An Examination of the Views on the Technological Leadership of School Administrators Working in Primary Schools in the North Cyprus

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ABSTRACT
The purpose of this study is to evaluate the views of school administrators working in primary schools affiliated with the Ministry of National Education of the Turkish Republic of Northern Cyprus regarding technological leadership. A qualitative research approach was employed in the study, and within this framework, a case study design was adopted. The study group consists of school administrators (principals and vice principals) working in public primary schools under the Primary Education Department of the Ministry of National Education of the TRNC. For this purpose, the researcher employed a semi-structured interview method and developed an interview form consisting of eight semi-structured questions. This interview form was used as the data collection tool. Content analysis was applied to analyze the qualitative data.
The findings indicate that school administrators largely associate the concept of technological leadership with competence in "using technology accurately and effectively" and "possessing sufficient technological knowledge." In addition, perceptions of technological leadership behaviors emphasize openness to innovation, guiding teachers in the use of technology, and directing groups toward effective use of technology. The study further reveals that the majority of administrators consider the existing technological infrastructure and equipment inadequate, and that the current infrastructure and schools' socioeconomic conditions directly affect administrators' technological leadership roles.
Based on the study's results, it is recommended that practical technology training programs be organized for teachers and school administrators, that budget allocations be increased and infrastructural deficiencies addressed, that equal technological resources be provided to schools, and that the effective use of educational technologies in teaching be expanded.
Keywords: School administrator, technology, leadership, technological leadership

INTRODUCTION

In the modern era in which we live, technology is regarded as advanced and continues to develop daily across many fields. The rapid advancement of technology affects all institutions, including educational institutions. In this process of change and transformation, it is of great importance for educational organizations to be successful and to use their resources effectively (Gülmez, 2021).

The effective use of educational technologies in schools necessitates the education of individuals equipped with the competencies required by the information society. In this context, it is of great importance that not only teachers but also all stakeholders working in educational institutions—particularly school administrators—can adapt to this technological transformation (Özmen, 2022). School administrators are expected to closely follow developments in the field of technology and to integrate innovations into teaching and learning processes in the most appropriate manner. This integrated process, which requires planning and integrating technology use in parallel with changes in educational environments arising from the continuous development of technology, as well as providing the necessary infrastructure, professional development, and support services for educational components, brings the importance of technological leadership in education to the forefront (Anderson, 2005).

School administrators should enhance the quality of instructional processes by ensuring the effective and efficient use of educational technologies; at the same time, they should assume a guiding role in developing the knowledge and skills of teachers and other educational staff in this field (Başaran, 2000). In this context, the technological leadership demonstrated by school administrators emerges as a decisive factor in enabling educational staff to develop their technological competencies and to adapt to processes of change.

According to Durak (2022), an individual who can be described as a technological leader is expected to use technology effectively and to motivate individuals working within the organization to engage in the use of technology. Within this framework, it is of great importance that school administrators possess the competence to use educational technologies effectively and have developed basic literacy skills related to information technologies. Individuals in administrative positions are expected to create environments that enable students and educational staff to integrate technology efficiently into the educational process. Furthermore, monitoring technological innovations, adapting these developments in accordance with the structure of the school, and implementing them in practice should be considered among the technological leadership competencies that a school administrator is expected to possess.

The purpose of this study is to evaluate the views of school administrators working in primary schools affiliated with the Ministry of National Education (MoNE) of the Turkish Republic of Northern Cyprus (TRNC) regarding technological leadership. In this context, based on the main research question, the sub-objectives of the study can be listed as follows:

1. How do school administrators define the concept of leadership?
2. How do school administrators define the concept of technological leadership in the current century?
3. What are school administrators' views regarding their technological leadership self-efficacy in the institutions where they work?
4. What are school administrators' opinions about the quality of the existing technological infrastructure and technological equipment in their schools?
5. What behavioral characteristics related to technological leadership should school administrators possess?
6. How do school administrators think that the information technology infrastructure of schools affects their technological leadership competencies positively or negatively?
7. How do school administrators think that the economic level or environment of the schools in which they work affects their technological leadership competencies positively or negatively?
8. What are school administrators' recommendations for expanding the use of educational technologies at the primary education level in the country?

METHODOLOGY

Research Design

This study was designed in accordance with the qualitative research method. In qualitative research, the primary focus is on gaining an in-depth understanding of the phenomenon under investigation within its own context. The qualitative research approach emphasizes understanding different perspectives, conducting descriptive analyses, and interpreting the data obtained. The research process progresses in a natural flow, and the findings are interpreted by being associated with theoretical frameworks in order to reach conclusions (Balcı, 2016).

In this study, the case study design, which is one of the qualitative research methods, was preferred. Case studies are regarded as one of the research methods used to describe the details influencing the formation of a phenomenon, to develop possible explanations related to the phenomenon, and to evaluate the relevant case (Büyüköztürk et al., 2023).

Study Group and Sampling

In qualitative research methods, the study group consists of individuals whom the researcher interviews or observes to collect data, and it is determined in accordance with the research questions and objectives. In qualitative research, the primary concern is to collect in-depth data from participants who are aligned with the research questions. Therefore, in qualitative studies, selecting participants who are relevant and appropriate to the research is considered more important than having a large number of participants (Yıldırım & Şimşek, 2021).

The study group of this research consists of a total of 45 school administrators (principals and vice principals) working in primary schools affiliated with the Ministry of National Education of the Turkish Republic of Northern Cyprus during the 2024–2025 academic year. In determining the participants, the maximum variation sampling method, which aims to include individuals with diverse characteristics in the study, was preferred. As stated by Yıldırım and Şimşek (2021), the main purpose of maximum variation sampling is to reflect the widest possible range of differences in the characteristics of individuals who may participate in the research. Accordingly, in the process of forming the study group, attention was paid to ensuring diversity in the sample by considering various demographic variables such as participants' years of experience, age range, and educational background.

Data Collection Tool

In this study, the interview technique was employed as a qualitative data collection method. As the data collection instrument, a semi-structured interview form developed by the researcher was used. The interview form, which

was developed based on a review of the relevant literature and expert opinions, consists of eight open-ended questions. The interview form was tested through pilot applications conducted with three school administrators.

In qualitative research, interview instruments are generally designed with a flexible structure and include open-ended questions that allow participants to express their thoughts in detail (Merriam, 2013). These questions are posed to interview participants in the same order, and participants are allowed to express their responses with the level of detail and scope they prefer (Yıldırım & Şimşek, 2021). In this study, a semi-structured interview form was prepared to examine the views of school administrators working in primary schools in the TRNC regarding technological leadership was used, and participants were provided with the opportunity to freely express their own experiences.

Data Collection Process

To conduct interviews with 45 school administrators working in the TRNC, written permission was obtained from the Primary Education Department of the Ministry of National Education of the TRNC (Appendix 1), and an application was submitted to the Ethics Committee of the Institute of Social Sciences at Akdeniz Karpaz University, where all required documents were duly provided.

The study group consists of principals and vice principals working in primary schools located in the districts of Nicosia, Famagusta, Kyrenia, Güzelyurt, İskele, and Lefke, which are affiliated with the Primary Education Department of the Ministry of National Education of the TRNC. During the research process, primary schools were visited, and interviews were conducted with the participants. Throughout the interviews, a semi-structured interview form consisting of questions prepared by the researcher for school administrators was used. The study was conducted after obtaining ethical approval from the Institute of Social Sciences at Akdeniz Karpaz University. The interviews commenced in the spring semester of the 2024–2025 academic year and were completed in May.

Data Analysis

In this study, a semi-structured interview form was used as the data collection tool, and the content analysis method was preferred for the analysis of the data obtained. Content analysis is an analytical technique that involves the process of coding data and interpreting the relationships among these codes. The main objective of this method is to identify explanatory concepts derived from the collected data and to reveal the relationships among these concepts. The analysis process consists of data coding, the formation of categories, the identification of themes, the organization of categories and themes, and the interpretation of the findings (Yıldırım & Şimşek, 2021). The information obtained from the analysis process may provide potential hypotheses and research areas for future studies, thereby offering new directions for scientific research. While the analysis results enable researchers to develop new ideas and approaches for addressing existing problems, they also contribute to the literature (Büyüköztürk, 2011).

To ensure confidentiality, the participating school administrators were assigned different pseudonyms. Codes such as (P1, P2, …) were used for principals, and (VP1, VP2, VP3, …) for vice principals. During the research process, responses to the interview questions were recorded in written form, and an in-depth analysis was conducted on these responses. In line with the main purpose of the study, the responses obtained from participants were grouped under specific themes. These themes were organized according to similarities and differences in participants' responses. Subsequently, the grouped responses were coded in accordance with the progression of the analysis. During the coding process, tables were prepared to facilitate a clearer understanding of the responses.

Validity and Reliability

Qualitative research is based on the researcher's objective and unbiased examination of the phenomenon under investigation. In this study, various strategies were employed to ensure validity and reliability throughout the qualitative data collection and analysis processes.

Kirk and Miller (1986) define *validity* as the researcher's ability to present the observed events and the collected data objectively. In order to ensure validity, the researcher employs various methods to verify the accuracy of the collected data and the resulting findings. Some of these methods include additional verification processes, such as obtaining feedback from participants or peers.

In qualitative research, it is acknowledged that realities may vary due to personal perceptions and environmental conditions. Therefore, repeating the same study with different groups or under different conditions does not always yield identical results. Reliability is a critical concept in terms of the robustness and replicability of a qualitative study. The consistency of the data collected by the researcher and the systematic conduct of the research are important factors that enhance reliability. While the methods used to ensure reliability may differ between

qualitative and quantitative research, in qualitative research, reliability is grounded in the researcher's stance toward neutrality and objectivity (Yıldırım & Şimşek, 2021).

Various methods can be employed to ensure reliability in qualitative research. The involvement of more than one researcher, as well as conducting data analysis at different times and through retrospective comparisons, contributes to enhancing reliability. In addition, consulting expert opinions during the data analysis process and conducting a thorough review of the literature while reporting the data support both the reliability and validity of the study.

Findings

Table 1. Demographic Characteristics of the Participants

Variable	**Category**	**f (n)**	**%**
Gender	Female	29	64.4
	Male	16	35.6
Position	Principal	24	53.3
	Vice Principal	21	46.7
Age	36–40 years	10	22.2
	41–45 years	10	22.2
	46 years and above	25	55.6
Educational Background	Graduate of Atatürk Teacher Academy/College	40	88.9
	Graduate of the Faculty of Education (Primary School Teaching)	2	4.4
	Graduate of the Faculty of Education (Special Education Teaching)	3	6.7
Undergraduate Degree	Primary School Teaching	38	84.4
	Preschool Teaching	4	8.9
	Special Education Teaching	3	6.7
Postgraduate Education	M.A. in Educational Administration and Supervision	30	66.7
	Ph.D. in Educational Administration, Supervision, and Planning	3	6.7
Years of Administrative Experience	0–5 years	15	33.3
	6–10 years	13	28.9
	11–15 years	5	11.1

An examination of Table 1 indicates that 29 of the participants (64.4%) are female and 16 (35.6%) are male. It is observed that 24 participants (53.3%) serve as principals, while 21 participants (46.7%) serve as vice principals. In terms of age distribution, the majority of the participants are 46 years of age and above. Specifically, 10 participants (22.2%) are between the ages of 36 and 40, 10 participants (22.2%) are between the ages of 41 and 45, and 25 participants (55.6%) are aged 46 and above. When the educational background of the study group is examined, it is seen that 40 participants (88.9%) are graduates of the Atatürk Teacher Academy/College.

The number of participants who graduated from the Primary School Teaching departments of Faculties of Education was identified as two, while three participants were graduates of the Special Education Teaching department. Additionally, 38 participants reported having completed an undergraduate degree in Primary School Teaching, whereas four participants completed Preschool Teaching and three participants completed Special Education Teaching undergraduate programs.

A total of 45 school administrators participating in the study are employed in 21 different schools. The diversity of the schools in which the administrators work indicates that the study encompasses a wide range of schools and reflects the views of administrators from different regions and school contexts.

Table 2. Evaluation of School Administrators' Views on the Concept of Leadership

Themes	N	%
Open to innovation, understanding, fair, and trustworthy	6	13.3
Able to solve problems and demonstrate empathy	13	28.9
Visionary	8	17.8
Able to provide direction	20	44.4
Motivation-oriented	11	24.4
Ability to influence and inspire	15	33.3
Possessing team spirit and effective communication skills	16	35.6
Creating a collaborative environment and being familiar with the group	7	15.6
Taking initiative and serving as a role model	13	28.9
Eliciting respect and admiration; wise	9	20.0
Establishing and managing new structures	11	24.4
Possessing task management skills and a sense of responsibility	7	15.6
Self-confident and providing guidance	12	26.7

An examination of Table 2 reveals that school administrators' perceptions of the concept of leadership are multidimensional. The highest proportion of participants (n = 20) defined leadership as the ability to provide direction. This finding indicates a strong perception of leadership as a guiding and decision-making process. Following this, 35.6% of the participants stated that a leader should possess team spirit and effective communication skills, emphasizing that effective leadership gains meaning within a collective structure.

Table 3. Evaluation of School Administrators' Views on the Concept of Technological Leadership in the 21st Century

Themes	n	%
Encouraging the use of technology	10	22.2
Adapting to technological developments	6	13.3
Use of and proficiency in technology	8	17.8
A fundamental leadership type of the 21st century	6	13.3
Guiding technology use, following innovations, and self-development in technology	11	24.4
Supporting teachers through in-service training	7	15.6
Using technology accurately and effectively, possessing technological knowledge	17	37.8
Integration of technology into educational processes and administration	6	13.3
Utilizing technology in administration	7	15.6
Providing vision and infrastructure for the integration of education and technology	9	20.0
Lack of knowledge regarding the concept of technological leadership	7	15.6

According to Table 3, the participants evaluated the concept of technological leadership within a multidimensional framework. It is understood that the competency of "using technology accurately and effectively and possessing technological knowledge" was identified as the core element of technological leadership by the highest proportion of participants. In this context, technological leadership can be said to be associated with having technological knowledge and the ability to use technology consciously and purposefully. Moreover, by emphasizing dynamics such as guiding technology use, following innovations in the field, and continuous self-development, the participants defined technological leadership as a developmental process. Accordingly, technological leadership is perceived not as a concept limited to existing knowledge, but as a process that requires continuous improvement and guidance.

Table 4. Evaluation of School Administrators' Views on Technological Leadership Self-Efficacy

Themes	n	%
Guiding educational technologies	12	26.7
Using basic computer skills and smart devices	16	35.6
Using technology in administrative tasks and MoNE correspondence	23	51.1
Using technology in communication groups and the institution's social media sharing	7	15.6
Experiencing difficulty in keeping up with technological developments	9	20.0
Need for self-improvement in technology	6	13.3

According to Table 4, a large proportion of the participants stated that they can use technology effectively in administrative procedures and official correspondence, and it is also evident that perceptions of self-efficacy related to basic computer use and the use of smart devices are widespread. However, self-efficacy perceptions appear to be more limited in areas that require pedagogical leadership, such as guiding the use of educational technologies. Another group of participants reported using technology in social media and communication groups; however, this use can be considered relatively superficial. In addition, the presence of participants (20%) who reported difficulties in keeping up with technological developments, along with those who expressed a need for self-improvement, indicates that school administrators are aware of their competencies in this area but require support and training. This situation highlights the importance of systematic professional development programs for administrators in order to transform technological leadership competencies into institutional capacity.

Table 5. Evaluation of Administrative Perceptions Regarding the Adequacy of Schools' Technological Infrastructure and Equipment

Themes	n	%
Those who believe it is adequate	6	13.3
Those who believe it is not adequate	18	40.0
Lack of smart boards and internet connectivity problems	33	73.3
Insufficiency of technological infrastructure	16	35.6
Insufficient educational technologies	14	31.1
Availability of basic equipment	12	26.2
Appropriateness for the century we live in	9	20.0

According to Table 5, the majority of the participants stated that the technological infrastructure and equipment of the schools in which they work are not at the required level. In contrast, another group of participants considered the infrastructure to be adequate. A lack of smart boards and problems with internet connectivity were reported by a large proportion of the participants. In addition, insufficiencies in technological infrastructure and educational technologies were frequently expressed by the participants.

Table 6. Evaluation of School Administrators' Views on Technological Leadership Behavioral Characteristics

Themes	n	%
Open to innovations	21	46.7
Visionary	13	28.9
Guiding teachers and directing the group toward technology	20	44.4
Following technological developments	17	37.8
Willing to learn and conduct research	17	37.8
Using technology effectively	12	26.2
Effective communication and strong persuasive skills	4	8.9
Generating budgetary resources	4	8.9

As shown in Table 6, the participants stated that school administrators, as technological leaders, demonstrate behaviors such as being open to innovations, guiding teachers, and directing the group toward the use of

technology. While describing the behavioral characteristics of school administrators, the participants also emphasized behaviors such as following technological developments and being willing to learn and engage in research.

Table 7. Evaluation of School Administrators' Views on the Relationship Between Information Technology Infrastructure and Technological Leadership

Themes	n	%
Positive impact	18	40.0
No impact	13	28.9
Negative effects of technological infrastructure	4	8.9
Increasing administrators' motivation	3	6.7
Providing opportunities to demonstrate technological leadership roles	8	17.8

According to Table 7, a large proportion of the participants stated that information technology infrastructure contributes positively to school administrators' technological leadership. However, another group of participants reported that the existing infrastructure has no effect. Participants also expressed that the current infrastructure of schools provides administrators with opportunities to demonstrate their technological leadership roles. Overall, the findings indicate that information technology infrastructure has multidimensional effects on school administrators' technological leadership. Among the participants, the view that technological infrastructure contributes positively to administrators' ability to perform their leadership roles effectively was widely expressed. This suggests that infrastructure offers administrators opportunities to use technology and provide guidance, thereby strengthening technological leadership behaviors. On the other hand, some participants perceived information technology infrastructure as ineffective, indicating the presence of differing perceptions related to the quality of infrastructure or the ways in which it is utilized.

Table 8. Evaluation of School Administrators' Views on the Relationship Between Schools' Socioeconomic Status and Technological Leadership

Themes	n	%
Positive impact	18	40.0
Negative impact	14	31.1
No impact	13	28.9

An examination of Table 8 shows that participants offered differing evaluations regarding the relationship between a school's socioeconomic status and school administrators' technological leadership. Some of the school administrators participating in the study stated that socioeconomic status has a positive effect on technological leadership. Conversely, others indicated that a low socioeconomic level of the school negatively affects technological leadership. A considerable proportion of participants, however, reported that socioeconomic status does not affect technological leadership. Overall, these findings suggest that a school's socioeconomic status may influence school administrators' perceptions and practices of technological leadership in different ways.

Table 9. Evaluation of School Administrators' Recommendations for Expanding the Use of Educational Technologies in Teaching

Themes	n	%
Increasing budget allocation by the MoNE	17	37.8
Resolving internet connectivity problems	5	11.1
Organizing practical technology training for teachers and administrators	29	64.4
Providing equal technological equipment to schools by the MoNE	11	24.4
Addressing infrastructural deficiencies	14	31.1
Establishing cooperation with the private sector	2	4.4
Including a computer course in the primary school curriculum	2	4.4
Establishing an IT unit within schools	5	11.1
Creating an educational technology sharing platform by the MoNE	6	13.3

Themes	n	%
Enhancing teacher motivation	5	11.1

According to Table 9, school administrators put forward various recommendations aimed at promoting the more widespread and effective use of educational technologies in teaching. A large proportion of the participants considered the organization of practical technology training programs for teachers and administrators to be necessary, and this recommendation constituted the majority of the responses. When examining the views ranked second in frequency, participants emphasized increasing the budget allocated to schools by the Ministry of National Education and addressing infrastructural deficiencies. Overall, the findings indicate that administrators primarily prioritize the organization of practical technology training for teachers and administrators, perceiving this as a fundamental requirement for the effective use of educational technologies. In addition, the need for structural support, such as budget increases, the elimination of infrastructural deficiencies, and the provision of equal technological equipment to schools, is strongly emphasized. Furthermore, recommendations related to establishing IT units within schools and creating educational technology sharing platforms point to the importance of strengthening systematic support mechanisms through technological infrastructure and collaborative models.

DISCUSSION

The research findings indicate that school administrators working in the TRNC have multidimensional perceptions of the concept of leadership. It is observed that the majority of participants emphasized the ability to provide direction when defining leadership. This finding is consistent with Özden's (2006) definition of leadership as "the ability to influence followers and guide and direct them toward achieving a specific goal."

It is understood that school administrators in the 21st century regard the competency of "using technology accurately and effectively" as the core element of technological leadership. The findings obtained from this study are consistent with those reported in the literature. In his study, Can (2007) emphasized that a technology leader is an individual who uses technology correctly while mobilizing the capacities of employees. Similarly, Özmen (2022), in his study examining the technological leadership roles expected by teachers from school principals, concluded that the majority of participants emphasized the roles of effectively using technology and possessing technological knowledge.

On the other hand, it is observed that school administrators tend to evaluate their technological leadership self-efficacy positively, primarily due to their effective use of technology in administrative tasks. A large proportion of the participants stated that they can use technology effectively in administrative procedures and official correspondence, and that perceptions of self-efficacy related to basic computer use and smartphone use are also widespread. This finding is consistent with the results reported by Ölez and Kılıçoğlu (2018). In their study, Ölez and Kılıçoğlu (2018) indicated that school administrators generally use technology actively in correspondence with the relevant ministry of education. Participants also reported that they effectively utilize the internet and telephones for communication with authorities on behalf of their institutions. However, according to the study titled *Teachers' Perceptions of School Principals' Technological Leadership* conducted by Erden and Erden (2007) in the TRNC, it was concluded that school principals' technological leadership competencies were not perceived as high by teachers. This finding differs from the results of the present study.

According to the research findings, the majority of school administrators' perceptions of technological leadership behavioral characteristics are concentrated on being open to innovations, guiding teachers in the use of technology, and directing the group toward technology. This result is consistent with findings reported in the relevant literature. Yahşi (2020) defines the core components of effective technological leadership as knowing how to use technology to enhance learning processes, developing strategies to support teachers' technology integration, and establishing a technology team and support system within the institution to promote the sustainable use of technology.

Results and Conclusions

In this study, school administrators working in primary schools in the TRNC defined the concept of leadership primarily in terms of the ability to provide direction and guidance, while they largely explained the concept of technological leadership through the competency of "using technology accurately and effectively" and possessing technological knowledge. The findings also indicate that participants feel confident in using everyday technological tools at a basic level and that they tend to use technology mainly for administrative tasks and official correspondence.

It was concluded that the majority of school administrators consider the existing technological infrastructure and equipment to be inadequate. In particular, the limited number of smart boards and problems with internet connectivity emerged as key factors hindering the effective use of technology in educational processes.

With regard to school administrators' perceptions of technological leadership behaviors, characteristics such as being open to innovations, guiding teachers in the use of technology, and directing the group toward technology were found to be particularly prominent.

It is observed that information technology infrastructure in schools has multidimensional effects on school administrators' technological leadership. While a large proportion of participants stated that the existing technological infrastructure serves a supportive function for administrators' technological leadership roles, some administrators expressed the view that the information technology infrastructure is inadequate or ineffective.

Notable findings were also obtained regarding the impact of socioeconomic status on technological leadership. Some administrators stated that a school's high socioeconomic level positively supports technological leadership practices, noting that greater resources and opportunities provide advantages in adopting technology and pursuing innovative practices. In contrast, there are views indicating that in schools with a low socioeconomic level, technological leadership activities are constrained due to limited resources, infrastructural deficiencies, and insufficient support. Nevertheless, some participants argued that socioeconomic status is not a determining factor, suggesting that leadership attitudes and competencies can develop independently of context or be supported through alternative means.

The participants within the scope of the study primarily consider the organization of practical technology training programs for teachers and school administrators to be necessary. In addition, administrators emphasize the importance of structural support, including increasing budget allocations, addressing infrastructural deficiencies, and ensuring the provision of equal technological equipment to schools.

Recommendations

Practical Recommendations for Implementation

- It is recommended that regular, practical, and up-to-date technology training programs be organized for school administrators. These programs should aim to develop not only administrators' technical skills but also their competencies in the pedagogical and strategic use of technological tools.
- It is recommended that all schools be provided with technological infrastructure under equal conditions and in line with contemporary requirements, and that solutions be developed to address internet connectivity problems and the shortage of smart boards.
- It is recommended that school administrators support technology integration in both administrative and pedagogical contexts and serve as role models for teachers in the effective use of technology.
- In addition to providing hardware to enable school administrators to use technology effectively, it is recommended that technical support and consultancy services be offered in schools to ensure the efficient use of this infrastructure.
- In order to enhance school administrators' technological leadership roles, it is recommended that a comprehensive strategic plan be developed within the Ministry of National Education of the TRNC. This plan should include provisions for equity in technology use, continuous professional development, and infrastructural improvements, and should be supported by monitoring and evaluation mechanisms.

Recommendations for Future Research

- It is recommended that quantitative and mixed-methods studies be conducted to examine the relationship between school administrators' and teachers' technological leadership skills.
- Future studies may compare the technological leadership competencies of school administrators who have participated in in-service training programs on current technological developments and educational technologies with those who have not participated in such training.
- To evaluate the effects of technological leadership in educational settings from a broader perspective, it is recommended that similar studies be conducted with the participation of teachers and students.

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