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Research Article

THE RELATIONSHIP BETWEEN SCHOOL ADMINISTRATORS' DIGITAL LEADERSHIP PRACTICES AND TEACHERS' ENTREPRENEURIAL BEHAVIOUR

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Abstract

Digital transformation, which lies at the centre of Industry 4.0, has brought artificial intelligence and innovation to the fore and necessitated school administrators and teachers to acquire new leadership styles and various skills. Within this framework, the present study was conducted to examine the effect of administrators' digital leadership practices on teachers' entrepreneurial behaviours. A quantitative research design was used, and data were collected using the 'Digital Leadership Scale' and the 'Entrepreneurial Teacher Behaviour Scale'. The study group consisted of 360 teachers working in the Şehitkamil district of Gaziantep, Turkey. Data analysis was performed using descriptive statistics, correlation, and regression methods. The findings revealed a moderate, positive, and significant correlation between digital leadership and entrepreneurial behaviour. Digital leadership explains 31% of the variance. The findings indicate that administrators' digital leadership encourages teachers' entrepreneurial behaviour, enhances educational quality, and creates a school culture that supports innovation and change.

Keywords: Digitalisation, digital leadership, entrepreneurship, entrepreneurial behaviour.

OKUL YÖNETİCİLERİNİN DİJİTAL LİDERLİK UYGULAMALARI İLE ÖĞRETMENLERİN GİRİŞİMCİLİK DAVRANIŞI ARASINDAKİ İLİŞKİ

Öz

Endüstri 4.0'ın merkezinde yer alan dijital dönüşüm, yapay zekâ ve yenilikçiliği öne çıkararak eğitim kurumlarında yöneticiler ve öğretmenler için yeni liderlik biçimleri ile farklı beceriler geliştirmeyi gerekli kılmıştır. Bu bağlamda çalışmanın amacı, okul yöneticilerinin dijital liderlik uygulamalarının öğretmenlerin girişimcilik davranışı üzerindeki etkisini ortaya çıkarmaktır. Araştırmada nicel araştırma yaklaşımlarından tarama modeli kullanılmıştır. Araştırma verileri "Dijital liderlik" ölçeği ve "Girişimci öğretmen davranışları" ölçeği ile toplanmıştır. Araştırmanın

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çalışma grubu, Gaziantep ilinin Şehitkamil ilçesinde görev yapan 360 öğretmenden oluşmaktadır. Verilerin analizinde, betimsel istatistikler, korelasyon analizi ve regresyon analizi kullanılmıştır. Elde edilen sonuçlara göre okul yöneticilerinin dijital liderlik uygulamaları ile öğretmenlerin girişimcilik davranışları arasında korelasyon değerine göre orta düzeyde, pozitif yönlü ve anlamlı bir ilişki bulunurken, girişimci öğretmen davranışındaki varsaysın %31'i dijital liderlik uygulamaları tarafından açıklanmaktadır. Araştırma bulgularından hareketle, okul müdürlerinin dijital liderlik uygulamalarının öğretmenlerin girişimci davranışlar sergilemelerine katkılar sağlayarak eğitimde kalitenin artılmasına, okul kültüründe yenilikçiliği ve değişimi teşvik eden bir atmosferin oluşturulmasına etki edebileceği söylenebilir.

Anahtar Sözcükler: Dijitalleşme, dijital liderlik, girişimcilik, girişimcilik davranışı.

Introduction

In today's world, the concept of digitalization has emerged as a result of technological advancements and the recording of numerous data into databases. Particularly, the widespread use of information and communication technologies (ICT) has made the rapid and secure access to data a necessity, driving the digitalization process. With digitalization, many traditional methods have been transformed, leading to more functional approaches and fundamentally altering the operations of many societal institutions. Given the current conditions, finding an area untouched by technology and digital transformation. Although this transformation can sometimes seem uncontrollable and intimidating, it is also a source of hope in terms of the benefits it provides (Küçükali & Coşkun, 2021).

Digitalization can be defined as the reconfiguration of traditional business processes, services offered, and products obtained using digital technologies in line with contemporary conditions. As Sürer (2020) pointed out, concepts such as place, time, ego, personality, production, consumption, and communication have ceased to be personal values and have started to be reshaped through digitalization. Especially since the 2000s, all elements of social life have become digitalized, making it possible to say that digitalization has influenced human life to the extent of creating dependency (Değirmencioğlu, 2016, s. 592). When the beneficial aspects of the digitalization process are considered, they can be seen as supportive for effectiveness in organizational life. As a significant part of social life, educational organizations must integrate digitalization into instructional, managerial. All other organizational processes (Taşkıran, 2017, s. 93). When examining developed countries, it is evident that with the digitalization of educational processes, the traditional understanding of education has been replaced by the innovations brought by digitalization, altering the roles and responsibilities assigned to teachers, administrators, and even students. From this perspective, leadership behaviors that will guide digital transformations come to the forefront. Education administrators are expected not only to have the ability to use technology effectively but also to exhibit digital leadership to the teachers they work with. Sheninger (2014) defines digital leadership as a dynamic combination of mindset, behaviors, and skills employed to transform and enhance school culture through the use of technology. In this context, digital leaders are expected to shape school culture by leveraging technological innovation and to utilize Web 2.0 technologies as tools to enhance their leadership capacities and professional practices. Although there are different views on the definition of digital leadership in the literature, the definitions of digital leadership emphasize the transformation of leaders in the direction of the use of technology, the

digitalization of the organization, and the recombination of learning in a hybrid and remote manner (Aydın, 2022). Zeike, Bradbury, Lindert, and Pfaff (2019, s. 2) emphasized that digital leadership can be evaluated in two dimensions. The first one covers skills and behaviors such as digital literacy and digital competencies, while the other one is high leadership competencies that include managing digital transformation. In addition to these, when the dimensions of digital leadership for managers of educational institutions are classified, three dimensions such as "digitalization", "digital transformation", distance and hybrid learning draw attention. Digitalization is a concept that requires determining new methods and strategies due to the inadequacy of many gains such as knowledge, skills, policies, methods, and strategies that institutions have brought from the past in today's conditions (Telli Yamamoto & Kalaç, 2018, s. 221). Digital transformation refers to the changes experienced in relation to the application of digital technologies in the whole life of human beings. It is also a process that covers areas such as organizational culture, services, functions, business models, business processes, organizational ecosystem, partnerships, and all stakeholders of the organization (Çelen, 2020, s. 449). In order to ensure the digital transformation of the school, the leader should ensure the digital maturity of the school with a digital vision and strategy, and then take on a role that initiates the management by placing followers, technology offerings, participation model, structure and business model on the way to realize this vision (Özmen, Eriş & Süral Özer, 2020, s. 63). On the other hand, distance and hybrid education is an education model that has emerged as a result of the increasing role of digital technologies in today's education systems and the radical changes in teaching methods. The emergence of distance and hybrid education models has gained momentum, especially during the COVID-19 pandemic (Aydın, 2022). While both models make the learning process more flexible, accessible and individualized, they also create new responsibilities in terms of instructional design, assessment methods and teacher competencies (Hrastinski, 2019). In this context, it has become an important requirement for school principals to have digital leadership skills such as motivating teachers in digital environments, monitoring and evaluating online processes, and digital planning in order to effectively manage distance and hybrid education processes. Because digital leaders are individuals with high-level thinking skills, intellectual intelligence, and deep digital knowledge. The increased interaction between education and digital platforms has further highlighted the importance of digital leadership (Tutar & Güler, 2022). The inclusion of ICT in educational institutions and the emergence of technological transformation in school environments together with leaders has become a significant aspect of the educational systems in developing countries. The emergence of concepts such as technological materials and digitalized classroom management practices thanks to digital leaders underscores the importance of the efforts of school principals to become digital leaders. Thus, the question of how school principals, expected to be digital leaders, lead and manage this process gains importance (Aksal, 2015). In this context, it is necessary to examine the characteristics of digital leaders. In a comprehensive literature review by Klenin (2020), the characteristics a digital leader should possess are categorized under three main headings: digital business, general mindset, and social attitude. According to Toduk and Gande (2016), the characteristics of digital leaders are as follows:

1. Innovation / entrepreneurship capability,
2. Possession of digital competencies,
3. Establishing a developed business network and exhibiting a collaborative approach,

4. Ensuring participation in the vision.

According to Raza (2016), the characteristics digital leaders should possess are:

1. Technical competencies and entrepreneurial leadership skills,

2. Emphasis on personal development and accountability,

3. Collaborative attitude, collective leadership, and interpersonal relationship skills,

4. Innovation, conceptual skills, and critical thinking abilities.

From all classifications, it can be concluded that digital leadership is a type of leadership that supports entrepreneurship, gathers colleagues around a common vision, possesses a collaborative attitude, and has innovative thinking skills. Therefore, for the future success of the school and teachers, it is necessary for school principals, as digital leaders, to create and develop a technology-based school culture. As school leaders keep up with the new era and become proficient in developing technology, they will enhance managerial success within the school. Entrepreneurial teachers are the ones who will support leaders in this direction (Akyürek & Göktaş, 2023). Considering 21st-century skills, entrepreneurship is the first attribute desired for students to acquire. This skill, included as an interdisciplinary gain in plans at all levels, has been incorporated into the curricula (Köstekçi, 2016). As educating individuals with 21st-century skills becomes a goal of education systems, reaching everyone in society, moving beyond traditional methods, and using new instructional methods that exhibit entrepreneurial characteristics gain importance (Özdemir & Göztürk, 2023). At this point, questions arise: Is entrepreneurship acquired later, or are these elements inherent in one's personality? Aytaç (2006) notes that this has been a topic of debate for many years, emphasizing that entrepreneurial characteristics come from personality and that psychological traits are dominant. There are two different views in the field regarding entrepreneurship as either an innate or acquired characteristic. Those who argue that it is an innate characteristic define entrepreneurial individual traits as risk-taking, achievement motivation, and locus of control, while those who argue that it is acquired emphasize the significant influence of social experiences and cultural traditions (Aytaç, 2006). Yüksel, Cevher, and Yüksel (2015) list the characteristics of entrepreneurial individuals as: inclination to teamwork skills, openness to change, being visionary, efficient use of time, consistency, innovative thinking ability, effective communication skills, and passion for their work. Van Dam, Schipper and Runhaar (2010, s. 968) suggest that entrepreneurial behaviour is not merely a result or tendency, but rather a multidimensional and dynamic process consisting of three fundamental components. These components are, in order, recognising opportunities, taking initiative and managing risk. The first component, recognising opportunities, refers to the ability to analyse developments and needs in one's environment, identify opportunities that have the potential to create value or bring about change in the current situation, and recognise the existence of these opportunities. This is directly related to the individual's sensitivity to both internal and external stimuli and their innovative perspective. The second component, taking initiative, encompasses the individual's voluntary, proactive, and self-motivated behaviour in transforming these opportunities into concrete action, rather than merely recognising them. In this process, the individual acts without the need for external guidance and plans and takes the first steps to bring the entrepreneurial idea to life. The third and final element, risk management, involves consciously and deliberately taking risks, being aware of the uncertainties and potential losses

that are inevitable in the entrepreneurial process. This dimension reflects the individual's ability to think strategically and take precautions to minimise negative outcomes. Therefore, we can say that this tripartite structure demonstrates that entrepreneurial behaviour is not merely a response to opportunities, but also encompasses the comprehensive ability to evaluate these opportunities and manage the risks that may be encountered. These traits suggest that entrepreneurial individuals adapt quickly to contemporary technology and turn situations to their advantage. Additionally, due to their high communication skills, they are sought after by their surroundings. In the context of educational organizations, the importance of teachers having entrepreneurial traits is highlighted as it facilitates innovative attitudes and is crucial for both being entrepreneurial individuals and imparting entrepreneurial characteristics to students (Konokman, Yokuş & Yelken, 2016). Entrepreneurial teachers know the existing opportunities and pursue innovations to benefit both themselves and their institutions (Enterprise and Entrepreneurship Education, 2018). In the Turkish Qualifications Framework (TYÇ), "initiative-taking and entrepreneurship" is listed as a competency in the curricula (MEB, 2018). To impart this competency, digital leaders and teachers with an entrepreneurial spirit are needed. Similarly, the OECD's "Future of Education and Skills: Preparing for 2030" project emphasizes that future individuals need creative thinking, the ability to offer new products and services, develop new jobs, processes, and methods, and possess divergent thinking abilities. Hence, it is essential for school administrators, as digital leaders, and entrepreneurial teachers to collaborate in achieving the necessities of the era in school management. Integrating new technologies into educational processes to enhance efficiency and effectiveness requires entrepreneurial teacher behaviors and digital leadership in schools (Akyürek & Göktaş, 2023). This is because entrepreneurial teacher behaviour refers to an innovative and open-minded attitude that includes elements such as recognising opportunities, taking proactive action and managing risks. For this reason, school administrators' leadership practices based on digital technologies can increase teachers' motivation to contribute new ideas to the teaching and learning process, develop creative solutions to problems and question existing practices. It is believed that possessing digital leadership characteristics, which are among the leadership skills sought after in today's conditions, such as agile leadership and empowering leadership, can also influence teachers' entrepreneurial behaviour (Baydar, 2023). The literature on digital leadership practices and teacher entrepreneurship indicates that studies in this area are new and limited. However, it is evident that digitalization in school management and the use of artificial intelligence in organizations are significant in the era of digital transformation. Likewise, teachers need to possess entrepreneurial traits to adapt to the digital age, organize their lessons, attainments, and classroom management accordingly. The importance of these concepts, which are quite popular in addressing students born into the digital age, is increasing. This study aims to contribute to the field. Within this framework, the study seeks to determine whether school administrators' digital leadership practices affect teachers' entrepreneurial behavior.

The study aims to answer the following questions:

1. What are the levels of teachers' perceptions of school administrators' digital leadership?

2. What are the levels of teachers' perceptions of entrepreneurial behavior?

3. Is there a significant relationship between teachers' perceptions of digital leadership and their entrepreneurial behaviors?

4. Are teachers' perceptions of digital leadership significant predictors of their entrepreneurial behaviors?

1. Method

1.1. Research Model

The research is a survey model research in order to determine the relationship between two variables and the effect of the variables on each other. The survey method, which is a macro-social field research, is a research that makes it possible to analyse more than two variables at the same time and to obtain explanatory and descriptive information according to the results of the analysis (Baloğlu, 2009, s. 71). A survey model was used in the research in order to reveal the relationship between the two variables.

1.2. Population-Sample

The population of the study consists of primary school teachers working in the Şehitkamil district of Gaziantep province. According to data from the Gaziantep Provincial National Education Directorate for 2023-2024, there are 3393 teachers working in the Şehitkamil district. In determining the sample size, Yazıcıoğlu and Erdoğan's (2004, s. 40) population-sample calculation for .95 and .05 error margin rules were taken into account. According to this calculation, if the population size is up to 5000, a sample size of 357 is considered sufficient. In this context, 360 teachers were selected for the study using a convenient sampling method. Demographic information about the participants is provided in Table 1.

Table 1: Findings Related to Demographic Variables of The Participants (n=360)

Variable	Grup	N	%
Gender	Female	230	63.9
	Male	130	36.1
Age	20-30	126	32.4
	31-40	162	41.6
	41-50	68	17.5
	51-60	4	1.0
Level of education	Undergraduate	332	92.2
	Postgraduate	28	7.8

A total of 360 teachers, 230 (63.9%) female and 130 (36.1%) male, participated in the study. 126 (32.4%) of the participants were between the ages of 20-30, 162 (41.6%) between 31-40, 68 (17.5%) between 41-50, and 4 (1%) between 51-60. According to the level of education, 332 (92.2%) of the participants were undergraduate graduates and 28 (7.8%) were postgraduate graduates.

1.3. Data Collection Process

The research permission of the study was approved by Gaziantep University Social and Human Sciences Ethics Committee with the document date and number 12.01.2024-438177. Following the research permission, scales appropriate to the research topic were determined, reproduced, and data was collected face-to-face from primary schools in the Şehitkamil district, taking into account ease of acc

1.4. Data Collection Tools

The research data were collected with "Digital Leadership Scale" and "Entrepreneurial Teacher Behaviours Scale".

Digital Leadership Scale: The scale developed by Aydın (2022) consists of 28 items and 3 sub-dimensions as "Digitalisation", "Digital transformation" and "Distance and hybrid learning". The Cronbach's alpha value of the original scale varies between .89-.92 on dimension basis and the value of the overall scale is .94. Within the scope of this study, it was found as .87 for the first sub-dimension, .93 for the second sub-dimension, .87 for the third sub-dimension and .95 for the overall scale.

Entrepreneurial Teacher Behaviours Scale: The scale developed by Van Dam et al. (2010) and adapted into Turkish by Akkaya and Çetin (2022) consists of 13 items and 3 sub-dimensions as "Recognising opportunities", "Taking initiative" and "Risk taking". While the Cronbach's alpha value of the original scale varies between .71-.87 on dimension basis, the overall value of the scale is .86. Within the scope of this study, it was found as .86 for the first sub-dimension, .82 for the second sub-dimension, .80 for the third sub-dimension and .90 for the overall scale.

1.5. Data Analysis

Firstly, in order to determine the suitability of the data for analysis, outliers were checked by Mahalanobis analysis and it was determined that there were no outliers. Then multicollinearity assumptions were then tested. In this context, tolerance (TV), variance increase factor (VIF) and condition index (CI) values were analysed and it was concluded that the values were within normal limits. According to the results found that TV= .59>.01, VIF= 1.67<10 and CI= 6.50<30. These results show that there is absence of multicollinearity problem. In descriptive statistics of the variables; arithmetic mean, standard deviation and percentage calculations were made. To determine the relationship, Pearson correlation analysis was made. In addition, multiple hierarchical regression analyses were conducted to reveal the effect between the predictor variables and the predicted variable.

2. Findings

The findings related to the first sub-problem, "What are the levels of teachers' perceptions of school administrators' digital leadership practices?" are presented in Table 2.

Table: 2 Descriptive Statistics of The Digital Leadership Scale

Dimensions	$\bar{X}$	**Ss**
Digitalization	3.16	.87
Digital Transformation	3.09	.81
Distance and Hybrid Learning	3.11	.98
Overall Digital Leadership	3.11	.79

As seen in Table 2, it is observed that teachers generally perceive the digital leadership of school administrators to be at a moderate level ($\bar{X}$=3.11). When analyzed by dimensions, it appears that school administrators are perceived as more competent in the digitalization dimension ($\bar{X}$=3.16) compared to other sub-dimensions. This is followed by the dimensions of distance and hybrid learning ($\bar{X}$=3.11) and digital transformation ($\bar{X}$=3.09).

The findings related to the second sub-problem of the study, "What are the levels of teachers' perceptions of entrepreneurial behaviors?" are presented in Table 3.

Table 3: Descriptive Statistics of The Entrepreneurial Teacher Behaviors Scale

Dimensions	$\bar{X}$	**Ss**
Recognizing Opportunities	3.02	.76
Taking Initiative	2.92	.68
Taking Risks	3.14	.71
Overall Entrepreneurial Teacher Behaviors	3.02	.62

As seen in Table 3, it is evident that the arithmetic mean and standard deviation values concerning the sub-dimensions and overall entrepreneurial teacher behaviors are presented. Overall, teachers indicated that they possess a moderate level of entrepreneurial behavior ($\bar{X}$=3.02). Among the sub-dimensions of entrepreneurial behavior, the risk-taking behavior received the highest score from teachers ($\bar{X}$=3.14), followed by recognizing opportunities ($\bar{X}$=3.02) and taking initiative ($\bar{X}$=2.92).

The findings related to the third sub-problem of the study, "Is there a significant relationship between teachers' perceptions of digital leadership practices and their entrepreneurial behaviors?" are presented in Table 4.

Table 4: Digital Leadership and Entrepreneurial Behavior Scale Binary Corelation Matrix

Dimensions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1.Recognizing Opportunities	1							
2.Taking Initiative	.63**	1						
3.Taking Risks	.53**	.67**	1					
4.Overall Entrepreneurial Behavior	.83**	.90**	.84**	1				
5.Digitalization	.40**	.37**	.37**	.44	1			
6.Digital Transformation	.46**	.44**	.39**	.50	.78**	1		
7.Distance and Hybrid Learning	.55**	.58**	.51**	.64	.63**	.78**	1	
8.Overall Digital Leadership	.40**	.49**	.44**	.56**	.86**	.97**	.85**	1

*** p < .01.*

As seen in Table 4, positive relationships between digital leadership and the dimensions of entrepreneurial behavior are observed. Dancey and Reidy (2007) state that a value of up to .30 on the inter-variable correlation coefficient indicates a weak relationship, a value between .40 and .60 indicates a moderate relationship, and a value between .70 and 1.00 indicates a strong relationship. According to there is a positive and weak relationship between overall entrepreneurial behavior and the digitalization sub-dimension of digital leadership (r=.44, p<.01), a positive and moderate relationship with the digital transformation sub-dimension (r=.50, p<.01), and a positive and moderate relationship with the distance and hybrid learning sub-dimension (r=.64, p<.01). Regarding overall digital leadership and the sub-dimensions of entrepreneurial behavior, there is a positive and weak relationship with the recognizing opportunities sub-dimension (r=.40, p<.01), a positive and moderate relationship with the taking initiative sub-dimension (r=.49, p<.01), and a positive and weak relationship with the taking risks sub-dimension (r=.44, p<.01). The highest relationship between the dimensions of both variables is observed between taking initiative and distance and hybrid learning (r=.58, p<.01). Additionally, there is a positive and moderate relationship between the overall perceptions of entrepreneurial behavior and overall digital leadership perceptions (r=.56, p<.01). This suggests that as participants' perceptions of digital leadership increase, their entrepreneurial behaviors also increase.

The findings related to the fourth sub-problem of the study, "Are teachers' perceptions of digital leadership a significant predictor of entrepreneurial behaviors?" obtained from the regression analysis, are presented in Table 5.

Table 5: Hierarchical Multiple Regression Analysis of Variables

Predictor Variable	Predicted Variable	ß	ShB	β	t	p	F	p	R	R^2
Constant	Recognizing opportunities	1.56	.17		8.81	.00	33.00	.00*	.56	.30
Digitalization		.07	.08	.08	.92	.35				
Digital Transformation		.00	.10	.00	.03	.97				
Distance and Hybrid Learning		.39	.07	.50	5.50	.00				
Constant	Taking initiative	1.67	.15		10.77	.00	37.32	.00*	.58	.33
Digitalization		.02	.07	.03	.33	.73				
Digital Transformation		-.04	.09	-.05	-.49	.62				
Distance and Hybrid Learning		.42	.06	.06	6.80	.00				
Constant	Risk-taking	1.94	.17		11.47	.00	26.56	.00*	.52	.26
Digitalization		.11	.07	.13	1.43	.15				
Digital Transformation		-.10	.10	-.12	-1.05	.29				
Distance and Hybrid Learning		.38	.06	.52	5.56	.00				
Constant	Overall entrepreneurial behavior	1.76	.10		16.38		152.22	.00*	.64	.41
Distance and Hybrid Learning		.40	.03	.64	12.33	.00				
Constant	Overall entrepreneurial behavior	1.66	.14		11.73		99.11	.00*	.56	.31
Digital leadership practices		.43	.04	.56	9.95	.00				

**p<.01*

As seen in Table 5, the extent to which the three sub-dimensions of digital leadership practices predict the "recognizing opportunities" sub-dimension of entrepreneurial teacher behavior was analyzed using the enter method. Collectively, the three variables account for 30% of the variance in the "recognizing opportunities" dimension ($F=33.00$; $p < .01$). Among these, the "distance learning and hybrid" sub-dimension exerts the most significant and relative impact on the "recognizing opportunities" sub-dimension ($\beta = .50$, $t = 5.50$; $p < .01$). Additionally, the three sub-dimensions of digital leadership practices explain 33% of the variance in the "taking initiative" dimension of entrepreneurial teacher behavior ($F=37.32$; $p < .01$), with the "distance learning and hybrid" sub-dimension again showing the most significant and relative effect ($\beta = .06$, $t = 6.80$; $p < .01$). Conversely, the three sub-dimensions of digital leadership practices account for 26% of the variance in the "taking risks" dimension ($F=26.56$; $p < .01$), where the "distance learning and hybrid" sub-dimension demonstrates the most significant and relative impact ($\beta = .52$, $t = 5.56$; $p < .01$). When the three sub-dimensions of digital leadership practices are included in the analysis using the stepwise method, only the "distance and hybrid learning " sub-dimension significantly predicts entrepreneurial teacher behavior. The "distance and hybrid learning " sub-dimension explains 41% of the overall entrepreneurial teacher behavior ($F=152.22$; $p < .01$). Finally, digital leadership practices account for 31% of the variance in the dependent variable, entrepreneurial teacher behavior ($F=99.11$; $p < .01$). The beta coefficient for the independent variable included in the regression model is .56 ($p < .01$). Thus, digital leadership practices have a significant effect on entrepreneurial behavior, given that $p < .00$.

3. Conclusion, Discussion, and Recommendations

This study examined the impact of school administrators' digital leadership practices on teachers' entrepreneurial behaviors. The findings indicate that digital leadership practices positively influence teachers' entrepreneurial behaviors. Based on the research results, digital leadership supports entrepreneurial characteristics in teachers such as recognizing opportunities, taking initiative, and taking risks. Sheninger also highlighted in his work how digital leadership can play a transformative role in education, supporting professional development and encouraging innovative thinking skills (Sheninger, 2014). Similarly, Blau and Shamir-Inbal (2017) examined the impact of digital competencies and long-term integration of information and communication technologies (ICT) on school culture, revealing that digital leadership promotes entrepreneurial behaviors among teachers, which in turn fosters positive changes in school culture. This finding corroborates the overall results of our research. When examining the school-based data-driven management action plans of the Ministry of National Education, the evolving responsibilities of school leadership become evident. These action plans emphasize the importance of school principals' abilities to use learning analytics systems and analyze data. Consequently, digital skills related to using and managing online platforms have come to the forefront for monitoring school development plans (Öz, 2020). In recent studies conducted by the Organisation for Economic Co-operation and Development (OECD, 2013), it has been emphasised that one of the fundamental objectives of education systems is to equip students, teachers and administrators with adequate digital literacy. It has also been noted that 18% of teachers need to develop more ICT (Information and Communication Technology) skills in the teaching process. These statements also emphasise the importance of digital leadership and entrepreneurship skills.

Currently, school administrators and teachers are confronted with a digital transformation. The pandemic and recent earthquakes, among other significant societal challenges, have underscored the necessity of digitalization, revealing the need to redesign the concept of schools and classrooms. Therefore, teachers and administrators face the critical task of reshaping educational environments. To effectively undertake this responsibility, they must possess entrepreneurial skills (Neto, Picanco, Campbell, Polega, & Ochsankehl, 2019). According to the findings obtained from the research data, it has been determined that teachers' levels of entrepreneurial behaviour are moderate. In particular, teachers perceive themselves as more competent in the sub-dimension of 'risk-taking.' This situation can be interpreted as meaning that teachers will not shy away from taking risks in order to adapt to changing conditions when appropriate conditions are provided. As Irge and Sen (2020) point out, individuals and institutions that can adapt to digital transformation and are not afraid to take risks can gain a competitive advantage. This is because rapid technological and structural transformations require the redefinition of the competencies that employees must possess. In this context, it can be said that teachers who exhibit entrepreneurial behaviour may be more willing and eager to make greater efforts to achieve the goals of the institution they work for, develop solution-oriented ideas and policies, and implement them. Another finding from the research is that teachers' perceptions of their school principals' digital leadership are at a moderate level. Based on this finding, we can say that school principals utilise information and communication technologies in managerial and educational processes and support teachers in this regard. Sağlam and Uçar (2022) also emphasise that, with the rapid development and change in technology in the 21st century, both institutions and students need to adapt to this

change in order to achieve success in schools, and they draw attention to the great importance of having school leaders who are constantly renewing themselves, creative and possess digital skills. Within the same finding, it was concluded that the most inadequate dimension in digital leadership practices is the 'digital transformation' dimension. Supporting this finding, Carretero, Vuorikari, and Punie (2017) stated that school leaders generally lack skills such as effective use of technology, technology production, innovative thinking, creating a technology-based vision, and guiding staff in line with this vision.

The Covid-19 pandemic, which has affected the entire world, has changed the perception of time and space in teaching processes, paving the way for the emergence and importance of distance and hybrid learning in educational institutions. Over the past six years, primarily due to the pandemic and the February 6 earthquakes in our country, the shift towards online and hybrid learning has accelerated, with alternative ICT-supported teaching practices becoming more widespread. The experiences gained from these events have opened new horizons for educational professionals, emphasizing the necessity of acquiring digital skills, innovative approaches, and entrepreneurial and digital leadership behaviors. The research findings, which analyze the relationship and impact between distance and hybrid learning and entrepreneurial behaviors, also support this assertion. Sadeghi (2019) and Tucker (2001) emphasise that individuals' educational demands have increased with the advancement of technology, but traditional educational methods have fallen short in meeting these needs and expectations. In this regard, as Sarı (2021) also points out, alternative methods that support traditional education are being researched in parallel with technological developments, and distance and hybrid learning models are being integrated into the structure of educational institutions. In this transformation process, the digital leadership skills of school principals and the entrepreneurial behaviour of teachers play a critical role. This is because digital leadership requires developing innovative solutions and transforming learning processes through the effective use of technology, while entrepreneurial behaviour enables teachers to take a more active role in leading change, taking risks, and implementing new ideas.

The Alpha generation, born into an era of information, communication, and rapidly changing technologies, possesses different skills and abilities compared to previous generations. This situation compels school administrators and teachers who will shape this generation to acquire unconventional skills. Consequently, new skill areas known as 21st-century teacher and administrator competencies have emerged. These skills include creativity, innovation, technology literacy, information literacy, and leadership, among others (Partnership for 21st Century Skills, 2008). As contemporary students are referred to as digital natives or digital immigrants (Palfrey & Gasser, 2008), there is a growing need for entrepreneurial teacher behaviors and school administrators with advanced digital leadership skills to guide and mentor them in accordance with 21st-century requirements. The recent findings of the study also support this argument, showing that digital leadership practices have a significant and positive effect on teachers' entrepreneurial behaviour. This finding shows that digital leadership practices support entrepreneurial characteristics such as innovation, risk-taking, opportunity evaluation, and proactive behaviour in educational environments. Similarly, Güleryüz, Sürücü, and Yıkılmaz (2023) also concluded in their corporate-level studies that digital leadership has a significant effect on internal entrepreneurship.

In conclusion, the findings of the present study reveal the positive impact of digital leadership practices on teachers' entrepreneurial behaviors. Various studies in the literature emphasize how digital leadership encourages teachers' innovative and entrepreneurial behaviors and the importance of digital tools and leadership strategies in this process. In this context, digital leadership can contribute to enhancing the quality of education by enabling teachers to become more entrepreneurial and fostering an atmosphere that encourages innovation and change within the school culture. Based on the findings of this research, the following recommendations are proposed:

1. Digital Leadership Training for School Administrators: Digital leadership training programs for school administrators should be developed.

2. Digital Transformation Strategies: Strategies that promote digital transformation in schools should be created and the necessary resources should be provided.

3. Development of Entrepreneurial Behaviors: Opportunities that support professional development for teachers and help cultivate an entrepreneurial spirit should be increased.

4. Policy Development: Educational policies support and encourage digital leadership and entrepreneurial teacher behaviors should include factors that support and encourage digital leadership and entrepreneurial teacher behaviours.

5. Future Research: Digital leadership and teacher entrepreneurship can be addressed in combination with different variables. Furthermore, the topic can be re-examined in greater depth using different qualitative or mixed methods research.

References

Akkaya, R. ve Çetin, M. (2022). Girişimci öğretmen davranışları ölçeği: Bir ölçek uyarlama çalışması. *Millî Eğitim Dergisi, 51*(234), 1473-1490. Doi: 10.37669/milliegitim.853723

Aksal, F. A. (2015). Are headmasters digital leaders in school culture. *Türk Eğitim Derneği*, *40*(182), 77-86. Doi: 10.15390/EB.2015.4534

Akyürek, M. İ. ve Göktaş, E. (2023). İnovatif okul liderliği ve girişimci öğretmen davranışlarının okul mutluluğu üzerindeki etkisi: Özel okullar örneği. *Anadolu Eğitim Liderliği ve Öğretim Dergis*i, *11*(1), 29-47. https://dergipark.org.tr/tr/pub/ajeli/issue/78579/1264941

Aydın, K. (2022). *Eğitim örgütlerinde dijital liderlik ve örgütsel bilgelik ilişkisi*. Yayımlanmamış Doktora Tezi, Eskişehir: Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü.

Aytaç, Ö. (2006). Girişimcilik: Sosyo-kültürel bir perspektif. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, *15*, 139-160. https://dergipark.org.tr/tr/pub/dpusbe/issue/4757/65345

Baloğlu, B. (2009). *Sosyal bilimlerde araştırma yöntemi*. İstanbul: D&R.

Baydar, F. (2023). The effect of school principals' agile leadership behaviors on entrepreneurial teacher behaviors through ınnovative organizations. *The Universal Academic Research Journal, 5*(3), 168–181. Doi: 10.55236/tuara.1324118

Blau, I. and Shamir-Inbal, T. (2017). Digital competences and long-term ICT integration in school culture: The perspective of elementary school leaders. *Education and Information Technologies, 22*, 769-787. Doi: 10.1007/s10639-015-9456-7

Carretero, S., Vuorikari, R. and Punie, Y. (2017). The digital competence framework for citizens. Retrieved from: https://publications.jrc.ec.europa.eu/repository/bitstrea/JRC106281/webdigcomp2.1pdf

Değirmencioğlu, G. (2016). Dijitalleşme çağında gazeteciliğin geleceği ve inovasyon haberciliği. *TRT Akademi, 1*(2), 590-606. https://dergipark.org.tr/tr/pub/trta/issue/23620/252171

Dancey, C. P. and Reidy, J. (2007). *Statistics without maths for psychology* (4th ed.). USA: Pearson Education.

Enterprise and Entrepreneurship Education. (2018). Enterprise and entrepreneurship education: Guidance for UK higher education providers: Assurance agency for higher education. Retrieved from: https://www.qaa.ac.uk/docs/qaa/about-us/enterprise-and-entrpreneurship-education-2018.pdf?sfvrsn=20e2f581_26

Güleryüz, İ., Sürücü, L. ve Yıkılmaz, İ. (2023). Dijital liderliğin iç girişimciliğe etkisinde dijital örgüt kültürünün rolü. *İşletme Araştırmaları Dergisi, 15*(3), 1852-1867. https://isarder.org/index.php/isarder/article/view/1979

Hrastinski, S. (2019). What Do We Mean by Blended Learning?. *TechTrends, 63*(5), 564-569. Doi: 10.1016/jcompedu.2016.09.008

İrge, N. T. ve Şen, E. (2020). Çalışanların dijital teknolojiye yönelik tutumlarının ve iç girişimcilik özelliklerinin bireysel iş performanslarına etkisi. *İşletme Araştırmaları Dergisi, 12*(3), 2556-2579. https://isarder.org/index.php/isarder/article/view/1166

Konokman, G. Y., Yokuş, G. ve Yelken, T. Y. (2016). Yenilikçi materyal tasarlamanın sınıf öğretmeni adaylarının yenilikçilik düzeylerine etkisi. *Bartın University Journal of Faculty of Education, 5*(3), 857-878. https://dergipark.org.tr/en/pub/buefad/issue/24921/263090

Köstekçi, E. (2016). *Öğretmen adaylarının girişimcilik özellikleri ile yansıtıcı düşünme düzeyleri arasındaki ilişkinin incelenmesi.* Yayımlanmamış Yüksek Lisans Tezi, Bartın: Bartın Üniversitesi Eğitim Bilimleri Enstitüsü.

Küçükali, R. ve Çoşkun, H. C. (2021). The position of digitalization and artificial intelligence in school administration. *International Journal of Leadership Studies: Theory and Practive, 4*(2), 124135. Doi: 10.52848/ijls.852119

MEB (Millî Eğitim Bakanlığı) (2018). *Matematik dersi öğretim programı*. Ankara: MEB.

Neto, R. D. C. A., Picanco, R. V., Campbell, K., Polega, M. and Ochsankehl, T. (2020). Teamwork and entrepreneurial behavior among K-12 teachers in the United States. *The Educational Forum, 84*(2), 179-193. Doi: 10.1080/00131725.2020.1702748

OECD (Organisation for Economic Co-operation and Development) (2017). Teaching and Learning International Survey. Retrieved from: https://www.oecd.org/en/publications/talis-2013-results_9789264196261-en.html

OECD (Organisation for Economic Co-operation and Development) (2018). The future of education and skills. Education 2030. Retrieved from: https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf

Öz, Ö. (2020). Dijital liderlik: Dijital dünyada okul lideri olmak. *Uluslararası Liderlik Çalışmaları Dergisi: Kuram ve Uygulama, 3*(1), 45-57. https://dergipark.org.tr/tr/pub/ijls/issue/53618/635293

Özdemir, G. ve Göztürk, L. (2023). Dijital dönüşümün eğitime yansımaları: Öğretmen görüşleri. *Akademik Sosyal Araştırmalar Dergisi, 11*(142), 19-33. Doi:10.29228/ASOS.69768

Özmen, Ö. N. T., Eriş, E. D. ve Süral Özer, P. (2020). Dijital liderlik çalışmalarına bir bakış. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*. *25*(1), 85-92. https://dergipark.org.tr/tr/pub/sduiibfd/issue/53017/705039

Palfrey, J. and Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. Boston: Basic Books

Partnership for 21st Century Skills. (2008). 21 st. Century skills, education and competitiveness. Retrieved from: https://files.eric.ed.gov/fulltext/ED519337.pdf

Raza, B. (2016). Leadership 4.0, module: Management competencies 1. Retrieved from: https://www.academia.edu/25513158/LEADERSHIP_4.0_Module_Management_Competencies_1_MC1_MBA_Aviation_Enrolment_number_1042342

Sadeghi, M. (2019). A shift from classroom to distance learning: Advantages and limitations. *International Journal of Research in English Education, 4*(1), 80-88. http://ijreeonline.com/article-1-132-en.html

Sağlam, E. ve Uçar, R. (2022) The relationship between school administrators' creative leadership qualities and school's organizational intelligence levels. *International Journal of Psychology and Educational Studies, 9*(4), 1133-1147. Doi: 10.52380/ijpes.2022.9.4.749

Sarı, Y. E. (2021). Uzaktan eğitimde etkili iletişim ve iletişimsel engeller: Sözlü ve sözsüz iletişim. *Diyalog Interkulturelle Zeitschrift Für Germanistik, 9*(2), 659-671. Doi: 10.37583/diyalog.1030779

Sheninger, E. (2014). *Digital leadership: Changing paradigms for changing times.* Dallas: Corwin.

Sürer, A.G. (2020). Eğitimde dijitalleşme çağı. *Kapadokya Eğitim Dergisi, 1*(1), 28-34. https://dergipark.org.tr/tr/pub/kaped/issue/72747/1181500

Taşkıran, A. (2017). Dijital çağda yükseköğretim. *Açık öğretim Uygulamaları ve Araştırmaları Dergisi, 3*(1), 96-109. https://dergipark.org.tr/tr/pub/auad/issue/34114/377387

Telli Yamamoto, G. & Kalaç, M. Ö. (2018). *Kamuda dijital dönüşüm* (1. Baskı). İstanbul: Kriter.

Tutar, H. ve Güler, S. (2022). Digital leadership as a requirement for the new business ecosystem: A conceptual review. *Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *12*(3), 323-349. Doi: 10.18074/ckuiibfd.1162792

Toduk, Y. and Gande, S. (2016). Whats next in Turkey? A new leadership model for connected age. *In Amrop Leadership Series, 1*(2), 1-41. Retrieved from: https://www.scribd.com/document/327715485/Turkey-A-New-Leadership-Model-for-a-Connected-Age

Van Dam, K., Schipper, M. and Runhaar, P. (2010). Developing a competency-based framework for teachers' entrepreneurial behaviour. *Teaching and Teacher Education, 26*(4), 965-971. Doi: 10.1016/j.tate.2009.10.038

Yüksel, H., Cevher, E. ve Yüksel, M. (2015). Öğrencilerin girişimci kişilik özellikleri ile girişimcilik eğilimleri üzerine bir araştırma. *Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 5*(1), 143-156. https://dergipark.org.tr/tr/pub/ckuiibfd/issue/32904/365545

Zeike, S., Bradbury, K., Lindert, L. and Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. *International Journal of Environmental Research and Public Health*. *16*(14), 2628. Doi: 10.3390/ijerph16142628