implementation of ICT in each line, conducting regular evaluations through performance reports and target achievements and conducting data-based decision making generated from various technology platforms.

The implementation of ICT as a pillar of education at SCB strengthens the role of the principal as a digital leader. By utilising various technology platforms such as PMM, PMO SIM PKB, and PCPA, the principal can effectively monitor and evaluate performance, ensure educational goals are achieved, and support sustainable digital transformation (Thannimalai & Raman, 2018) (Abdullah et al., 2013).

### **The Implications of Ecological and Digital Leadership Practices on the Performance of Sekolah Baznas Cendekia**

The ecological leadership and digital leadership practices implemented by the Principal of Sekolah Cendekia Baznas have significant implications for school performance and achievement. The following is a detailed description of the resulting implications:

#### **1. Adiwiyata Raksa Prasada Award for West Java Province 2023 and Towards National Adiwiyata 2025**

SCB achieved Anugerah Raksa Prasada In 2023 for the category of eco-friendly/Adiwiyata school at the provincial level. This achievement is the result of the Principal's ability to:

- a. Managing the school environment effectively.
- b. Establishing a comfortable, safe and eco-friendly.
- c. Instilling a commitment to sustainability to all school members.

With this achievement, SCB is committed to continue developing and innovating to achieve the National Adiwiyata award in 2025, as part of a sustainable vision.

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## **2. The Development of Innovative Products Based on Environment and Technology**

SCB produces innovative products that combine environmental utilization and modern technology, including:

### **a. Kebun Sehat**

Optimising school land to grow vegetables (such as kale, long beans and cucumber) to meet the consumption needs of students in the dormitory.

### **b. Rumah Jamur**

Mushroom farming with daily production reaching 10-30 kg. The production is not only used for internal consumption but also sold to the community. Rumah Jamur is an entrepreneurial unit as well as a student learning laboratory.

### **c. Kolam Ikan with Bio floc Technology**

Unlike the conventional method, fish farming using Biofloc technology is more eco-friendly because it combines organic and unorganic compounds consisting of carbon, oxygen, hydrogen, nitrogen, fish waste, and feed residue which will later form bioflocs. In addition, the Biofloc technique allows for space efficiency. At SCB, fish pond uses bioflocs with a diameter of 4 metres. Each cubic metre can be filled with 100 tilapia or 1000 catfish. Therefore, this technique increases the sustainability of production and supports resource saving.

## **3. "A" accreditation from BAN-SM**

SCB achieved "A" Accreditation in 2021 through the implementation of online accreditation during the Covid-19 pandemic. This success reflects the Principal's capacity to lead the Accreditation process and the effective use of technology to meet national accreditation standards.

## **4. Achievements in Library Competition**

SCB won 1st runner-up in the district-level library competition. The main indicator was library digitization, which continues to be developed at SCB to support easy access to information for students and teachers.

## **5. National Student Science Olympiad Medal**

In 2024, SCB students won a total of 60 medals in the National Student Science Olympiad at junior and senior high school levels. Participating in various Olympiads is one of the Club of Studies (KBS) programmes organized by the School as a measure of self-strengthening, material evaluation, and competitive spirit with various students both at the national and international levels. This achievement cannot be separated from the great role of the Principal in encouraging efficient student involvement in various online competitions.

## **6. Improvement in Student Achievement**

Throughout 2021-2023, more than 300 achievements were made in various national and international competitions, such as:

### **a. International Kangaroo Mathematics (IKMC).**

- b. Hardiknas Science Competition.
- c. National Numeracy Olympiad.
- d. BNN Pencak Silat National Championship.
- e. Nusantara Islamic Religious Educational Competition

The Principal's role was a major factor behind this success. This role can be seen in the form of providing strategic policies, facilitating online competitions and encouraging a competitive culture.

#### **7. Increasing the number of graduates who study at state universities**

By 2024, 73% of SCB graduates will be admitted to public universities through the merit pathway. This achievement is the result of the synergy between digital technology-based learning, achievement coaching, and Principal leadership that encourages students to reach their full academic potential.

### **Conclusion**

The practice of ecological and digital leadership applied by the principal at Sekolah Cendekia BAZNAS (SCB) has proven to have a significant impact in improving school performance and achievement.

#### **a. Ecological Leadership**

Ecological leadership is manifested through the formulation of an environmental vision and mission, innovation of eco-friendly products such as the Kebun Sehat, Rumah Jamur, and Kolam Ikan with Biofloc Technology, as well as active participation in the Adiwiyata programme. The principal also succeeded in encouraging the formation of environmental members that actively involved students, creating a sustainable school culture, and expanding the impact to the community through the School Social Responsible programme (SSR).

#### **b. Digital Leadership**

Digital leadership is demonstrated through the utilization of technology in communication, collaboration, and monitoring of school performance. The implementation of digital innovations such as smart cards, library digitization, and collaboration with various parties enables SCB to adapt to technological developments. This digital transformation supports the school's various achievements, including the success of online accreditation, the implementation of technology-based learning programmes, and the improvement of student competencies in various national and international competitions.

#### **c. The Impact on School Achievement**

The combination of these two leadership styles has resulted in numerous achievements, such as the Adiwiyata award at the provincial level, A accreditation from BAN-SM, and more than 300 student awards at the national and international levels. In addition, SCB has successfully increased the number of graduates admitted to public universities (73% through merit pathways), demonstrating the superior quality of education.

Led by a principal who uses digital and ecological leadership styles, SCB is not only an outstanding school, but also a model of an educational institution that is adaptive and responsive to the challenges of the digital era and environmental issues.

## References

- Abdullah, N. A. W., DeWitt, D., & Alias, N. (2013). School Improvement Efforts and Challenges: A Case Study of a Principal Utilizing Information Communication Technology. *Procedia - Social and Behavioral Sciences*, 103, 791–800. <https://doi.org/10.1016/j.sbspro.2013.10.400>
- AlAjmi, M. K. (2022). The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait. *International Journal of Educational Research*, 112, 101928. <https://doi.org/10.1016/J.IJER.2022.101928>
- Arina, Y., Febrianti, H., Sabandi, A., & Alkadri, H. (2023). Peran Pemimpin dalam Pengambilan Keputusan. *Innovative: Journal Of Social Science Research*, 3(2), 747–753. <https://j-innovative.org/index.php/Innovative/article/view/380>
- Arts, I., Fischer, A., Duckett, D., & van der Wal, R. (2021). Information technology and the optimisation of experience – The role of mobile devices and social media in human-nature interactions. *Geoforum*, 122, 55–62. <https://doi.org/10.1016/J.GEOFORUM.2021.03.009>
- Asbari, M., Wijayanti, L., Hyun, C. C., Purwanto, A., & Santoso, P. B. (2020). How to build innovation capability in the RAC industry to face industrial revolution 4.0? *International Journal of Psychosocial Rehabilitation*, 24(6). <https://doi.org/10.37200/IJPR/V24I6/PR260192>
- Atoyan, V., Movsisyan, N., Ohanyan, S., & Hovyan, V. (2023). The Impact of Digital Technologies on the Formation of New Identity Models and Value Orientations. *Scholars Bulletin*, 9(08). <https://doi.org/10.36348/sb.2023.v09i08.001>
- Avolio, B. J., Sosik, J. J., Kahai, S. S., & Baker, B. (2014). E-leadership: Re-examining transformations in leadership source and transmission. *The Leadership Quarterly*, 25(1), 105–131. <https://doi.org/10.1016/J.LEAQUA.2013.11.003>
- Azmi, N. R. L., Sobri, A. Y., & Nurabadi, A. (2018). Kepemimpinan Ekologis Kepala Sekolah Dalam Pembentukan Sekolah Berbudaya Lingkungan. *JAMP : Jurnal Administrasi Dan Manajemen Pendidikan*, 1(3), 327–336. <https://doi.org/10.17977/UM027V1I32018P327>
- BAN-S/M. (n.d.). BAN-S/M Provinsi Jawa Barat. Retrieved January 14, 2025, from <https://disdik.jabarpov.go.id/berita/ban-sm-provinsi-jawa-barat-makin-melaju>
- Bernarto, I., Bachtiar, D., Sudibjo, N., Suryawan, I. N., Purwanto, A., & Asbari, M. (2020). Effect of transformational leadership, perceived organizational support, job satisfaction toward life satisfaction: Evidences from Indonesian teachers. *International Journal of Advanced Science and Technology*, 29(3).
- Budiman, A., Sudarno, S., & Putra, A. A. M. S. (2022). Kepemimpinan Kepala Sekolah Dalam Mewujudkan Sekolah Adiwiyata Nasional (Studi Kasus di SD Negeri 18 Pekanbaru). *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 8(1), 87–100.

- <https://doi.org/10.37905/AKSARA.8.1.87-100.2022>
- Desky, H., Mukhtasar, Istan, M., Ariesa, Y., Dewi, I. B. M., Fahlevi, M., Abdi, M. N., Noviantoro, R., & Purwanto, A. (2020). Did trilogiy leadership style, organizational citizenship behaviour (OCB) and organizational commitment (OCO) influence financial performance? Evidence from pharmacy industries. *Systematic Reviews in Pharmacy*, 11(10). <https://doi.org/10.31838/srp.2020.10.50>
- Dwivedi, Y. K., Hughes, L., Kar, A. K., Baabdullah, A. M., Grover, P., Abbas, R., Andreini, D., Abumoghli, I., Barlette, Y., Bunker, D., Chandra Kruse, L., Constantiou, I., Davison, R. M., De, R., Dubey, R., Fenby-Taylor, H., Gupta, B., He, W., Kodama, M., ... Wade, M. (2022). Climate change and COP26: Are digital technologies and information management part of the problem or the solution? An editorial reflection and call to action. *International Journal of Information Management*, 63, 102456. <https://doi.org/10.1016/J.IJINFOMGT.2021.102456>
- Guruinovatif.id. (n.d.). Inovasi dan Sinergi Warga Sekolah: Membangun Pendidikan yang Adaptif dan Progresif - Guruinovatif.id. Retrieved January 3, 2025, from [https://guruinovatif.id/artikel/inovasi-dan-sinergi-warga-sekolah-membangun-pendidikan-yang-adaptif-dan-progresif?utm\\_source=chatgpt.com](https://guruinovatif.id/artikel/inovasi-dan-sinergi-warga-sekolah-membangun-pendidikan-yang-adaptif-dan-progresif?utm_source=chatgpt.com)
- He, S., Zhao, W., Li, J., Liu, J., & Wei, Y. (2023). How environmental leadership shapes green innovation performance: A resource-based view. *Heliyon*, 9(7), e17993. <https://doi.org/10.1016/J.HELIYON.2023.E17993>
- Indonesia.go.id. (n.d.). Indonesia.go.id - Mencetak Pemimpin Berwawasan Lingkungan. Retrieved January 2, 2025, from <https://indonesia.go.id/kategori/komoditas/2856/mencetak-pemimpin-berwawasan-lingkungan>
- Jihaduddin, Sartika, N. S., Subroto, D. E., Mauladaniyati, R., Rosdianwinata, E., Rifai, R., Sujana, A., Abidin, Z., Priadi, M. D., Setiawati, E., Yanti, D., & Purwanto, A. (2020). Effect of Pedagogic, Professional Competency, and Work Motivation Toward Indonesian Primary School Teachers Performance. *Systematic Reviews in Pharmacy*, 11(9). <https://doi.org/10.31838/srp.2020.9.91>
- Karangdowo, P. (n.d.). Inovasi Pembelajaran Berbasis Proyek: Upaya Peningkatan Mutu Pendidikan di Sekolah Desa Karangdowo | Karangdowo. Retrieved January 3, 2025, from [https://karangdowo.desa.id/inovasi-pembelajaran-berbasis-proyek-upaya-peningkatan-mutu-pendidikan-di-sekolah-desa-karangdowo/?utm\\_source=chatgpt.com](https://karangdowo.desa.id/inovasi-pembelajaran-berbasis-proyek-upaya-peningkatan-mutu-pendidikan-di-sekolah-desa-karangdowo/?utm_source=chatgpt.com)
- Lumintang, J. (2014). Peranan Kepemimpinan Dalam Pengawasan Lingkungan Hidup. *Oecd.org*. (2020, November 27). OECD Digital Economy Outlook 2020. OECD Digital Economy Outlook 2020; OECD. <https://doi.org/10.1787/BB167041-EN>
- Pramono, R., Kristianti, T., & Purwanto, A. (2020). Character development training for adults (a case study of heartmaster program in Jakarta). *Test Engineering and Management*, 83.
- Quddus, A., Nugroho, B. S., Hakim, L., Ritaudin, M. S., Nurhasanah, E., Suarsa, A., Karyanto, U. B., Tanjung, R., Hendar, Pratama, V. Y., Awali, H., Mufid, A., Purwanto,

- A., Fahlevi, M., & Sudargini, Y. (2020). Effect of ecological, servant dan digital leadership style influence university performance? evidence from Indonesian universities. *Systematic Reviews in Pharmacy*, 11(10). <https://doi.org/10.31838/srp.2020.10.64>
- Shafait, Z., & Huang, J. (2024). Examining the impact of sustainable leadership on green knowledge sharing and green learning: Understanding the roles of green innovation and green organisational performance. *Journal of Cleaner Production*, 457(December 2023), 142402. <https://doi.org/10.1016/j.jclepro.2024.142402>
- Sri Chairiyah, S., Khayati, N., & Mulawarman, U. (2024). Analisis Peran Kepala Sekolah sebagai Motivator dalam Meningkatkan Kinerja Guru di Sekolah Menengah Pertama. *EDUKATIF: JURNAL ILMU PENDIDIKAN*, 6(4), 3460–3468. <https://doi.org/10.31004/EDUKATIF.V6I4.7358>
- Sugiyono. (2013). *Metode Penelitian Manajemen*. Alfabeta.
- Susanto, Y. F. (2020). Pengaruh Kepemimpinan Lingkungan Terhadap Perilaku Zero Waste di Desa Panglipuran Kecamatan Bangli. *Jurnal Green Growth Dan Manajemen Lingkungan*, 9(1), 1–8. <https://doi.org/10.21009/JGG.091.01>
- Tagscherer, F., & Carbon, C. C. (2023). Leadership for successful digitalization: A literature review on companies' internal and external aspects of digitalization. *Sustainable Technology and Entrepreneurship*, 2(2), 100039. <https://doi.org/10.1016/J.STAE.2023.100039>
- Thannimalai, R., & Raman, A. (2018). The Influence of Principals' Technology Leadership and Professional Development on Teachers' Technology Integration in Secondary Schools. *Malaysian Journal of Learning and Instruction*, 15(1), 201–226. <https://doi.org/10.32890/MJLI2018.15.1.8>
- Topan, A. (n.d.). Ahmad Topan: Januari 2010. Retrieved January 14, 2025, from <http://atopatonblog.blogspot.com/2010/01/>
- Vizano, N. A., Utami, W., Johanes, S., Herawati, A., Aima, H., Sutawijaya, A. H., Purwanto, A., Supono, J., Rahayu, P., Setiyani, A., Widayati, C. C., & Elmi, F. (2020). Effect of career, organizational commitment on turnover intention through mediation of organizational culture: Evidence from Indonesian companies. *Systematic Reviews in Pharmacy*, 11(9). <https://doi.org/10.31838/srp.2020.9.136>
- Wahidin, Basri, Wibowo, T. S., Abdillah, A., Kharis, A., Jaenudin, Purwanto, A., Mufid, A., Maharani, S., Badiati, A. Q., Fahlevi, M., & Sumartiningsih, S. (2020). Democratic, autocratic, bureaucratic and charismatic leadership style: which influence school teachers performance in education 4.0 era? *Systematic Reviews in Pharmacy*, 11(9). <https://doi.org/10.31838/srp.2020.9.45>
- Yahaya, N. I. S., Sopian, N. I. H., Abdul Razak, I. S., & Mohd Ishar, M. I. (2021). Impact of Technology Progress on Human Development in the Era of Industrial Revolution 4.0. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 6(2), 266–274. <https://doi.org/10.47405/mjssh.v6i2.661>
- Zhang, S. (2024). The impact of emission trading schemes and government pressure on corporate climate change disclosure in China. *Environmental Challenges*, 16(June

2024), 100979. <https://doi.org/10.1016/j.envc.2024.100979>