



Hybrid transformational leadership strategy in developing the higher-order thinking skill-based learning quality in 21st century and catastrophic anomalies

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Abstract

Hybrid transformational leadership (HTL) in schools is a leadership approach that aims to enhance the attainment of higher-order thinking Skills - Learning Quality (HoTS-LQ) goals by integrating online and conventional educational technologies. This approach was inspired by the challenges and opportunities presented by the 21st century and the impact of catastrophic events. This study explores how principals' HTL influences schools in developing an effective HoTS-LQ. To analyze the data, the researcher used quantitative and qualitative approaches. The percentage technique used in the quantitative approach expresses information as a proportion of the whole. A quantitative approach employed a three-stage sorting, coding, and categorizing, which was deepened and validated through FGD. The study participants included 1,033 principals and teachers from Indonesia's preschools to senior high schools. The collected data underwent four stages of analysis: sorting, coding, categorizing, and validating through FGD using a convenience sampling method. The finding revealed two critical areas in which HTL enhances the HoTS-LQ as impacted by 21st-century and catastrophic anomalies characteristics: the quality of HoTS-LQ is determined by teachers' ability to integrate learning into the learning management system (LMS); the quality of LMS utilization in HoTS-LQ depends on the principal's ability to implement an HTL using ICT. These findings highlight the comprehensive impact of HTL implementation on enhancing teachers' capabilities for effective HoTS-LQ.

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Introduction

Leadership is central to every change in various fields, including learning. Leadership is critical in determining the quality of learning systems (Fullan, 2013). Many experts have concluded that leadership is essential to learning success or failure. Experts agree on the importance of strong organizational leadership (Arifin et al., 2018; Torres, 2022). Juharyanto et al. (2020), and Torres (2022) also agree that the strategic factors that affect leadership effectiveness may differ from one another, depending on the strength of local wisdom and specific policies agreed upon at each locus as well as the disruption of unpredictable changes (John & Chattopadhyay, 2015; Juharyanto et al., 2023). Effective leadership strategies are specific to organizations and are influenced by time and location. Leaders must adapt to radical changes and develop the organization appropriately (Lunenburg, 2010). In the 21st century, disruptive changes and catastrophic anomalies have shocked organizations, demanding swift, wise, and effective responses. Influential leaders possess strong digital competencies, including ICT and distance interaction, in all fields (Ahmad, 2012; Dess & Picken, 2000; Maisyaroh et al., 2021). Moreover, leadership is more robust and effective when its values resonate with all organizational stakeholders. Transformational leadership responds appropriately to current leadership issues (Caillier, 2016). Whether individual or collective, leadership is crucial for organizational success, involving shared stakeholder perceptions, achievement motivation, and willingness to participate in various roles (Aas & Brandmo, 2016; Caillier, 2016). Organizational success is essentially the joint success of all stakeholders, including success in developing a learning system that emphasizes integrating higher-order thinking skills (HoTS) as a prerequisite for learning in the 21st-century era (Ahiri et al., 2013). HoTS-based learning is believed to provide students with high competence in managing their future lives.

ICT integration in schools drives leadership focus, while catastrophic anomalies prompt alternative models. Studies suggest online interaction is insufficient for effective stakeholder interaction (Chick et al., 2020). Offline interaction is still needed, especially because ICT infrastructure support is not evenly distributed, and there is a low ability to use ICT effectively (Giatman et al., 2020). This study addressed a big question on how principals' HTL influences schools in developing an effective HoTS-LQ based on the unique catastrophic

challenge experiences and for future quality learning implementation. Therefore, this study seeks to identify the hybrid transformational leadership strategies that have developed HoTS-LQ in the 21st century.

Literature Review

Leaders of the 21st Century and Catastrophic Anomalies

Globalization in the 21st century presents challenges for organizations, including global uniformity and local diversity, which impact effective leadership and organizational quality (Kraus et al., 2021). At least four characteristics of change in the 21st-century era must be the focus of future leadership: volatility, uncertainty, complexity, and ambiguity (VUCA). These four characteristics further strengthen leaders' future difficulties in running their organizations (Brodie, 2019; Rimita et al., 2020). Leaders must balance global and local aspects, distribute values effectively, and prioritize quality learning for students to respond effectively to VUCA, while retaining talent and developing next-generation leaders (Hallinger, 2005; Mebane et al., 2017).

The COVID-19 pandemic has significantly disrupted education, forcing principals and teachers to utilize ICT for leadership and lesson design, requiring integrated lesson packages. The COVID-19 pandemic is just one of several catastrophic events, such as floods, earthquakes, and tsunamis, which necessitates schools to plan effective learning compatible with ICT. Under these exceptional circumstances, leadership and learning activities must be conducted hybrid. In the context of leadership, this hybrid approach is called hybrid leadership. This form of leadership aims to facilitate a transformation that maintains the quality of the learning conducted by teachers. This can be referred to as hybrid transformational leadership.

Change leaders lead functional and emotional school organizations (Adamson & Darling-Hammond, 2015; Hallinger, 2005). Often, leaders look only from the functional side and forget that change inevitably causes anxiety in everyone. The leader's job is to ensure that all stakeholders know that change is inevitable and everyone is coping well. Leading change leads to a proportional responsibility between an organization's functional and emotional aspects. Functional change requires rationalization and higher-order thinking that works well when anxiety, worry, fear, and belief in the ability to make positive changes are managed effectively (Arifin et al., 2018; Cotta, 2021).

The next leader's task is to retain talented employees by developing influential leaders, increasing stakeholder involvement, building organizational capabilities, and creating a conducive environment for stakeholder quality development (Balan & Cavendish, 2017; Gorton, 2016). Positive attitudes and behaviors translate into greater productivity and creativity among stakeholders to support achieving school goals. Schools empower students through learning for future capabilities, influenced by principals and teachers' leadership qualities in incorporating 21st-century values into all aspects of schooling, especially learning (Alismail & McGuire, 2015; Desimone & Garet, 2015). The principal must ensure the entire school program is prepared and determined based on future competency needs.

Hybrid Transformational Leadership: The 21st-Century Era and Catastrophic Anomalies Requirements

Transformational leadership refers more to the personal strength of the leader, who inspires and motivates subordinates to succeed in the organization's vision (Bafadal et al., 2019; Bush, 2014). Transformational leadership fosters trust, respect, and admiration among followers, promoting a high level of awareness and fostering a collaborative environment for progress.

In the context of the 21st-century, with ICT facilities that continue to develop and the pressures of catastrophic anomalies, this transformation cannot be consistently performed face-to-face but combined with distance meetings known as hybrids (Clausen et al., 2020). Hybrid transformational leadership involves leaders inspiring and motivating others to perform organizational tasks through physical and non-physical meetings, using ICT facilitation and catastrophic anomalies. An inspirational leader integrates leadership competency with ICT platforms and Internet skills, effectively managing resources to produce valuable information for organizational development and efficient response to VUCA (Rodrigo & Platon, 2022).

The Struggle to Enforce HoTS-LQ

Higher-order thinking skills are one of the primary mandates in learning integrated with 21st-century values (Rodrigo & Platon, 2022). The HoTS-LQ directs students to use problem-solving activities systematically and logically. Possessing HoTS-based competencies equips students with uncertainty about future problems (VUCA) and various alternative solutions in a divergent manner. Through the HoTS-LQ, students can analyze problems, find alternative solutions, assess their feasibility,

select them accurately and measurably, and do so effectively.

However, the HoTS is not instantly formed. HoTS learning will be created if it is supported by the HoTS learning culture of schoolteachers and principals (Rodrigo & Platon, 2022). A comprehensive design is needed to echo and bring HoTS into school culture, from instilling a HoTS mindset to a HoTS-based culture of thinking and behaving. The role of leadership in accelerating HoTS in the ICT era will be successful if supported by transforming leadership values in an appropriate, firm, collective, inspiration-based, profound, sustainable, measurable, and context-based manner.

Methodology

Participants

The study utilized a qualitative approach to explore hybrid technology variables, transformational leadership factors, and the quality of HoTS-LQ based on 21st-century characteristics in Indonesia, involving 1,033 respondents across 33 provinces. The respondents were principals and teachers of preschool, elementary, junior high, and senior high. Table 1 lists the total number of respondents and their level of involvement in the study. The data obtained through the tabulation of the results of the questionnaire through Google Forms were then given a percentage to determine the dominance of the acquisition of each variable.

Table 1 Data distribution

No	Level	Respondents	Percentage
1	Preschool Education	32	3.09
2	Basic Education	923	89.35
3	Senior High School	78	7.56
Total Respondents		1,033	

Data Collection

This study used interviews through fully and semi-opened questionnaires to investigate principals' and teachers' ICT skills, challenges, opportunities, and motivations for implementing HoTS in learning. Fully opened questionnaires were used for the initial discussion with the educational superintendents, represented by 6 persons from KTT Regency North Kalimantan, and 4 supervisors from Bondowoso East Java, where the information was taken to be

the basis of developing the semi-structured one. Data were collected using convenience sampling based on available respondents (Rukin, 2019). This convenience was derived from the fact that the respondents were selected because they happened to be in the right place at the right time and were willing to participate in the study. Convenience sampling precludes the possibility of coercion and guarantees the objectivity and validity of the data collected. Data were collected through a questionnaire designed in Google form, shared via email or social media by the principal, and distributed to all the teachers interested in participating in this research.

Data Analysis

To analyze the data, the researcher used quantitative and qualitative approaches. The percentage technique used in the quantitative approach expresses information as a proportion of a whole. A quantitative approach employed a three-stage sorting, coding, and categorizing (Bergin et al., 2018), that the reliability was examined and then deepened and validated through FGD. The analysis process involves sorting and coding, organizing and identifying relevant data. The researcher reads transcripts, makes analytical decisions, and assigns essence-capturing codes to data segments. The researchers use an open coding approach, comparing coded segments (Timmermans & Tavory, 2022) to ensure that the codes accurately represent the data. The third stage, categorizing, involved grouping the coded data segments into categories based on shared characteristics, forming the study's findings (Bergin et al., 2018).

The preliminary findings were analyzed more deeply through group discussion forums (FGD) in three top schools in different East Java regencies and three excellent schools in Tana Tidung Regency, North Kalimantan. Utilizing a qualitative approach, the research aimed to uncover the effective leadership strategies employed by principals in developing HoTS learning using ICT facilities. The participants of the FGD included school principals and teachers at both elementary and high school levels, and the FGDs were conducted to confirm and validate the findings. The research sites were selected through collaboration with Universitas Negeri Malang, which maintains an ongoing partnership with the institution.

Results and Discussion

Principal and Teachers' ICT Capabilities as Key Requirements for 21st Century Leadership

The capacity of principals and teachers to recognize, understand, select, and use the learning resources available through ICT in schools in Indonesia is high. The percentages of principal and teacher capabilities, as shown in Figure 1, were confirmed by participants in the FGD. Principals and teachers have a high potential to use ICT to develop HoTS learning. This capacity occurs mainly because of the pressure of catastrophic anomalies, which requires a change in mindset and quality of learning practices, even though it cannot be done as regularly as before. Principals are pressured to perform various leadership and managerial innovations so that school progress continues under the established educational management standards, and learning standards (Horth & Vehar, 2014; Juharyanto, 2020) are still developed under the demands of the current curriculum standards, especially by emphasizing efforts to integrate HoTS principles as a 21st Century Characteristic.

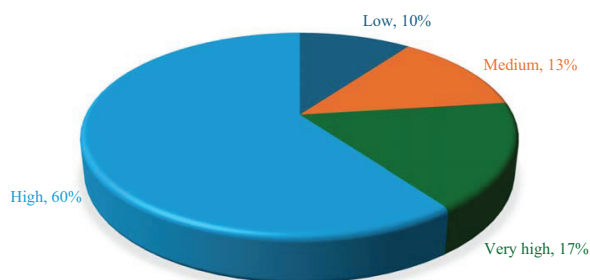


Figure 1 Principals' and teachers' ICT capabilities

Principals and teachers agree that government policies require schools to assist students in acquiring basic problem-solving thinking skills by using alternative solutions through divergent thinking processes. Therefore, the learning process requires innovative and strategic efforts to create a learning climate called HoTS. Student worksheets are essential to distance learning. However, the most important aspect of distance learning is maximizing the HoTS process, which can only be performed by LMS integration. Thus, searching for various sources of information, selecting and adapting to innovative designs, and integrating them into LMS has become critical. The pressure of catastrophic anomalies in the last two years has made all academics and school stakeholders

aware that integrating ICT into school programs, especially quality learning (HoTS-LQ), is available without limits on the internet.

Bezy and other experts have stated that it is essential for school principals and stakeholders to be aware of the changes that are bound to occur without prediction (Bafadal et al., 2018; Bezy & Makolandra, 2009; Elkington, 2018). Organizational progress relies on leaders' readiness to change, considering functional and personal change. 21st-century ICT facilitation significantly impacts effectiveness and efficiency in achieving vision and goals. This achievement occurs maximally and naturally when the principal responds proportionally and human-likely (Parks et al., 2011; Rimita et al., 2020). Therefore, managing the anxiety of the staff and all school stakeholders by sharing the values of high self-confidence of the principal, creativity, innovation in finding solutions, belief in the positive impacts of each change, and an attitude of not giving up to move forward and develop, as well as optimism towards success in passing and restraining the emerging change itself through practical work, is an inspiration that fosters concern and togetherness for human resources in developing school organizations, especially learning as its primary function (Liedtka, 2015; Rothstein, 2010).

They firmly believed that the crucial prerequisites for success involved carefully selecting appropriate references from the internet and judiciously adapting and implementing them in proportionate measures. According to the data, 13 percent of school principals and educators, particularly those at the senior high school level, possess the skills necessary to create HoTS learning applications that can be implemented effectively in educational institutions. This theory, supported by numerous studies, posits the existence of numerous alarming transformations that impact all parties involved (Bezy & Makolandra, 2009; Hallinger, 2009). Schools recommend developing platforms to effectively filter and manage resources on websites and social media. These platforms integrate information into processes, enabling students to engage effectively and efficiently in constructive activities for HoTS-LQ development (Brodie, 2019; Park, 2018).

However, the FGD participants agreed that the capacity of school principals and teachers in ICT supports offline and online learning quality. The use of an LMS is highly effective for HoTS learning. However, this condition only occurred in 13 percent of the schools rated as excellent. However, HoTS is not only a conceptual issue; its performance must be confirmed and validated.

This concern is not only in learning but also in the impact of principal coaching, which is mainly done online. Coaching/distance and face-to-face (hybrid) learning are the most appropriate leadership solutions (Fullan, 2014; Olfert et al., 2018).

Hybrid Transformational Leadership as Effective Leadership Strategy for HoTS-LQ

The principal's primary responsibility is optimizing the 21st-century HoTS-LQ learning process, integrating ICT facilities for safety and effective coaching. A hybrid strategy involves dividing participants into online and offline groups.

Hybrid technology is a new strategy applied in seminars, conferences, meetings, and learning with the design of groups and different locations at the same or different times (Bolden & Petrov, 2014; Tonini et al., 2016). The hybrid approach is the most appropriate solution to overcome the limitations of face-to-face meetings according to the health protocol affected by catastrophic anomalies. However, many organizations successfully implemented it before the emergence of the pandemic. A hybrid is considered adequate and efficient because it is supported by the massive development of ICT facilities in the organizational context, including changing trends in implementing transformational leadership (Cherry, 2017; Hsiao & Chang, 2011). The effectiveness of transforming principals' leadership in the 21st-century era is not limited to implementing past organizational traditions. Nevertheless, it can occur maximally through proportional and wise use of ICT facilities.

In carrying out their roles and responsibilities, this study's principal relies on two focuses: programs and policies. The first focus is on the orientation of the principal's activities, emphasizing the vision, integration of Internet resources, development of school platforms, involvement of school stakeholders, and dependence on government regulations. The second focus is policies to support the first focus, including support for funding allocations for learning and the preparation of hybrid learning work standards, wise use of various learning resources (starting from search, selection, adaptation, and integration activities), the development of stakeholder involvement, and dependence on orders or directions.

The effectiveness of principals in carrying out leadership responsibilities is primarily determined by their focus on learning (Bafadal et al., 2019; Nurabadi et al., 2021). Quality learning is the foundation of

the principal's vision and has implications for policies, programs, targets, and strategies for developing school quality. In the 21st century, all derivatives of this vision have been integrated into ICT, particularly HoTS-LQ (Horth & Vehar, 2014; Mulford, 2003). With all its facilities, ICT is a new trend that cannot be avoided but must be cultivated so that the quality of ICT skills of principals and teachers is higher and becomes the primary provision in accelerating HoTS-LQ for the future more robust generation.

Interestingly, the comparison between the data obtained through questionnaires and qualitative data through FGDs, as shown in [Table 1](#), revealed a significant difference in the trends between regular and excellent schools. These differences are mainly related to the need to implement hybrid teacher and student guidance and assistance, where excellent schools have implemented it a lot in terms of standard preparation and capacity utilization of internet resources. Excellent schools focus on preparing various learning tools, starting with documents, references, and effective hybrid learning strategies.

However, excellence school is not instantaneous (Hallinger, 2011). The excellence of a school is determined primarily by its principal's leadership and managerial capacity. However, excellent principals lead excellent schools (Bafadal et al., 2020). Slowly but surely, the excellence of the principal's leadership values resonates with all staff, even students and parents (Boyatzis & McKee, 2010; Cherry, 2017). A high resonance power will affect the effectiveness of coaching by the principal, even if it is carried out in a hybrid manner. The quality of the hybrid transformational leadership strategy will not be problematic if the principal has a superior capacity in both functional and personal contexts. In the 21st-century, ICT skills have become a leading indicator of school principals' excellence (Elkington, 2018).

The data in [Table 2](#) suggest that excellent schools offer more support to school principals in utilizing information technology resources than average schools. However, traditional schools require more assistance than excellent schools to enhance hybrid learning. It is crucial to emphasize the significance of hybrid learning skills and their practical application as vital components of modern educational requirements while preparing for potential future interruptions. The proposed approach recommends that regular schools allocate their financial resources in anticipation of possible shortages. Excellent schools strongly emphasize providing a diverse range of IT-based electronic learning platforms supported by internal human resources rather than relying on external resources.

Various FGDs concluded that a hybrid strategy is the most effective option for implementing principal leadership. The effectiveness of this leadership style in excellent schools, with principals who are more creative and less dependent on government policies, has implications for teachers' efforts to implement quality learning by selecting the most recent approaches and materials. In leading schools, a holistic hybrid leadership transformation occurs among all school human resources (Pan et al., 2015). The capability to use ICT facilities in excellent schools is more effective and efficient, especially when integrated into the LMS platform. Utilizing an LMS effectively reduces the risks associated with catastrophic anomalies in the 21st-century. The policies and activities of principals and teachers that emphasize the consistency of the HoTS-LQ vision are the needs of all the human resources in schools (Pan et al., 2015; Schmidt, 2014). Hybrid Transformational Leadership in excellent schools is a daily activity that effectively develops HoTS-LQ as a 21st-century characteristic. The principal's capability to use ICT facilities is illustrated in [Figure 2](#).

Table 2 Principal policy intervention in supporting hybrid leadership transformation for HoTS-LQ between regular and excellent schools

Principal Strategy	Principal Policy Intervention in Supporting Hybrid Leadership Transformation for HoTS-LQ		
	Principal Policies and Activities	Regular School (%)	Excellent School (%)
Strengthening the Vision Focus	Financial Allocation Support for Learning	13.89	9.72
	Procedural Standard Support for Hybrid Leadership and Learning	34.52	20.14
Source Integration enforcement	ICT Resources Search, Selection, adaptation, and Integration	27.78	40.38
Media Innovation and Development	School Learning e-portal Development	5.36	17.26
Empowering Stakeholders' Involvement	Stakeholders' Involvement Development	14.68	11.11
Others	Principals' directions and orders	3.77	1.39

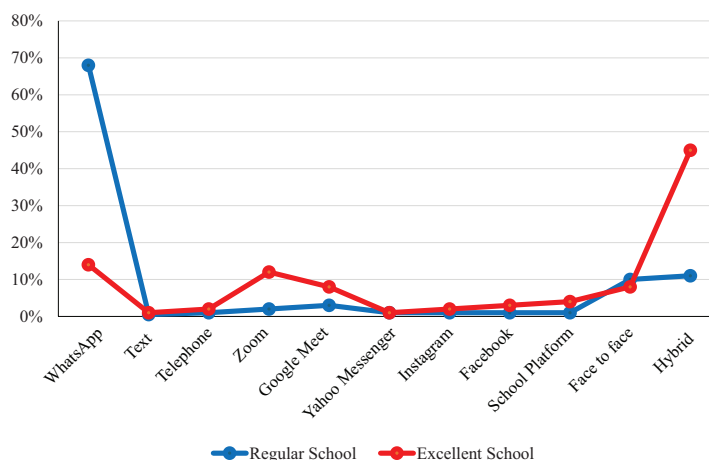


Figure 2 The trend of integrating ICT by principals and teachers

Figure 2 shows a noticeable difference between regular and excellent schools that use ICT facilities. Although WhatsApp is primarily used for educational purposes in regular schools, hybrid interaction, which is more effective in implementing HoTS, is widely employed in excellent schools. Furthermore, using Zoom, Facebook, and innovation to create a unique learning platform is crucial in these schools.

The principal's creativity in encouraging the use of ICT facilities is both motivational and inspirational for all school human resources. The higher the capacity of the principal to use ICT, the greater the potential to raise motivation and inspiration for the development of school programs (Hallinger, 2009). Thus, hybrid transformational leadership is crucial for the success of schools in the 21st-century era, especially during catastrophic anomalies.

Conclusion

The effectiveness of principals is determined by their focus on learning and the integration of ICT in creating the HoTS-LQ, particularly for 21st-century capability students. A study in 33 provinces of Indonesia found that principals and teachers have a high potential to use ICT to develop HoTS learning due to catastrophic anomalies. The data tell us that excellent schools have enough capability to establish the HoTS-LQ under the support of a hybrid transformational leadership strategy that is dominantly implemented by school principals. The reality is reversed compared to regular schools, where it takes quite a while to respond effectively to the impact of the pandemic. A hybrid strategy is the most effective

option for implementing principal leadership. Hybrid leadership is essential to adapt to 21st-century era characteristics of change: volatility, uncertainty, complexity, and ambiguity (VUCA). In the COVID-19 pandemic, hybrid leadership involves combining physical and non-physical meetings, using ICT facilitation, and managing anxiety, worry, fear, and belief in positive change. Higher-order Thinking Skills (HoTS-LQ) are a crucial component of 21st-century learning, but it requires a comprehensive design to integrate it into school culture.

Limitations

The study describes the importance of HoTS as a vehicle for achieving 21st-century competence in conditions of anomaly, where learning cannot be fully carried out in the classroom. Hitching onto a hybrid model transformational leadership approach is the way to go that the school's principals as key makers potentially do. This strategy can only be implemented when the school's principals develop specific programs for enhancing teachers' ICT proficiency given Indonesia's low level of ICT capabilities among educators. Both approaches can support teachers in Indonesian schools in overcoming various anomalous difficulties, particularly Covid-19. As a result, the findings of this study cannot be applied to other countries, except for those that share some similarities in political support, financial policy, and culturally paternalistic societies. This research is expected to continue and be tested further to find the ideal model for improving the quality of HoTS for more optimal 21st-century competencies.

Implications

Theoretical Implications

Several studies concerning the quality of schooling insist that the principal is the most crucial determining factor (Bezy & Makolandra, 2009; Elkington, 2018). From the earlier studies, it is evident that the teacher is the dominant factor in learning quality. Learning is considered the primary task or mission of the school (Bafadal et al., 2019; Malakolunthu et al., 2014). Research into the improvement of the quality of teachers, more so in the use of ICT in the era of COVID-19, is inexplicably enormous.

Many interactive habits are broken, especially in the subtlety that reinforces quality learning. The most dominant strategy that schools have undertaken during COVID-19, by ICT, is online learning. Not all school leaders, teachers, and staff can interact with ICT (Mwawasi, 2004). Second, the research enriches the leadership concept in schools with a new leadership concept of hybrid transformational leadership. For instance, a leader who practices transformational leadership tries to inspire the people by fulfilling their deepest needs to give their all. Concerning catastrophic anomalies, this includes a hybrid presentation of the style. Of all strategies, hybrid transformational leadership is the most promising way to improve the quality of HoTS-LQ in support of the formation of 21st-century capabilities and new interesting topic of the next research.

Practical implications

Research on hybrid transformational leadership in strengthening HoTS-LQ in enhancing 21st-century capabilities in the context of disaster anomaly has not been done. In Indonesia, policies on improving the quality of learning are believed to be relevant to the formation of the most effective human capabilities for their future lives. The leadership of the school principals is a crucial factor in these efforts. Leadership practices facing tremendous challenges during the Covid-19 pandemic. Learning that should be online, is a shocking impediment for schools in developing quality learning. True learning not only plays a role in transforming information but also the positive character values that are needed for the future of students. Everyone agrees that the vision must continue to be fought under any circumstances. Many schools in Indonesia failed in the early stages of the pandemic

and later succeeded, especially after adaptation through hybrid transformational leadership strategies based on data on teacher competence in ICT use, community input, and government support.

This work can provide a practical implementation of improving learning quality through hybrid transformational leadership and a new path for future research.

Conflict of Interest

The authors assert that they hold no affiliations with or participate in any organization or entity with a financial interest in the subject matter or materials covered in this manuscript.

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