MODELLING TECHNOLOGY INTEGRATION OF TEACHERS: THE ROLE OF SCHOOL CLIMATE AND LEADERSHIP

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Approval of the Graduate School of Social Sciences

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ABSTRACT

MODELING TECHNOLOGY INTEGRATION OF TEACHERS: THE ROLE OF SCHOOL CLIMATE AND LEADERSHIP

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The purpose of this study is to examine the relationship between school climate, leadership and technology integration of teachers. The variables of the study were classified at three levels as school climate, leadership and technology integration. Within the scope of the study, teacher collaboration, trust in school principal and enabling school structure are the school climate based variables, and technology leadership is the leadership-based variable. The population of the study consists of teachers working in schools affiliated with the General Directorate of Basic Education and General Directorate of Religious Education of the Ministry of Education (MoNE) in Turkey. The sample of the research consists of 13487 participants. To collect data, teacher collaboration subscale of teacher leadership culture scale, trust to administrator subscale of organisational trust of school scale, vision subscale of elementary school principals' technology leadership role scale, enabling bureaucracy subscale of enabling school structure scale and technology integration scale were used. In analysing the data, descriptive and inferential statistical methods were used. Structural Equation Modelling (SEM) was the main inferential statistical technique used in the study. The results revealed that collaboration among teachers positively affect technology integration of teachers and enable technology to be integrated more

intensively into educational practices. Moreover, teachers' trust in their school principal relates to technology integration. Similarly, there is a strong positive association between technology leadership and technology integration of teachers. Lastly, enabling bureaucracy in schools provided a positive effect to technology integration of teachers via teacher collaboration and trust in school principal variables.

Keywords: School Climate, Technology Leadership, Teacher Collaboration, Trust in School Principal, Enabling School Structure

ÖZ

ÖĞRETMENLERİN TEKNOLOJİ ENTEGRASYONUNUN MODELLENMESİ: OKUL İKLİMİ VE LİDERLİĞİN ROLÜ

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Bu çalışmada, okul iklimi ve liderlik temelli değişkenler ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki incelenmiştir. Çalışmanın değişkenleri okul iklimi, liderlik ve teknoloji entegrasyonu olmak üzere üç düzeyde sınıflandırılmıştır. Çalışma kapsamında, öğretmen işbirliği, okul müdürüne güven ve kolaylaştırıcı okul yapısı, okul iklimine ilişkin değişkenler olarak, teknoloji liderliği ise liderliğe ilişkin değişken olarak çalışmaya dahil edilmiştir. Araştırmanın evrenini Milli Eğitim Bakanlığı, Temel Eğitim Genel Müdürlüğü ve Din Öğretimi Genel Müdürlüğü'ne bağlı ülke geneli okullarda görev yapan öğretmenler oluşturmaktadır. Araştırmanın örneklemi ise, evrende ulaşılan ve bu çalışmaya gönüllü olarak katılan 13487 katılımcıdan oluşmaktadır. Katılımcılardan veri toplamak için, öğretmen liderliği kültürü ölçeğinin öğretmen işbirliği altölçeği, okullarda örgütsel güven ölçeğinin yöneticiye güven altölçeği, ilköğretim okulu yöneticilerinin teknoloji liderliği rolleri ölçeğinin vizyon alt ölçeği, kolaylaştırıcı okul yapısı ölçeğinin kolaylaştırıcı bürokrasi altölçeği ve teknoloji entegrasyonu ölçeği kullanlmıştır. Çalışmada betimleyici ve çıkarımsal analizler kullanılmış, Yapısal Eşitlik Modeli (YEM) ise temel çıkarımsal analiz yöntemi olarak uygulanmıştır. Sonuçlar, okullarda öğretmenler arasındaki işbirliğinin, öğretmenlerin teknoloji entegrasyonunu olumlu etkilediğini ve teknolojinin eğitim

uygulamalarına daha yoğun bir şekilde entegre edilmesini kolaylaştırdığını ortaya koymuştur. Ayrıca okul müdürüne yönelik güvenin öğretmenlerin teknoloji entegrasyonunu ile ilişkili olduğu ortaya konulmuştur. Benzer şekilde, teknoloji liderliği ile öğretmenlerin teknoloji entegrasyonu arasında güçlü bir pozitif ilişkinin olduğu görülmüştür. Son olarak, okullardaki kolaylaştırıcı bürokrasi, öğretmen işbirliği ve yöneticiye güven değişkenleri aracılığıyla, öğretmenlerin teknoloji entegrasyonuna olumlu etki sağlamıştır.

Anahtar Kelimeler: Okul İklimi, Teknoloji Liderliği, Öğretmen İşbirliği, Okul Yöneticisine Güven, Kolaylaştırıcı Okul Yapısı

To My Lovely Family

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LIST OF ABBREVIATIONS

AMOS	Analysis of Moments Structures
CARET	The Center for Applied Research in Educational Technology
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
DPT	State Planning Organization (Turkey)
EBA	Educational Informatics Network (Turkey)
ESS	Enabling School Structure
FATİH	Movement of Enhancing Opportunities and Improving Technology (Turkey)
IBM	International Business Machines
M	Mean
MoD	Ministry of Development (Turkey)
MoNE	Ministry of National Education (Turkey)
MVA	Missing Value Analysis
NSCC	National School Climate Center
OCDQ	Organisational Climate Description Questionnaire
OECD	The Organisation for Economic Co-operation and Development
RMSEA	Root Mean Square of Error Approximation
SBB	Presidency of Strategy and Budget (Turkey)
SD	Standard Deviation
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Root Mean Square Residual
TALIS	Teaching and Learning International Survey
TC	Teacher Collaboration

TI	Technology Integration
TL	Technology Leadership
TLI	Tucker-Lewis Index
TSP	Trust in School Principal
YEGITEK	General Directorate of Innovations and Education Technologies (Turkey)

CHAPTER 1

INTRODUCTION

1.1. Background of the Study

Innovations and reform movements arising from technological advances are used extensively in all areas of life from the economy to education. As a result, there has been an intensive digital-intellectual change and transformation in every society (Robins & Webster, 1999). The production and the transfer of information has gained importance for socio-economic change and transformation process. That is, improvements in technological area have made information an essential factor deciding the economic structure of the society (Masuda, 1981). It has become the most critical element for the individuals and countries' prosperity and level of development. Besides, the importance of reaching the right information, processing it and transferring the processed information using effective media has also been increasing. Together with developing technology, the way of obtaining, using and assigning the right and useful information has depended on beneficial and successful use of technology. In this regard, information society needs for highly qualified human capital in almost all parts of the community from individuals to foundations to obtain progress in development goal (Kivinen & Ahola, 1999).

The trends of change that have emerged with the developments in technology have not only been transformed the people's daily life habits, but have also brought paradigm changes for many fields, including education. In this direction, schools have entered a process of restructuring as a living space. Countries have grounded their existence strategies on the success of the education systems that restructured in line with global developments (MoNE, 2017a). Therefore, these developments have sparked considerable interest in incorporating technology to various areas of education, such as institutional structures and teaching. Currently, resources and budgets provided to technology integration around the world have been increasing steadily. In this sense,

Turkey has funded a lot in technology integration, as it has for other nations. From past to present, The Turkish National Education System has consisted of policies and projects that have encouraged the integration of technological products into educational settings. One of these projects is the Movement for Improving Opportunities and Technology Improvement (FATİH) project. MoNE declared the main purpose of this project to equip the education and training environments with information technology tools and to make the education more appealing to the senses (MoNE, 2017b). Via this project, MoNE has provided many educational technology tools like multi-function printers, tablet computers, Internet network infrastructure, high-speed Internet, interactive board, wired/wireless Internet, classroom management software to public schools. Furthermore, in vision 2023 document, MoNE (2018) announced the need for the development of an infrastructure with the involvement of various stakeholders and agencies for the growth of digital teaching-learning and instructional materials.

When the literature is investigated, it is seen that countries have a tendency towards the integration of technology into education. Besides, studies supporting technology-integrated education are available. The focus of these studies suggests that the implementation of technology in teaching and learning processes has a beneficial impact on school success. It is argued that technology, when operated with collaborative methodological approaches and effective leadership, benefits students to be successful in promoting creative thinking, facilitating problem-solving and success in working life (ISTE, 2018a). In this context, technology is seen useful for instructional activities through assuring contact, enforcing investigation, facilitating the self-expression of learners, building educational outcomes and creating learning settings with high energy and motivation (Najdabbasi & Pedaste, 2014). Further, it is accepted as an effective instrument to provide opportunities for bringing the real-life experiences to learning settings, supplying outline that makes students to contribute the complicated duties, improving chances to get sophisticated and individualized help,broadening educators' facilities to develop them and constructing communication among members of the schools (Bransford, Brown, & Cocking, 2000). It improves both students' gain of learning and their eagerness to learn, which is essential for

learning. In addition, it encourages collective educational experiences and helps develop problem-solving competencies (Schacter & Fagnano, 1999). Thanks to technology integration, learning environments, teaching methods and techniques are diversified, changed and transformed. Therefore, the effective use of the tools provided by technology in all of the information production processes makes technology-supported teaching an inevitable element in the education system of countries (Güllüpınar, Kuzu, Dursun, Kurt, & Gültekin, 2013). On the other hand, whether technology has changed education is still questionable despite the considerable allocation of budgets provided by policymakers and schools. Although there are many evidences revealing technology integration is beneficial, it is an undeniable reality that this integration should be handled in various ways to increase the expected benefits from it. In this sense, the transfer of technological tools to educational environments makes it necessary to take into account many factors and to think multi-dimensionally. Otherwise, the innovation and change attempts for technology in education may be affected negatively when educators were not supported in their efforts to change (Huberman & Miles, 1984). In this regard, the critical component of successful change movements is human, but organizations are over-focused on the changes' economic aspect (Beer & Nohria, 2000). As an organization, schools should also give priority to build a favourable culture for reforms and consider people's attitudes, feelings, and beliefs, which may identify the mood of the school and determine the effectiveness of the change movements (Markus & Benjamin, 1987). Otherwise, change efforts and innovation movements cause to feelings of uncertainty in teachers resulted from lack of knowledge, skills, confidence. Because of uncertainty, teachers sometimes perceive insufficiency and unawareness about their current positions, and this is not a desirable case (Fullan & Hargreaves, 1992). In other words, technology integration can be evaluated as a reform, so the experiences, capabilities and perceptions of the individuals to implement these changes must be considered in all reforms (Hoy & Ferguson, 1985).

In this context, the school leaders are the crucial actors to unlock the immobility of education and implement changes in teaching and learning practices (Karagiannidis, Politis, & Karasavvidis, 2014). Technology, as a movement for change and reform,

would have an impact on the school's look and feel. However, technological change can be considered an external threat to the school's leadership in the lack of the successfully established climate (Hodas, 1993). That is, the power of technology is both the greatest opportunity and the greatest threat to schools and their leaders. Technology leaders can only be successful when they choose to concentrate on the most useful way of combining technological tools with instructional activities (Creighton, 2003). In this regard, technology leadership should be considered to organise activities and policies to use data and communications systems effectively in schools (Anderson & Dexter, 2005). Leaders promoting the integration of technological tools into educational operations and enabling teachers to collaborate at school and between schools have a critical act in the institutionalisation of innovation movements (Hoy & Miskel, 2005).

In this sense, ISTE standards are significant to reveal the expectations from schools principals. These standards emphasize essential clues related to the issues that principals should be competent. Notably, it is expected from school principals using technological advancements to promote equality, participation and digital citizenship activities and to involve school members in creating a strategy and preparing development plan to transform instructional operations. Moreover, they should be capable of building a school atmosphere where school members can teach and learn creatively. Similarly, they need to improve instructional environments and should develop teams and structures to introduce, maintain and consistently strengthen the integration of technological tools into instruction. In this way, school principals can guide themselves and school members and encourage continuing technical development in schools (ISTE, 2018b). In this respect, Rivard (2010) highlights the school principals' insufficiency about the capacity to grasp the different management and development problems surrounding practical technology implementations. On the other hand, the growing integration of technological tool into teaching-learning settings needs principals to be ready. Hence, providing support for educators in the incorporation and encouragement of technology may be relevant (Esplin, Stewart, & Thurston, 2018).

Furthermore, OECD studies indicate that countries with higher performance in education are actively focused on building teacher collaboration that result in better instruction and stronger learner performance. It has been discovered that educational success is better in the school where people operate, design and learn with each other in collective units (Darling-Hammond, 2014). Supporting this view, Wesley and Franks (1996) maintain that teacher could benefit one another by offering support and guidance and exchanging current strategies about technological tools' integration into education. Similarly, Stevenson (2004) indicates that comparing school cultures in which teachers collaborate widely with schools cultures where personnel typically are not willing to common work may enlighten the reasons of the differences in promoting skilled technology development. In addition, he reveals that although educators can quickly learn technology from their colleagues, the role of collaboration in improving the capacity of educators to use technology has not been grasped. For this reason, teacher collaboration also emerges as an essential variable of technology integration.

In addition, for the reform of schools, trust between the principal and the teachers is a particularly fundamental issue (Kochanek, 2005). According to Koşar (2015), teachers need to trust their principals in order to build a qualified educational setting and to operate skilled educational processes in their courses. Trust in school principal provide teachers with autonomy which is one of the crucial factors of teacher professionalism (Lai & Lo, 2007). Thus, professionally trained teachers can take responsibility for the teaching process with their knowledge and skills and reflect various techniques and methods to their practice in the classroom (Hargreaves, 1994).

As well as that, according to Abbott's viewpoint (as cited Hoy & Miskel, 2005), when the structure of the social organisations, including schools, is examined, it is seen that most of them have bureaucratic characteristics. The hindering or enabling structure of a school system is thus considered to have a significant effect on the overall operation of a school and on organizational behaviour. In other words, schools are bureaucratic systems, so structured and organisational processes need to be planned appropriately to avoid and facilitate disorders. In this context, a bureaucratic structure can supply positive effects like capability for the organisation of actions, clarification of duty,

reduction of tension, and empowerment of individuals. From this perspective, it can be said the bureaucratic structure of a school may directly or indirectly affect schools functioning in terms of increasing innovation, decreasing contradiction of task, reducing perceptions of exclusion in educational structures (Hoy & Sweetland, 2001). For this reason, structures of the schools may also be considered as an essential variable of technology integration.

In brief, technology can be effectively introduced in schools only if it is actively supported and learned by the principal and providing appropriate professional development and supporting the human factor for change as well (Wilmore & Betz, 2000). Based on the issues mentioned above, it can be asserted that as the contexts and conditions of education evolve, the managerial roles and expectations change significantly. Whereas adequate technological substructure is necessary, leadership is far more critical in this context in order to enable efficient use of technological tools (Weng & Tang, 2014). In this sense, it is expected from school leaders to create a climate promoting technology integration and to demonstrate technology leadership to benefit technological tools efficiently. When this is the case, technology integration into education seems to be closely related to school climate and leadership based actors. Thus, this study aims to discuss teachers' technology integration in the school climate and technology leadership axis which are the issues mostly affected by school principals.

1.2. Purpose of the Study

The purpose of the study is to test a model examining the relationship between school climate-leadership based variables and teachers' technology integration into the educational activities. The variables of the study were categorized into three levels: school climate, leadership and technology integration. Within the scope of the study, teacher collaboration, trust in school principal and enabling school structure are the school climate based variables, and technology leadership is the leadership-based variable. In this regard, the research question and specific research questions are the following:

How do school climate and technology leadership relate to teachers' technology integration in a model?

1. How is the relationship between teacher collaboration and teachers' technology integration?
2. How is the relationship between trust in school principal and teachers' technology integration?
3. How is the relationship between enabling school structure and teachers' technology integration?
4. How is the relationship between school principal's technology leadership and teachers' technology integration?

1.3. Significance of the Study

Technology is seen as the cause of change as well as an important instrument to achieve it. There is increasing evidence urging the impact of technology on learning processes, teachers and students (Levin & Wadmany, 2008). However, there is a broad gap between promises and school reality. Despite large investments, adoption of technology in many countries' education systems progresses at a slower pace than anticipated (National Center for Education Statistics, 2005). Thus, the related variables of teachers' technology integration into education should be revealed because teachers are the main practitioners of these technologies in schools. In this context, the focus of the current study was built on the perspectives of teachers related to school climate and leadership based variables. Therefore, this study is significant in revealing the school climate and leadership based agents' effect on teachers' technology integration. Specifically, this study dwells on the importance of underestimated variables such as teacher collaboration, trust in school principal, technology leadership, enabling school structure in relation to teachers' technology integration in a structural equational model. Furthermore, it takes the picture of the reflections of these variables in the field. This photo provides important clues for both policymakers and researchers. That is, study supplies a holistic view of the relationship between school climate-leadership based variables and teachers' technology integration.

Moreover, it is expected from this study to provide significant and valuable implications for practice and literature. In this sense, it is significant to reveal the effectiveness of technology integration projects and investments in the schools. That is, study provides detailed and beneficial information about to what extent technology investments are used, how the technology integration in school can be increased and what policymakers can make to increase technology integration movements' effectiveness. In this regard, within this study, the meaning of collaboration as an instrument regarding professional development about teachers' technology integration is investigated and revealed the detailed analysis on this issue. In addition, the study gives clues about the impact of bureaucracy and trust in school principal on teachers' technology integration. Next, this study is significant to elicit the issue that the school principal's technology leadership attributes make what kind of difference in the teachers' technology leadership.

1.4. Definition of Terms

Technology Integration:	This is a dynamic and participating process that aims to include technical instruments into the instructional practices to expand, enhance and evaluate the progress of students in curriculum outcomes and covers the interaction of both teacher and student to create comprehensive educational activities (Wang, 2012).
Technology Leadership:	It is the school principals' inclusion of other people to establish a common goal and to reveal a strategy for technological transformation within education (ISTE, 2018b).
Teacher Collaboration:	Teacher collaboration refers to teacher initiatives that are implemented and carried out to improve the technological tool' integration to education.
Enabling School Structure:	It is a kind of bureaucracy displaying enabling characteristics (Hoy & Sweetland, 2001).
Trust in School Principal:	It implies the trust that principals can hold their commitment and behave for teachers' serenity (Hoy & Kupersmith, 1985).

CHAPTER 2

LITERATURE REVIEW

2.1. Technology and Educational Technology

Related to the origin of technology, it was conceptualized by ancients Greeks as a special engagement and a type of information (Saettler, 1998). In this regard, Carpenter (1997) describes technology as all formalized, empirical and scientific knowledge based on experiments and maybe even theory that improves the potential of civilization to generate products.

Technology is seen as a property of high-quality scientific expertise with its present connotation. Although it appears in daily speech, written and visual media in this way, it is an environment in which all socio-economic operations are included (Aksoy, 2003). That is, through technology, the earth is changing rapidly, so technology is a crucial part of the modern age and is being used in almost every part of the globe, from daily life to instruction (Cereci, 2019).

Together with the inclusion of technology into the education sector, the educational technology term has emerged. At the beginning of the 1960s, this term was introduced first into American literature on education and soon spread to the western world and elsewhere. In addition, this concept has been commonly used in the Turkish education sector since the 1960s (Gül, 2013).

Related to educational technology concept, Januszewski and Molenda (2013) maintain that this concept has been changing as long as the field has, and it goes on to evolve. Hence, they asserts that today's thoughts are provisional and timely. In this regard, there is some debate on what the concept of "educational technology" means in the educational field. That is, this concept is explained differently in several definitions. For instance, AECT describes educational technology as an area in which individual education is facilitated via the structured recognition, advancement, arrangement and

use of a wide range of teaching tools (Richey, Silber, & Ely, 2008). Spector's (2015) other description of educational technology is that educational technology includes the systematic implementation of information technologies to enhance teaching-learning outcomes. Venkataiah (1996) urges that educational technology is too closely viewed as hardware-confined. This focus gives rise to the very narrow educational technology definitions like "the art of using tools and machines" or "the new media and technological systems employed" for instructional purpose. In reality, there are a great many components in the concept of educational technology, including hardware, organization material systems and new roles for teachers and school principals. Hence, the definition of education methods as the use of processes and methods in the systematic design of a teaching experience is more helpful. In other words, while technology integration in schools is usually understood as technology, the key issue should be integration into the teaching, learning and curriculum system (Hew & Brush, 2007).

Educational technology is not only mechanically implementation of various new software and computer hardware. It also includes the means by which you choose the software, how you can explain the methods you chose, how you can analyse them and how you can adapt the use of these technologies to fix educational issues (Okojie, Olinzock, & Okojie-Boulder, 2006). Similarly, Eren (2010) points out that educational technology is not to use every tool that arises from advances in technology at random in educational environments. It could be clarified as the active use of technological tools in educational environments within a specific plan to make education and training more qualified. Parallel to this view, it can be said that integrating technological tools into instruction is a natural and smooth action of choosing the correct instrument for the learning that efficiently encourages self-motivated, self-regulated learning with multi-faceted evaluation and accountability (ISTE, 2018b).

At this point, educational institutions emerge as one of the most important units that have been transformed by technology. In this regard, the use of technology in education does not only imply an instrumental change in hardware and software, but a total individual-based and institution-based change or adaptation. In this context,

ISTE (2018b) has revealed fundamental requirements regarding the use of technology in education. In particular, qualified manpower, providing adequate resources, continuous professional development, establishing a vigorous vision at the point of technology use, good institution-based leadership, having a supportive attitude from decision-makers, and curriculum-based adaptation are the main requirements of technology use in education. In this context, attention is drawn to increase the competencies of educators who have a primary role in technology integration. The lack of competence in technology is one of the most important deficiencies that hinders this issue. Similarly, educators should have the opportunity at the point of technological tool resource. It is obvious that a successful technology integration can not be mentioned in a structure where there is not enough access to resources, and there is a shortage of resources. Another issue points to professional development that is crucial to inform educators about the point where technology has arrived and how and when it is integrated into educational processes. Continuous professional development of educators by both themselves and their institutions is one of the indispensables of successful technology integration. Similarly, another issue to be emphasized is to reveal the vision. Having a vision that will encourage individuals and organizations to achieve technology integration can accelerate this integration. In addition, it is crucial to have a leadership that will prepare the environment for change and provide guidance. This leadership can be both at the institutional level and at the decision-maker level in the form of policy-making, financial support, and designing reward mechanisms. One of the critical issues contributing to technology integration is also having an appropriate curriculum framework. In this context, it is essential to have content enabling and encouraging the use of technology (ISTE, 2018c).

The integration of technology into education has brought many convenience and opportunities. It has gone beyond simple-level practices and integration of many products such as multimedia tools and network tools into education (Kosakowski, 1998). At this point, the use of technology in education supports education to be done more constructively and more actively with its motivating feature on teachers and students. Further, technology integrated practices can effectively provide students with the opportunity to improve their imagination and problem-solving skills through

deep and to concrete demonstration of their mastery (Blair, 2012). In addition, teachers gain an advantage thanks to technology in many subjects such as lesson planning, preparing educational material, preparing exams, and carrying out statistical studies. Technology offers very favourable environments for people in the school to share their ideas and experiences. They can be able to interact, exchange information and opinions, meet colleagues and share their experience with technology in collaborative projects (Jhurree, 2005). Furthermore, education beyond the school was also an option, thanks to technology. Students are no longer limited to face-to-face learning, since technological advances make it possible for students to choose whether they want to participate face-to-face or online or both (Delgado, Wardlow, McKnight, & O'Malley, 2015). In addition, technology provides teachers with expanded opportunities for professional growth through attending distance education classes, accessing instructional study, and obtaining resources such as teaching materials (Kosakowski, 1998).

Overall, technology changes the teaching process itself. Many studies in the literature say that technology affects education positively. In this context, the issue to be considered is to what extent and how these innovations can be included correctly in the educational and training environments. In this regard, it is important to determine the factors that can be related to the use of technology by teachers who are expected to use technology efficiently.

2.1.1. Technology Integration Issue in Turkish Policy Documents

While the change in human relations with knowledge and society leads to changes in human qualities, it is striking that the structure and functions of contemporary society vary (Gül, 2013). Therefore, it can be clearly said that society must renew itself and adapt to new conditions with its social, economic and human institutions in such a swift transformation span (Alkan, 2005). In this span, the degree to which countries can benefit from certain technology products is an important variable that defines the role of them in the world today (Aksoy, 2003). As such, it should not be denied that the integration of technological opportunities into educational settings is an inevitable situation. In the light of scientific and technological advances, each society has its own

development goals. These goals are decisive elements in the social structure of countries. From past to present, the issue of integrating technology into education has been found in many policy documents in Turkey. In this concept, development plans have been designed to be able to adapt to the advancements and changes as best as possible. Education has always been an important dimension in these plans. Specifically, in the 3rd development plan covering the 1973-1977 period, there is a policy clause for the use of radio and television in non-formal education (DPT, 1972). In 6th development plan covering the 1990-1994 period, the emphasis was put on the need for revision of training programs according to society's needs and conditions. In this regard, the plan highlights the use of technology in education, the dissemination of audio-visual tools in educational environments, the development of computer-assisted education and training (DPT, 1989). In 7th development plan covering the 1996-2000 period, it was stated that adequate progress had not been achieved in the use and dissemination of new technologies in education. Plan reveals that inadequate development of software programs especially in computer-aided education, inadequate formator teachers or appointment of trained teachers to schools without a computer laboratory and the limited resources allocated to educational technology affect the expected benefit from education negatively (DPT, 1995). Similarly, in 8th development plan, it was declared that adequate development had not been achieved in the use and dissemination of new technologies in education. Starting from primary education, the importance of switching to computerized education at every level of education, providing internet access to each school and producing curriculum programs as software programs were emphasized. In addition, it was asserted that in all levels of education, the opportunities provided by technology, especially computer technology would be utilized to the maximum extent, and new training methods using distance education and advanced technologies would be put into practice. Starting from the advanced classes of primary education, an effective guidance system based on talent-weighted assessment and student recognition techniques would be developed through computer-assisted guidance at all levels of education. The reorganizing of educational programs, instructional management and techniques, educational tools and materials in a universal, democratic and libertarian manner by considering in terms of

development goals and technological development was also added to plan. In the 8th plan period, private sector support for educational investments reached significant dimensions, the utilization of technological devices in schools was expanded, and the curriculum development activities were accelerated (DPT, 2000). In 9th development plan covering the 2007-2013 period, it was aimed to enable foreign language teaching to develop the necessary manpower during the transition to the information society and to develop and disseminate methods that would enable the use of information and communication technologies in the courses (DPT, 2006). In 10th development plan covering the 2010-2014 period, Turkey has started to FATİH Project that is ever the most important and comprehensive educational technology project in the world. Within the scope of the plan, it was stated that technology infrastructure would be developed in formal and non-formal education institutions, the competencies of students and teachers to use these technologies would be increased, and qualitative and quantitative indicators would be developed for the integration of technology into education (MoD, 2013). In 11th development plan covering the 2019-2023 plan, enriching the content of EBA (Education Information Network) portal by harmonizing with the curriculum and need for using this portal effectively added to plan. In order to provide access to technology, network infrastructure and interactive board will be established for schools (SBB, 2019).

Furthermore, MoNE (2018) declared a vision 2023 document of which the main purpose is to stimulate a mentality of wealth and knowledge that is based on moral compulsion and positions individual at the centre. In the document, MoNE states that teachers who develop digital learning materials will be promoted. In this context, it is discussed that an infrastructure will be developed with the involvement of various stakeholders and agencies for the growth of digital teaching-learning and instructional materials. Furthermore, the document highlights that an online content archive is going to be developed that provides an opportunity to reach designed products systematically. In this way, leading teachers who have acquired a culture of using and creating digital contents will be effectively trained, and this culture will become widespread in school settings.

In summary, from past to present, Republic of Turkey mostly included educational technology issues into the educational development policies. The budgets allocated concerning the steps to be taken in line with the policy documents are a considerable level.

2.1.2. Technology Integration Movements in Turkey

Steps for technology integration to education in Turkey began with the integrating radio and television into non-formal education in the 1970s with the 3rd Development Plan. Next, in the scope of supporting open higher education and non-formal education, second channel television facilities were established under the 4th Development Plan. Planning to open a television channel for public and higher education was a significant step forward in a period when broadcasts were not a widespread and desired level across the country (Aksoy, 2003).

The Ministry of National Education made the first effort to use computers in education in Turkey in 1984. A Computer Education Specialization Commission in Secondary Education comprised of participants from the relevant departments of the universities and ministry officials was established. The process that initiated in 1984 through the computer purchase and computer education in secondary education has been replaced by computer-assisted education applications where the computer is used as an educational tool. Moreover, with the National Education Project realized in 1990, the number of computers in schools increased, and the human factor was brought to the forefront. Within the scope of this project, computer laboratories were established in 28 high schools. It is also aimed to build a computer network that connects the National Education Directorates to the centre of the Ministry (Ekici & Yılmaz, 2013). About 6,500 computers were distributed to 2,400 schools in 1991. Universities has also given courses to administrators, directors, teachers and teacher trainers in collaboration with the MoNE. In this regard, 750 teachers at different schools have participated in-service training (Özar & Aşkar, 1997). With the Basic Education Project conducted between 1998 and 2003, 3,188 IT classrooms were established in 2,802 primary schools and 45,000 computers and other tools were provided to 22,854 schools. Within the scope of Basic Education Project 2, which was realized between 2002 and 2007, IT

classrooms were established in 4.002 classes of 3,000 primary schools and educational materials were purchased in 4,000 primary schools in rural and slum areas (Ekici & Yılmaz, 2013). In 2010, to offer all students with a better learning opportunity and qualified instructional materials, the FATİH Project was introduced as the biggest and most inclusive educational technology project. Then, Educational Informatics Network (EBA), which one of the crucial components of the FATİH project, aiming to increase the quality of education and equal opportunities and improve the level of success was founded.

Table 1

Budgets of Technology Integration Projects

(*Retrieved from Topuz & Göktaş, 2015, p. 105*)

No	Project Name	Project Budget
1	Industrial Schools Project	72,7 Million $
2	National Education Development Project	177,2 Million $
3	Basic Education Project Phase I	300 Million $
4	İLSİS Project	-
5	Basic Education Project II. phase	300 Million $
6	MoNE Internet Access Project	-
7	Modernization of Vocational and Technical Education Project	18,5 Million €
8	Support Campaign for Computer Based Education	-
9	Secondary Education Development Project	80 Million €
10	Project for Establishing a Video Conference System (Smart Class) Within Industrial Technical Education Schools	448.869,64 $
11	Strengthening MoNE Capacity Project	4,7 Million €
12	The Ministry of National Education Information Systems (MEBBİS)	-
13	Innovative Technologies for Engaging Classrooms (iTEC)	-
14	World Links Project	-
15	Project for Establishment of Industrial Automation Technologies Department in Anatolian Technical High Schools within the Scope of Turkish-Japanese Technical Cooperation	5 Million $
16	Education Framework Project Phase I	50 Million €
17	Support to Basic Education Project	145 Million $
18	Education for the Future (Intel)	-
19	Internet Radio TV	-
20	Educational Collaboration with Microsoft	-
21	Information Technologies Project	15.221.000 $
22	Skoool.tr Portal	Ücretsiz
23	Education Framework Project Phase II	50 Million €
24	Application Methods of Distance Education System Applications in EU Countries	13.320 €
25	Applicable Information System Project in Vocational Technical Education (METUBIS)	500.000 ₺
26	Think.Com Portal	Free
27	Teacher Program (Intel)	-

Table 1

Budgets of Technology Integration Projects

(Retrieved from Topuz & Göktaş, 2015, p. 105)

No	Project Name	Project Budget
28	Specialized Vocational Training Centers Project (UMEM)	119.270.553 ₺
29	Improving Lifelong Learning Project	15 Million €
30	Improving the Quality of Vocational and Technical Education Project in Turkey	33 Million €
31	Improving Lifelong Learning Operation 2	15 Million €

In general, millions of money invested in the education system between 1984 and 2013. The table 1, as mentioned above, shows the projects and their budgets between 1984 and 2013. Since there is no clear information about the total budgets of some projects, a minus (-) symbol is placed in the budget, area of these projects (Topuz & Göktaş, 2015).

2.1.2.1. FATİH Project

FATİH Project is one of the major educational technology investments in Turkish educational system. The project aims to bring together the education system with the technology of the era and to educate individuals with the skills required by the 21st century society (MoNE, 2016). In this sense, within the scope of Turkey's information society vision, science and technology has become the focal point. In other words, decision-makers have given priority to technology-enhanced development in all sectors. In addition, in educational area, FATİH Project was revealed to contribute to the progress of the country towards becoming an information society and to advance this change by making use of technology in education beneficial. It is intended to become a country using technological developments as an important asset and creating better quality via decision-making mechanisms based on knowledge (MoNE, 2017c). Furthermore, one of the major goals of the project is to provide equal opportunities throughout the country, to develop information technology in school and to make more sense of the educational system (YEGITEK, 2019). The project has been operated by MoNE General Directorate of Innovations and Education Technologies since 2010.

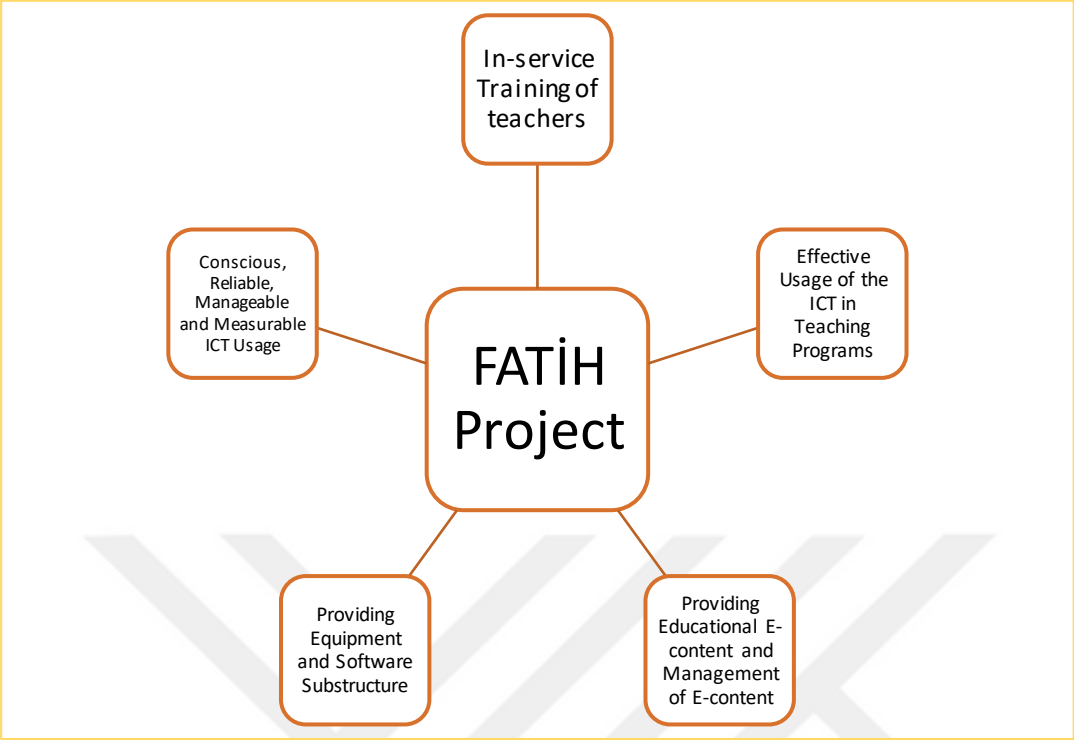

Figure 1. The scope of FATİH Project (YEGITEK, 2019)

The scope of the FATİH Project consists of the provision of hardware and software infrastructure, realization and management of educational content, in-service training of teachers, implementation of conscious, safe manageable and measurable IT use and effective IT use in teaching programs.

Table 2

FATİH Project Components (YEGITEK, 2019)

For Every School	**For Every Classroom**	**For Every Teacher**	**For Every Student**
VPN- Broadband Internet Access	Interactive Board	EBA Applications	EBA Market
Infrastructure	Wired/Wireless Internet Access	Eba Market	Eba Market
High Speed Access		Cloud Account Sharing Course Notes	Cloud Account Digital Identity Sharing Homework Individual Learning Materials

The overall structure of the FATİH Project is very comprehensive. It has supportive qualities to boost educational standards. Although a certain success has been achieved

in terms of hardware, the desired level has not been achieved in terms of content development, effective dissemination of technology, and sufficient project awareness for teachers and administrators (SETA, 2019). In 2018 budget, MoNE declares that 432288 interactive boards established and Internet Network Substructure supplied to 15103 schools across Turkey in scope of FATİH Project (MoNE, 2017c).

Since the beginning of the project, FATİH Project has been processed in many studies, and many positive and negative evaluations have been made. MoNE (2017c) maintains that every student should have 21st century skills in global competition. In this context, MEB asserts that 21st century skills covering critical thinking, problem-solving, oral-written communications, teamwork-collaboration, diversity, IT literacy, leadership, creativity-innovation, lifelong leaning-self direction are supplied by FATİH Project. Similarly, Eryılmaz and Uluyol (2015) highlight that The FATİH Project that aims the effective integration of technological tools into the instructional processes is directly related to technology literacy competencies. In their study, Kayaduman, Sarıkaya and Seferoğlu (2011) discussed the applicability of the FATİH Project in the light of the current situation of teacher competencies and teachers' use of ICT in classrooms. The study concluded that teachers have serious inadequacies in the use of technological assets. Similarly, Eryılmaz and Uluyol (2015) reported that the demands of users for technology integration in schools had not been sufficiently taken into account by MoNE. In the other study aiming to discover how the FATİH project promotes social justice in the learning settings, Tarman, Baytak and Duman (2015) urge that the project creates a new injustice because the technology and e-resources given are for certain areas only, and other areas are ignored. In addition, Şekerci, Bozkurt and Arslan (2015) examine the teachers' views opinions regarding the FATİH project. The study results reveal that teachers have some negative opinions caused by the implementation of the FATİH Project because of the lack of physical infrastructure, the crowded classrooms and the educational problems of teachers who can use information technologies. Lastly, Akkoyunlu and Baskan (2014) examined the school principals' views toward the project. In study, principals reveal that FATİH Project can affect the instruction positively in terms of efficient learning, saving time, motivating and enhancing the

interest and involvement of students and provided tools included in project alert more sense organs of the learners and can help effective and permanent learning.

2.1.2.2. Educational Informatics Network (EBA)

EBA has been developed as a website with the name of providing and managing e-content in education, and is the second phase of FATİH. It is one of the essential components of the FATİH Project, which aims to increase the quality of education and equal opportunities and improve the level of success. It is a new generation system that recognizes teachers and students, provides individualized learning opportunities, makes feedbacks and suggestions to users by using artificial intelligence algorithms, analyses data and makes reports. It was established to ensure the effective use of educational contents through information technologies and training processes. It is a social education platform that contains the well-prepared contents that are suitable for classroom levels, reliable and examined. In this platform, educational programs are presented as educational contents by making them compatible with information supported technologies. To enable teachers to contribute to EBA and develop e-content, trainings are organized through face-to-face and distance education methods. EBA content includes video, simulation, audio, visual, animation, e-book, interactive dictionary, e-magazine, presentation file, educational game genres. Teachers also contribute to the creation of these contents. The EBA has quickly become one of the world's largest educational portals at the K12 level. Audiobooks prepared for the visually impaired individuals and learning materials for the hearing impaired were uploaded to the EBA. In addition, these contents are reproduced in a physical environment (CD, DVD, etc.) and delivered to the students. EBA incorporates the contents developed by public institutions and organizations, non-governmental organizations (NGOs), universities, municipalities and the private sector and delivers them to the target audience (MoNE, 2017c).

2.2. School Climate

When the literature is examined, it is observed that many definitions are made about school climate by many researchers. In this regard, Hoy and Miskel reveal that how can certain personal characteristics constitute personality; it can be said that ecology,

neighbourhood, social system and culture create the climate. They see school climate as the comparatively durable reliability of the school setting, which influences school members' behaviour. School climate is related to teachers' perceptions of the school's general working environment, formal organisation, informal organisation, personalities of members, and organisational leadership affecting it (Hoy & Miskel, 2005).

Furthermore, school climate includes shared perspectives and conditions related to organisational variables that influence institutional operation, such as motivation of teachers, school leadership (Conley, 2006). A school with a good climate is considered to have enthusiastic, hardworking students, committed, cooperative teachers and an overarching sense of confidence, mutual respect and support among teachers and administrators (Ellis, 1998). In contrary to negative school climate, schools possessing positive school climate show favourable instructional and psychological results (Marshall, 2004).

The climate of the school focuses on daily operational activities which are important for school and its members (Watts, 2009). In this context, school members' behaviours are significant elements in creating a positive organisational environment. In a well-organised school climate, the positive reactions of the members in the school environment is efficient to fulfil duties and responsibilities, to achieve the schools' goals and to secure work peace (Taymaz, 2007).

National School Climate Center (NSCC) (2007) uses two keywords to describe school climate: quality and character of school life. School climates depend on the school stakeholders'' experiences of school life. It is vital reflector of the schools' goals, teaching-learning activities and organisational structure. Moreover, building a positive school climate helps create an efficient and rewarding culture inside a functioning community.

According to Halpin and Croft (1963), the school climate relates to the educational environment's social ambience. To describe climate, Halpin and Croft use a conceptual continuum open to closed climates. In this regard, they built the Organizational

Climate Descriptive Questionnaire (OCDQ), including sixty-four Likert-type items and comprising eight factors. From the scores of these factors, they obtained a score which determines the school's place on the open to closed continuum. They maintain that open climate is an energetic and lively organisation moving toward its goals that provide satisfaction for group members' social needs. Further, they argue that, unlike open climate, closed climate is unsuccessful in change operations as individuals are unable to reach both satisfaction of social needs and satisfaction with tasks.

Moreover, Hoy, Tarter and Kottkamp (1992) revealed another viewpoint related to school climate. They used "healthy" word to describe a positive school climate. According to them, being a healthy school triggers to be better school and schools having a positive school climate encourage teachers to be more productive. In this sense, Hoy and Tarter (1997) constructed the Organisational Health Inventory (OHI) to evaluate school climate. While OCDQ investigates the openness- the closeness of teacher and principal-teacher interactions, the OHI examines the healthy relationship between school stakeholders like students, teachers, administrators and community members. The instrument categorises schools as healthy and sick. Hoy and Tarter (1997) assert that principal behaviour is healthy in a healthy school. In other words, principals at healthy schools act kind, accessible, inclusive and welcoming. They provide teachers with the opportunities to carry out their duties. Besides, in a healthy school, principals are influential with superiors. In this way, the principal can expect the best from teachers. As for sick schools, they assert that a sick school is prone to disruptive outside powers and does not have a competent principal. The principals provides little direction or structure, shows insufficient courage for teachers. In addition, teachers do not like their colleagues and their jobs. Besides, instructional materials, devices, and supplementary materials are not available when required.

In the literature, there are studies advocating that school climate negatively or positively affects school works. In their study, Şenel and Buluç (2016) examined the correlation between school climate and school effectiveness level and found that school climate is a predictor of the school effectiveness.

Based on the results, they highlight that school administrations should work to enable teachers to work more comfortably, to focus on the development of their professions and their students, to strengthen both human and professional relations with each other rather than dealing with bureaucratic business transactions and paperwork.

Further, Balcı (1988) argues that the school climate should be kept in mind in terms of its effect on learning outcomes. An effective, safe, clean and supportive school should be organised so that its primary objectives can be achieved. In this regard, he maintains that there is a mutual dependence between educational and non-educational staff in the effective schools. In other words, all staff have an indispensable role in creating a climate that leads to effective teaching and learning in such schools.

Schools in which teachers are included in the decision-making processes related to technology integration are more motivated to increase their use of technology because they feel their wants and needs were considered. Furthermore, through supporting the implementation of tools, rewarding technology integration and creating a school climate encouraging technology integration, school principals can improve technology integration in their schools (Simonson, Scholosser, & Flores, 2017). In addition, Clark (2012) states that a supportive climate provides confidence to teachers in order to benefit from technology in instructional activities and affects student learning outcomes positively. Similarly, Bitner and Bitner (2002) emphasise the importance of developing an environment that encourages educators to innovate without anxiety. In this regard, a certain number of mistakes are unavoidable as technological devices are integrated into educational settings. The lesson learned from such failure should be considered as opportunities that can make positive contributions to success.

In the other study, Sayın (2017) examined the relationship between the school climate and teacher performance. The study concluded that school climate has a positive and significant impact on teacher performance. In addition, it was revealed that teachers and administrators indicate more professional performance in a positive school climate.

2.2.1. Teacher Collaboration

School environments are the leading indicators of teacher collaboration to create better teaching-learning activities and learning settings. In school settings, teacher collaboration is considered an important variable in increasing school reform movements. Given the widespread impact of teacher collaboration on the achievement of organisational objectives, it has become a necessity to attach importance to collaboration among individuals in schools (Gajda & Koliba, 2007; Schleifer, Rinehart, & Yanisch, 2017).

The literature concludes that the concept of collaboration is not specified explicitly. It is considered as a topic which could affect several dimensions of the school positively (Mora-Ruano, Gebhardt, & Wittman, 2018). In general, teacher collaboration is examined in terms of their effects and benefits to the school operations and school effectiveness. In this regard, Esslinger (2002) defines collaboration as a function that is undertaken and executed by two or more individuals to maximise work performance and job satisfaction. It demands a mutual purpose viewpoint (Mora-Ruano et al., 2018).

The proponents of teacher collaboration believe in working with teachers' positive impact on one another and improving schools naturally. When teachers rely on each other for support, they build trust and empathy relationships which are crucial in building professional relationships (Astate, 2017). OECD studies indicate that countries with higher performance are actively focused on building teacher cooperation that results in a better teaching and stronger student performance. It has been discovered that educational success is better in the school where people operate, design and learn with each other in collective units (Darling-Hammond, 2014).

Educators need to work more together in the restoration and reform of schools for the 21st century (Ferguson, 1999). That is, to continue learning and development as professional, educators must collaboratively improve their practices. In particular, the settings, desires, skills and responsibilities could be temporary, yet another aspect asserts that educational institutions may not change without individuals coming

together (Lieberman, 1986). Movements in schools for a common purpose can be achieved by creating environments that encourage collaboration in the school field. In other words, collaboration is an essential issue in the modern workplace, where people are expected to express their thoughts and to work together to reach intended goals (Haddad & Draxler, 2002). To support this view, Brown and Knowles (2007) claims that when teachers work together in a collaborative team, they feel better organised, more prepared, and have a support structure consisting of teachers and staff members. Without a doubt, even the most knowledgeable individuals working alone cannot achieve significant organisational goals and development (Peters & Waterman, 1982). In this regard, collaboration can be considered one of several factors that can enable teachers to become committed to their schools and to professional development (Schleifer, Rinehart & Yanisch, 2017).

Related to teacher collaboration's advantages for schools, Goddard, Goddard, and Tschannen-Moran (2007) reveal a critical viewpoint. They say schools could provide many chances for teachers to work together to enhance education, although not all schools. Such a commitment offers teachers the opportunity to learn from their colleagues. Within that sense, as a most crucial consequence of teacher collaboration, teachers would be able to improve their teaching experience. Low collaboration reveals teachers are hesitant to take personal risks. This case can be extremely high for teachers who have worked on their own for years. In this situation, collaboration allows teachers to step beyond relying on memories and observations of their own schooling and to collaborate with others on critical educational issues (Goddard, Goddard, & Tschannen-Moran, 2007).

Furthermore, teacher collaboration arises educators' work with one another to enhance success among students. It is not an activity to carry out and go on. It is a constantly altering and continuous activity that is only improved by social networks and access to new technologies. The advantage of it is not just the opportunity to benefit from different viewpoints. It involves the opportunity to share responsibilities students' learning. As teachers try together to share knowledge, resources, ideas and skills, students will learn more quickly and more accessibly. It refers to intentionally

constructed interpersonal relationships and means making an effort to reach healthy interdependence which is formed when teachers are volunteer for giving and receiving help without losing accountability (Davis, 2020).

TALIS highlights that school leadership's efficiency is aligned with the growth of school-based technical teaching groups. It notices that schools, where the principal insists on training and teaching and includes others in decision-making, are more likely to be environments in which teachers show collaboration to develop their educational competencies. That is, teachers, participate in collaborative discussion, can express a mutual sense of mission and an emphasis on educating students in these schools (OECD, 2013).

Educational reforms and innovation efforts like technology integration mostly aim to enhance learners' success by improving teaching standards for teachers (Schleifer, Rinehart, & Yanisch, 2017). In this regard, the focus point of the current study is to examine the relationship between teacher collaboration and teachers' technology integration. In literature, there are views and studies maintaining teacher collaboration's relationship with technology integration issue that is an educational reform in schools. In this context, Common (1983) reveals that the institutionalisation of innovation can be very difficult as schools have more homeostatic forces than innovative force. Besides, an assumption pointing that innovation movement comes from decision-maker or non-teacher may prevent teachers' improvement in technology. Serious dedication to innovation takes place only after teachers see that it helps them teach their students. This kind of transition is not happening rapidly, however, is evolving over a period. Although to highlighting time as a crucial factor, researchers also emphasise the importance of encouraging organisational support and collaboration among teachers for the acceptance of innovations (Common, 1983).

Furthermore, in their study, Drossel, Eickelmann and Gerick (2016) examined the predictors of educators' technology usage. In this regard, they analysed the International Association for the Evaluation of Educational Achievement (IEA) study. They included teacher collaboration as a predictor variable into their study and revealed it as an important factor in many countries for improving instruction.

Moreover, teachers could benefit one another by offering support and guidance and exchanging current strategies about technological tools integration to education (Wesley & Franks, 1996). Teachers' repeated interactions may guide them know more about technology tools to include them into teaching (Becker & Anderson, 1999). On the other hand, teacher isolation is considered one of the main challenges for the efficient use of technology in school classrooms (Sandholtz, Ringstaff, & Dwyer, 1992).

Related to teacher collaboration and technology integration relationship, Stevenson (2004) performed research to investigate the significance of teacher collaboration as a way of technological development linked to the usage of educational technologies. Study acknowledges that educators can learn about technology from their friends, but the importance of collaboration has been poorly understood in developing the ability of teachers to use technology. The research reflects on the perspectives of teachers on their collaboration for gaining technological literacy skills. Based on the study result gathered from the data collection tools, it was revealed collaboration is much more productive than the operationally organised or funded programs in terms of technical skills advancement. Study also indicates that comparing school cultures in which the teachers collaborate widely with schools where personnel typically are not willing to common work may enlighten the reasons of the differences in promoting skilled technology development. As well as that, collaboration among teachers seems to facilitate the professional advancement regarding teachers' use of technological tools.

Moreover, Vangrieken, Dochy, Raes and Kyndt (2015) conducted a comprehensive study of teacher collaboration. In this context, a remarkable finding of the research is that an important gain of teacher collaboration is the improved technology competency of teachers. Similarly, in their study, Zayim and Kondakçı (2015) highlight the importance of having a positive environment for changes and the standard of teacher collaboration effectively to decrease the uncertainty and to encourage teachers' competencies in coping with changes. They reveal that teachers can honestly share difficulties and tell peers for assistance; therefore, educators guide as advisors to each other as there are difficulties in adopting the change.

Within the scope of the current study, the following hypothesis was generated related to teacher collaboration:

Hypothesis1: Teacher collaboration associates with teachers' technology integration.

2.2.2. Trust in School Principal

Trust is one of the crucial elements influencing organisations' performance and success, so researches in various disciplines are focusing on this issue (Özer & Atik, 2014). The importance of the trust among people and relationships in the organisations is becoming more and more apparent (Tschannen-Moran & Hoy, 1998).

At the point of profoundly examining the issue of trust, it can be clearly stated that trust is complicated. It is hard to identify since it relates to a variety of actors and changes with perceptions arising from various types of interactions over time. Therefore, researchers differed in the dimensions of trust. In the past four decades, several trust meanings have been put forward, but the exact meaning of trust is still uncertain. Trust concept is spreading swiftly in education and other fields, but no widely agreed meaning of that appears to exist (Tschannen-Moran & Hoy, 1998). In this context, many definitions have been made in the literature on the subject of trust, and the most popular ones are as follows. Specifically, trust is the willingness of an individual to become open to another person or group on the ground that the latter is friendly, trustworthy, capable, truthful and open (Balyer, 2017). In the other definition, made by Cummings and Bromily (1996), trust is considered as an effort being faithful to the explicit or implicit commitments that a person has given to other people or groups, showing an honest attitude during the commitment phase and not taking advantage of someone else when the opportunity is available.

The issue of trust draws attention as an issue that needs to be addressed primarily in the functioning and climate of organizations. Trust allows individuals to focus and learn more effectively on their responsibilities (Tschannen-Moran & Hoy, 1998). In reality, in the absence of it in organizations, people reject risks (Tyler & Kramer, 1996).

In this context, considering that schools are one of the basic building blocks that contribute to the formation of the society, it is vital to discuss the issue of trust carefully in these environments. Individuals and groups largely depend on others in schools. Such interdependence implies the need for trust to some degree to enable continuous, numerous relationships that happen among the member of the school (Price, Moolenaar, Tschannen-Moran, & Gareis, 2015). There is relatively little trust study in literature, given its significance. Existing studies show that trust in schools involves four elements: teachers, principals, students and parents. Of these elements, teachers' trust in school principals is crucial and the basis of establishing a school structure dominated by trust (Balyer, 2017).

School principals are in the key position for schools in altering the level of trust (Bryk & Schneider, 2004). Trust in school principal, in this sense, implies the trust that principals can hold their commitment and behave for teachers' serenity (Hoy & Kupersmith, 1985). It is clear that school principals' attitudes and lead competencies significantly influence the motivation of teachers, job satisfaction, cooperation, and that these aspects are all related to the trust environment built in the school (Tschannen-Moran, 2001).

In a different view, it is asserted that the teachers' trust in school principals contributes to their professionalization. Trust in school principal provide teachers with autonomy which is one of the crucial factors of teacher professionalism (Lai and Lo, 2007). In this context, autonomy gives teachers the opportunity to develop their training and to carry out qualified activities in their classrooms. Thus, professionally trained teachers can take responsibility of teaching process with their knowledge and skills and reflect various techniques and methods to their practice in the classroom. (Hargreaves, 1994).

Regarding school principals' effect on building an environment of trust in their schools, various suggestions are included in the literature. In this direction, it can be clearly stated that school principals identify their own destiny by their attitudes and behaviours feeding trust or distrust in their school (Tschannen-Moran, 2001). At this point, school principals could be more likely to be trusted when they are available and give importance to the viewpoints and recommendations provided by teachers, staff,

parents, and even students. Furthermore, the school principals should be competent in their roles as educational leaders in order to promote trust. They must be familiar with trust issue. They should realize that it takes time to create reliable relationships that help schools achieve their goals, and the time spent on creating and maintaining these relationships is efficient. It should not be forgotten that a school principal who is not trusted by the staff at the school is unlikely to be successful in fulfilling the basic task of promoting student learning (Price et al., 2015).

According to Topaloğlu (2010), as trust in school principal and administration increases, participation in decisions, job satisfaction, performance, organizational commitment, information sharing, seeking reconciliation, willingness to strive for the well-being of the institution, voluntary acceptance of corporate decisions and efficiency increase. In addition, negative attitudes such as conflict and unhappiness at work are significantly reduced. Participation in decisions and information sharing with staff feed the trust between principals and staff, which increases loyalty and productivity.

Within this research, one of the focus is the relationship between trust in school principal and teachers' technology integration. In literature, there has been limited researches inspecting this issue. Studies are generally related to the impact of trust on teachers' professional development and their ability to keep up with changing trends. From this perspective, Zayim and Kondakçı (2015) examined association between readiness for change and trust in the organization. In this context, they revealed that trust in the school principal has generated a meaningful association with readiness for change. This result suggests that teachers, trusting to their principals, usually believe in and are able to adopt and implement changes. Otherwise, teachers may be left with unresolved questions in the presence of mistrust; therefore, they may not recognize the value of efforts to change for themselves and their school and therefore not start embracing them.

In the other study, Balyer (2017) examined the trust of teachers towards school principal. Teachers' viewpoints were gathered via interviews. Study findings revealed that trust in school principal has a major impact on the success of teachers and the

peace of work. Study apparently revealed the importance of the fact that teachers must trust the school principal as an administrator in order to feel reliable and in order to devote their efforts to educational objectives of schools. In addition, It was claimed that trust in school principal and its implementation is crucial in school settings because teachers may do their best and feel that they may be promoted in a trust dominated structure (Balyer, 2017).

Further, in their study, Price, Moolenaar,Tschannen-Moran & Gareis (2015) investigated the relationships between trust in school principal, basic leadership behaviors, school climate and student success. They found that trust in school principal was associated with both professional and instructional leadership perceptions. In addition, they revealed that student success was also associated with trust, school principals' leadership skills and school climate.

Lastly, Koşar (2015) studied the relationship between professionalism of primary and secondary school teachers and their feelings about trust in school principal. Within the study, teacher professionalism described as an environment where students learn from teachers and develop themselves effectively. In other words, teacher professionalism was considered as the key issue for teaching activity and its improvement. In this regard, study investigated the importance of trust in school principal on teacher professionalism and found that trust in school principal is an important actor for the primary and secondary school teachers' professionalism.

Within the scope of the current study, the following hypothesis was generated related to trust in school principal:

Hypothesis2: Trust in school principal associates with teachers' technology integration.

2.2.3. School Bureaucratic Structure

The concept of bureaucracy is mostly handled with its negative aspects and identified with concepts, such as rigidity, meaningless rules, paperwork and inefficiency (Lunenberg & Ornstein, 2012). In fact, bureaucracies could be harmful to their stakeholders; however, it reveals a single aspect of the subject (Hoy & Sweatland

2001). In this regard, researches maintain two different views on the results of bureaucracy regarding employees. The negative view asserts that the bureaucracy is alienated, nurtured dissatisfaction, prevented creativity and do not motivate employees, while the positive opinion put forwards that bureaucracy offers the necessary guidance, makes responsibility clear, and helps people perceive better (Hoy & Miskel, 2005). Namely, researches on this issue reveal that bureaucracies can also enhance innovation, decrease role conflict and reduce feelings of alienation (Hoy & Sweatland, 2001).

The pioneering studies on bureaucracy was conducted by the famous German socialist Max Weber who studied comparatively the organisations existing at the beginning of the 12th century. Weber introduced the bureaucracy model as an optimal method of organisations' structures (Lunenberg & Ornstein, 2012). He states that to have modern organisational structures functioning effectively, it must have bureaucratic features (Etzioni, 1964).

In this regard, Abbott (as cited Hoy & Miskel, 2005) suggests that schools have a highly developed bureaucracy. That is, schools are formal organisations with many of the same characteristics that bureaucratic organisations have. They use the strategies of military, industry and public institutions, which can be compared with them. Therefore, the bureaucratic model is a structure adopted by many school administrations, and various researchers have explained that this model can be used to analyse the behaviour in schools. In this context, a far more useful approach than classifying schools as bureaucratic and non-bureaucratic is to investigate the degree of bureaucratic model in schools that is suitable for the essential components of the Weber model (Hoy & Miskel, 2005).

Further, Hoy and Sweetland (2001) examined the structure in schools in terms of the two main characteristics for bureaucracies: formalization and centralization. Formalization is a concept related to the extent to which an organization has written rules, regulations, procedures and policies. Adler and Borys (1996) described formalization as enabling and coercive as a more detailed conceptual study. Hoy and

Sweetland (2001) used Adler and Borys' enabling formalization and coercive formalization conceptualization to study school structures.

Table 3

Contrasting Enabling and Coercive Formalization (Hoy & Sweetland, 2001, p.299)

Characteristics of Enabling Rules and Procedures	**Characteristics of Coercive Rules and Procedures**
Enabling Formalization Characteristics	Coercive Formalization Characteristics
Engage in interactive dialogue	Frustrate two-way communication
View problems as opportunities	View problems as obstacles
Foster trust	Foster mistrust
Value differences	Demand consensus
Learn from mistakes	Punish mistakes
Delight in the unexpected	Fear the unexpected
Facilitate problem solving	Blindly follow the rules

Coercive rules and regulations penalize employees instead of rewarding successful activities. Rather than encouraging institutional learning, coercive procedures pressure unwilling employees to obey. On the other hand, enabling formalization makes it easier for subordinates to cope with the problems and crises via the rules and procedures, providing flexible guidance. Enabling processes encourage interactive dialogue, point out problems as opportunities, increase trust, emphasize the importance of differences, learn from mistakes and offer a positive approach towards unexpected situations (Hoy & Sweetland, 2001). Unlike enabling procedures, coercive procedures hinder two-way communication, spread autocracy, see problems as obstacles, promote mistrust, want consensus to be a priority, disregard differences, prefer punishment for mistakes, worry at the unexpected and expect blind obedience to the procedures. Enabling structures have the dominance of participation, cooperation and trust in management, but coercive systems are top-down, unilateral and rigid (Hoy & Sweetland, 2001).

As for centralization, it can be described as the focus of check, which determines to what extent employees will be involved in decision-making processes. In this context, excessive centralization means the effectiveness of very few people, but low centralization means the effectiveness of many people in decision-making processes. Excessive centralization is often challenging and argues that the directives from above

must be followed without question and that the hierarchy exists to implement the discipline flawlessly.

Similar to formalization, there are two types of authority structures in centralization: enabling and hindering.

Table 4

Contrasting Enabling and Hindering Centralization (Hoy & Sweetland, 2001, p.301)

Enabling Centralization Characteristics	Hindering Centralization Characteristics
Facilitates problem solving	Frustrates problem solving
Enables cooperation	Promotes control
Collaborative	Autocratic
Flexible	Rigid
Encourages innovation	Discourages change
Protects participants	Disciplines subordinates

Hindering centralization cares about management and hierarchy rather than solving the participants' problems and guiding them in their works. In these structures, hierarchy prevents the effective implementation of innovation. Moreover, administrators in hindering bureaucracies utilize their authority mostly to discipline individuals. Conversely, enabling centralization plays an important role in solving problems by guiding employees rather than preventing their work. It is a combination of authority, which seeks to ensure the confidence and initiative of members in their professional roles. This kind of strategy transforms centralization from being rigid, autocratic and controlling into a flexible and collaborative structure. In these structures, administrators employ their powers to support individuals and to design environments that make learning-teaching processes easier (Hoy & Sweetland, 2001).

When the bureaucracy is considered in terms of schools, it can be said that the bureaucratic structure can affect the functioning of the school directly or indirectly (Özer & Dönmez, 2013). Enabling bureaucracy is a hierarchy guiding instead of blocking, and is a system of rules facilitating problem-solving instead of punish failures. In enabling school structures, school members work in collaboration, maintaining their different roles and adhering to their authority limits. Hierarchy and rules in such structures are mechanisms that support teachers instead of being a tool to increase the principal's power. On the contrary, hindering school structure is a

hierarchy that causes obstructions by imposing compelling rules. The key goal of this hierarchy is to ensure that individuals are disciplined. Therefore, teacher behaviour is closely followed. This structure is used to ensure that unwilling, inadequate and irresponsible teachers act in the way their administrators command. The principal's power was increased, but the teachers' work was reduced. These two school structures have contradictory features. In short, enabling school structure has positive results, and the hindering school structure has negative results. In other words, enabling structures are functional, and hindering structures are not functional controlled (Hoy & Miskel, 2005).

In literature, several studies evaluate the association between schools' bureaucracy and certain operational features. In this regard, Cerit (2012) examined the association between the bureaucratic structure of schools and professional actions of the teachers. The findings of the study showed that the bureaucratic structure of the school was related to the professional behaviour of classroom teachers and substantially predict the professional practice. In another study, Parlar and Cansoy (2017) investigated the correlation between the successful operating of school bureaucracies and the culture of teacher leadership. The study was designed as a sequential mixed model approach. The findings displayed that school bureaucracies relate to professional cooperation, school principal's support and supportive work environment.

Furthermore, Sweetland (2001) investigated the relationship between empirical measures of authenticity and enabling school structures. In the study, two issues are examined. The first one is related to the extent to which the enabling school structure facilitates authenticity among school staff like teachers and principals. The second is about to the extent to which enabling school structure facilitates a sense of power in teachers. The results of the study indicate a clear association among enabling bureaucracy, authenticity and the sense of power of the teacher. Based on these findings, the author claimed that the enabling structures allow teachers to interact openly, truthfully and authentically. The study also showed that school leaders should work towards creating and achieving enabling organizational systems instead of hindering them. Similarly, rules and regulations in bureaucratic structures should

encourage solutions to problems and crises, and maintain guidance for normal operations.

In the other study, Gilmore (2007) conducted a quantitative study to investigate the relationship among the variables of change into a professional learning community, faculty trust in school principal, and enabling school structures. Strong and significant associations were found between the variables. Within the study, it was revealed that schools showing enabling bureaucracy characteristics with a strong level of trust in the in principals are better in introducing a change to skilled instructional settings. Besides, school with an enabling school structure adapt to change more easily and are more successful in being a professional learning community. In this regard, it is easier to keep up with change and to be a learning organization in schools where trust in principal is high, and the school structure is enabling. These results are remarkable in terms of guiding the success of technology-based reform movements currently implemented in schools.

Lastly, Oldaç (2016) conducted a study to examine the relationship between student achievement and a set of school-level variables, consisting of distributed leadership, academic optimism, teacher collaboration and enabling school structure. Data was gathered from 23,053 students and 426 teachers. Concerning the relationship between formal school structure and student achievement, the study results indicated a non-significant correlation for enabling school structure and a significant correlation for hindering school structure. Study concluded that the presence of a hindering school structure is far more powerful than the presence of enabling bureaucracy on student achievement.

Within the scope of the current study, the following hypotheses were generated related to technology leadership:

Hypothesis 3: Enabling school structure associates with trust in school principal.

Hypothesis 4: Enabling school structure associates with teacher collaboration.

2.3. Technology Leadership

Technology integration into all areas of life from industry to education are increasing continuously. In this context, the topic of technology leadership is a key issue for these fields. Regarding the educational area, the school principal's technology leadership skills are considered an important issue to need to be developed. In schools with technology infrastructure equipped with rich information technologies, there is a need for managers who will plan and lead the technology integration to obtain the desired benefit effectively. Despite such large investments in technology in education, failure to achieve the desired results is an issue that should be addressed in the context of technology leadership (Anderson & Dexter, 2005).

It is clear that technology integration throughout a school system is in itself crucial systemic reform, so technology leadership has an important effect on this reform movement. That is, technology leadership and the implementation and maintenance of systemic reforms in schools are closely associated with each other (Creighton, 2003). It reflects all practices relevant to technology at school like management actions, strategies and application of technological tools (Dexter, 2011).

Changing world standards and needs lead the school principal as the technology leader to discover, evaluate, install, operate all kinds of new technology and to be a guide and driving force in teaching processes. In this context, principals ought to recognize how technology will facilitate instruction, be properly positioned as a topic to benefit the program, to help the development of the entire education system (Schrum, Galizio, & Ledesma, 2011). Based on Creighton (2003), the leadership put forward by today's school administrators is considered as outdated and useless unless it guides the challenges posed by the technological tools offered to schools. He reveals the principal's mission to develop and incorporate innovative approaches that support teachers identify, appreciate and connect technology into education. That is, equipping schools and classrooms with more hardware and software does not always offer meaningful learning for students. This situation is mostly related to whether schools and its member accept these technologies or not. At this point, the most important task

that should be done by the school principal is to create a road map and plan on how to apply this technology effectively in educational processes.

School principals are one of the key factors affecting change and technology integration movements in schools (Wilmore & Betz, 2000). The actions exhibited by the principal, his interests and professional self-efficacy have a significant impact on the ongoing climate, applied programs and teaching practices, so it is expected from effective principal to have knowledge, dispositions and performance (Afshari, Bakar, Luan, Samah, & Fooi, 2008). In this context, they should have competencies to incorporate digital systems effectively to working activities and demonstrate strong and constructive guidance for the incorporation of technological assets. Besides, they should be capable of focusing on the unique interests of teachers to gain progress in technical transformation instead of buying and implementing programs filled with fancy hardware and software (Creighton, 2003). That is, they must be able to know very well the capabilities, benefits and drawbacks of modern technologies, provide professional expertise in their usage and develop a community that encourages further use of emerging technological tools (Schiller, 2003).

Furthermore, school principals should strive to improve their organizational performance by using technology to provide more qualified education and training services to the students. It is only achievable through school principal's guidance in development in technological skills. In this context, school principals need to be peaceful with newer technologies and even put them among the indispensables of their daily life in order to perceive, make sense, organize and deliver all kinds of information that come from outside the school and produced within the school (Sincar, 2009).

ISTE (2018b) have also introduced certain principles regarding the competencies and responsibilities that need to be fulfilled by principals. According to these principles, it is expected from school principals using technological advancements to promote equality, participation and digital citizenship activities and involve others in creating a strategy, development plan to transform instructional operations. Moreover, they must develop a climate where teachers and learners have the authority to benefit from technology innovatively. Similarly, they need to strengthen educational activities and

develop structures to introduce, maintain and continuously enhance the usage of technologies in instruction. In this way, school principals guide their subordinates and students about innovations and encourage them to stay new.

In literature, a variety of research examine the position of school leaders in the incorporation of technological tools into educational fields. To begin with, Thannimalai and Raman (2018) performed an investigation to examine the extent of technology leadership for school principals and examine the correlation between principals' technology leadership and teachers' technology integration. They gathered data from 90 principals and 645 teachers using systemic random sampling. The findings of the study showed a significant correlation between technology leadership for principals and the integration of technology for teachers.

In another study, Ünal, Uzun and Karataş (2015) focused on revealing the degree of self-efficacy of school principals' technology leadership skills. The analysis was designed as a survey research. The sample comprised of 320 school principals. The findings displayed that school principals' technology leadership self-efficacy is at the desired level. The study showed that while the variables of professional seniority and in-service training create considerable gaps, the variable of the school level did not cause a noticeable gap in school principals' technology leadership self-efficacy.

In the other study, Afshari, Bakar, Luan, Samah and Fooi (2008) aimed to examine how the usage of technology in education was impacted by leadership. A questionnaire was applied to 30 school principals to analyse their technology usage levels, technology competencies and leadership styles. The findings revealed that principals used computers two or three times a week for various educational and administrative tasks. The study also suggested that the idea of transformational leaders could increase technological tool integrations into educational settings. The results of the study argued that effective technology leadership would be possible only by increasing the competencies of principals in the use of technology and displaying guidance.

In addition, Banoğlu (2011) carried out research analysing the competence of school administrators in technology leadership. More specifically, school principal's

technology leadership competence was investigated considering the demographic features of the school principal, the grade of school and the involvement of an IT supervisor. The population of the research was 134 school principals. The study findings revealed that school principals performed successful performance in their technology leadership competence. The other significant result is that women principals are better technology leaders, particularly in leadership and vision dimensions. In addition, the study was reported a striking result that the IT supervisor teacher significantly increased the technology leadership competencies of school principal.

Watt (2009) conducted a study to analyse the relationship between technology leadership and teachers' technology integration. The sample of the study consisted of 968 teachers and 44 administrators from 32 public schools. While the claim that the success of technology integration largely depends on technology leadership in the literature, the results of this study suggest that the technology leadership shown by school principals does not correlate positively with technology integration.

In the other study conducted by Gürfidan (2017), the relationship between technology leadership and teachers' technology integration examined. The dataset collected from 396 teachers working at the 20 high schools in Isparta, Turkey. Similar to Watts (2009), study findings displayed that technology leadership does not show a direct positive effect on teachers' technology integration.

Furthermore, Irmak (2015) conducted a research to examine the perceptions of primary and secondary school teachers about the technology leadership competencies displayed by school principals and to analyse how technology leadership affects teachers' educational activities. In this regard, 3933 teachers working in 139 schools constituted the sample of the research carried out in the 2012-2013 academic year. Unlike Watts (2009) and Gürfidan (2017), the study results revealed that the level of school principals' technology leadership attitudes is effective in teachers' technology integration performance. Moreover, the high-level demonstration of technology leadership attitudes of school principals has an impact on learning environment efficiency. Therefore, the study suggested that school principals would include a long-

term technology growth strategy and be competent in technology leadership. Additionally, the study concluded that school administrators and teachers must be qualified to utilise technology efficiently in instructional activities.

Within the scope of the current study, the following hypotheses were generated related to technology leadership:

Hypothesis 5: School principal's technology leadership associates with teachers' technology integration.

Hypothesis 6: School principal's technology leadership associates with enabling school structure.

Hypothesis 7: School principal's technology leadership associates with trust in school principal.

In the study, following correlations among variables were hypothesized in line with literature.

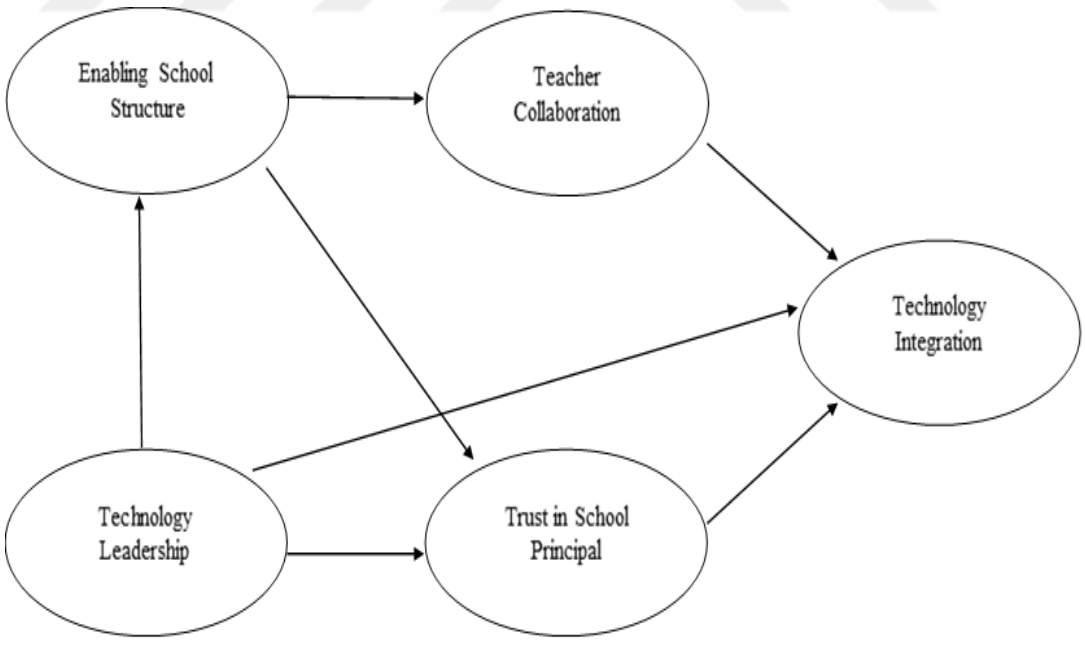

Figure 2. Hypothesized Structural Model

CHAPTER 3

METHOD

3.1. Design of the Study

The purpose of this research is to analyse the relationship between the variable of teacher collaboration, trust to school principal, school principal's technology leadership, enabling school structure and teachers' technology integration. To investigate the relationship between variables, correlational research method was used in this research. Correlational approach is useful in predictive studies. That is, if there is a correlation of significant degree between two variables and a score on the other variable is identified, it is possible to estimate a score on one variable (Fraenkel, Wallen, & Hyun, 2015). As a correlational technique, Structural Equation Modelling (SEM), which is a multivariate statistical analysis technique, was used because it is useful to evaluate direct, indirect and correlated effects of several variables in a hypothesised model (Kline, 2011). Besides, it is just an important way to function concurrently on the correlation between the precedents and the outcomes of the conceptions (Oreg, 2006).

3.2. Population and Sampling

The population of the research consists of teachers 610905 teachers from several branches working in countrywide schools affiliated to the General Directorate of Basic Education and General Directorate of Religious Education of MoNE. In the research, convenience-sampling method was used. The sample of the research consists of 13487 teachers who were reached in population and voluntarily participated in this study. Within the current study, convenience-sampling was applied in the following way. First, the data collection tool was uploaded to MoNE' online data collection system, which is reached by all public school teachers via their username and password. After uploading data collection tool to the system, announcement e-mail was sent to all provinces in Turkey. Based on the announcement e-mail, data collection tool was filled

in by teachers working in countrywide schools affiliated to the General Directorate of Basic Education and General Directorate of Religious Education of the Ministry of Education (MoNE) in Turkey. Finally, a large volume sample was obtained from teachers working in schools across Turkey. Frequency and percentage distributions related to participants' demographic characteristics are presented in the tables below:

Table 5

Distribution of Participants by Gender

Gender	Frequency *(f)*	Percent *(%)*
Female	8118	60.2
Male	5369	39.8
Total	13487	100,0

According to table 5, sample consisted of 8118 (60.2%) female and 5369 (39.8%) male participants.

Table 6

Distribution of Participants by Age

Age (year)	Frequency (*f*)	Percent (%)
20-30	2179	16,2
31-40	5857	43,4
41-50	3792	28,1
51 +	1659	12,3
Total	13487	100,0

Considering the age of participants, sample consisted of 2179 (16.2%) 20-20 year, 5857 (43.4%) 31-40 year, 3792 (28.1%) 41-50 year and 1659 (12.3%) 51+ participants.

Table 7

Distribution of Participants by Professional Seniority

Professional Seniority (year)	Frequency (*f*)	Percent (%)
less than 1 year	25	.2
1-5	1952	14.5
6-10	3075	22.8
11-15	2678	19.9
16-20	2162	16.0
21 +	3595	26.7
Total	13487	100.0

According to table 7, sample consisted of 25 (.2%) less than 1 year, 1952 (14.5%) 1-5 year, 3075 (22.5%) 6-10 year, 2678 (19.9%) 11-15 year, 2162 (16.0%) 16-20 year, and 3595 (26.7%) 21+ year participants.

Table 8

Distribution of Participants by Educational Status

Age (year)	Frequency (*f*)	Percent (%)
Two-Year Degree	517	3.8
Bachelor's Degree (BS)	12024	89.2
Master's Degree (MS)	924	6.9
Doctorate (Ph.D.)	22	.2
Total	13487	100.0

Considering the educational status of participants, sample consisted of 517 (3.8%) two-year degree, 12024 (89.2%) bachelor's degree, 924 (6.9%) master's degree and 22 (.2%) doctorate graduate of participants.

Table 9

Distribution of Participants by Branch

Branch	Frequency (*f*)	Percent (%)
Physical Education	451	3.3
Information and Communication Technologies	355	2.6
Religious Culture and Moral Education	782	5.8
Science	820	6.1
Visual Arts	221	1.6
Elementary Mathematics Education	961	7.1
Imam-Hatip Vocational Courses	239	1.8
Music	181	1.3
Early Childhood Education	876	6.5
Special Education	166	1.2
Guidance	400	3.0
Classroom Teaching	4574	33.9
Social Studies	666	4.9
Technology and Design	319	2.4
Turkish	1067	7.9
Foreign Language	1080	8.0
Others	329	2.4
Total	13487	100.0

Regarding the branches of the participants (table 9), sample consists of 451 (3.3%) physical education teachers, 355 (2.6%) information and communication technologies teachers, 782 (5.8%) religious culture and moral education teachers, 820 (6.1%)

science teachers, 221 (1.6%) visual arts teachers, 961 (7.1%) elementary mathematics education teachers, 239 (1.8%) imam-hatip vocational courses teachers, 181 (1.3%) music teachers, 876 (6.5%) early childhood education teachers, 166 (1.2%) special education teachers, 400 (3.0%) guidance teachers, 4574 (33.9) classroom teaching teachers teachers, 666 (4.9%) social studies teachers, 319 (2.4) technology and design teachers, 1067 (7.9) Turkish teachers, 1080 (8.0) foreign language teachers and lastly 329 (2.4) teachers from other branches.

Table 10

Distribution of Participants by Graduation Department

Graduation Department	Frequency (*f*)	Percent (%)
Physical Education	429	3.2
Information and Communication Technologies	344	2.6
Biology	253	1.9
Geography	102	.8
Child Development and Education	98	.7
Religious Culture and Moral Education	377	2.8
Electrical and Electronics Education	8	.1
Philosophy	64	.5
Science	601	4.5
Physics	164	1.2
Visual Arts	266	2.0
Elementary Mathematics Education	691	5.1
Theology	635	4.7
Chemistry	201	1.5
Math	243	1.8
Engineering Departments	182	1.3
Music	175	1.3
Early Childhood Education	768	5.7
Special Education	107	.8
Guidance	334	2.5
Health Departments	10	.1
Classroom Teaching	3580	26.5
Social Studies	454	3.4
Agriculture	14	.1
History	269	2.0
Turkish Language and Literature	332	2.5
Turkish	811	6.0
Foreign Language	1210	9.0
Others	765	5.7
Total	13487	100.0

Considering the graduation departments of the participants (table 10), sample consists of graduates teachers from several departments like 29 (3.2%) Physical Education, 344 (2.6%) Information and Communication Technologies, 253 (1.9%) Biology, 102 (.8%)

Geography, 98 (.7%) Child Development and Education, 377 (2.8%) Religious Culture and Moral Education, 8 (.1%) Electrical and Electronics Education, 64 (.5%) Philosophy, 601 (4.5%) Science, 164 (1.4%) Physics, 266 (2.0%) Visual Arts, 691 (5.1%) Elementary Mathematics Education, 635 (4.7%) Theology, 201 (1.5%) Chemistry, 243 (1.8%) Math, 182 (1.3%) Engineering, 175 (1.3%) Music, 768 (5.7%) Early Childhood Education, 107 (.8%) Special Education Teachers, 334 (2.5%) Guidance, 10 (.1%) Health, 3580 (26.5%) Classroom Teaching Teachers, 454 (3.4%) Social Studies, 14 (.1%) Agriculture, 269 (2.0%) History, 332 (2.5%) Turkish Language and Literature, 811 (6.0%) Turkish, 1210 (9.0%) and lastly 765 (5.7%) other departments.

3.3. Data Collection Procedure

Firstly, the permission from Middle East Technical University Human Subjects Ethics Committee related to the subject and content of the study was received. The permission document is added to Appendix A.

Afterwards, a request was made to Ministry of National Education for the use of data collection module and for the implementation of data collection tool to teachers working in General Directorate of Basic Education and General Directorate of Religious Education across 81 provinces. The Ministry provided the necessary permission, and the questionnaire was applied to the target group. The letter of application and the permission of MoNE added to Appendix B. Finally, the data collection tool was entered into the online data collection module and filled on a voluntary basis by the teachers.

The questionnaire used in data collection consists of six sections. The first section includes participants' demographic information like gender, age, professional seniority, education status, branch, graduation department. The other sections include questions related to Teacher Collaboration, Trust to School Principal, School Principals' Technology Leadership, Enabling School Structure and Technology Integration. Details about the scales used to collect data from teachers are clarified in the instrumentation part.

3.4. Instrumentation

For this research, five measurement instruments were used. The detail about these scales are following:

3.4.1. Teacher Collaboration Subscale

Within the current study, to collect data on teacher collaboration variable, teacher collaboration subscale of the teacher leadership culture scale, developed by Demir (2014), was used. The main scale has three subscales, which are teacher collaboration, managerial support and supportive work environment. The study group to develop scale consisted of 347 teachers, working in public primary schools in Burdur. For the reliability studies of the scale, Cronbach Alpha coefficient formula, an internal consistency approach, was used, and the results were confirmed with the composite reliability value. The calculated alpha internal consistency coefficient for the "Teacher Collaboration" subscale was 0.88, and composite reliability value was 0.93. The construct validity of the scale was tested by two-level hierarchical confirmatory factor analysis. The analyzes showed that the developed scale could be regarded as a valid and reliable instrument. Teacher collaboration was revealed as one of the three subscales, and consists of 8 Likert-type items ranged from 1 (strongly disagree) to 5 (strongly agree). The sample items from the teacher collaboration subscale like "At this school, we share the learned new ideas and methods with our colleagues" and "At this school, teachers share course materials". Within the current study, the Cronbach alpha value of the scale was also computed and reported as .92 for teacher collaboration subscale. Regarding model fit, a measurement model was tested, and the details were presented in the results part. Besides, permission was obtained from the developer to use the subscale in this study.

3.4.2. Trust to Administrator Subscale

To gather data on the trust in school principal variable, trust to administrator subscale of the organizational trust of school scale, developed by Daboval, Comish, Swindle and Gaster, translated in Turkish by Kamer and reassessed by Yılmaz (2005), was used. In this regard, Yılmaz (2005) conducted the validity and the reliability study of the scale. For this purpose, the data gathered from the teachers working in the primary

schools in the Central Anatolia Region between March and April 2005. Next, the construct validity study was carried out by using factor analysis method. As a result of factor analysis, trust to administrator was found one of four subscales (sensibility to workers, trust to administrator, openness to modernity and communication climate). Total reliability coefficient of the scale was found 0.97, and the reliability coefficient of trust to administrator subscale is 0, 95. The subscale includes 12 Likert-type items ranged from 1 (strongly disagree) to 6 (strongly agree). The sample items from trust to administrator subscale like "The principal deals with the problems of the teachers" and "The principal listens to the teachers' suggestions". In this regard, within the current study, Cronbach alpha values of the scale was computed and reported as .97 for trust to administrator subscale. Related to model fit, a measurement model was tested, and the details were presented in the results part. Besides, permission was obtained from the developer to use the subscale in this study.

3.4.3. Vision Subscale

To collect data about school principal technology leadership from the perspective of teachers, vision subscale of the elementary school principals' technology leadership role scale was used. This scale was developed by Sincar (2009). The validity and reliability studies of scale was carried out by him. The scale has four dimensions which are human-centred (α=.94), vision (α=.92), communication-cooperation (α=.91) and support (α=.91). In this regard, the vision subscale consists of 7 Likert-type items ranged from 1 (never) to 5 (always). The sample items from the vision subscale like "The principal has a vision for the effective use of educational technologies at school" and "The principal has long-term technological development plans". Moreover, Cronbach alpha values of the scale was computed for the current study and reported as .97 for vision subscale. Regarding model fit, a measurement model was tested, and the details were presented in the results part. Besides, permission was obtained from the developer to use the subscale in this study.

3.4.4. Enabling Bureaucracy Subscale

Within the scope of this study, enabling bureaucracy items of the Turkish adaptation of Enabling School Structure Scale were used. The scale was initially developed by

Hoy and Sweetland (Hoy & Sweetland, 2001). The Turkish adjustment of Enabling School Structure Scale (ESSS) was done Buluç (2009). Then, the scale was reassessed by Özer and Dönmez (2013). According to the findings of the authors' reliability and validity checks, the Turkish form of ESSS is opposite to its original type, a two-factor scale as enabling bureaucracy and hindering bureaucracy. The Cronbach alpha results are .806 for enabling and .774 hindering bureaucracy. The enabling bureaucracy subscale consists of 6 Likert-type items ranged from 1 (never) to 5 (always). The sample items from the enabling bureaucracy subscale like "Administrative rules help rather than hinder" and "Administrative rules in this school are guides to solutions rather than rigid procedures". Furthermore, Cronbach alpha values of the scale was computed for this study and reported as .89 for enabling school structure subscale. Regarding model fit, a measurement model was tested and the details were presented in the results part. In addition, permission was obtained from the developers to use the subscale in this study.

3.4.5. Technology Integration Scale

To gather data related to teachers' technology usage frequencies, Technology Integration Scale, developed by Karaca, Can and Yıldırım (2013), was used. The scale includes 10 Likert-type items ranged from 1 represents "Never", and 5 represents "Always". The sample items from scale like "to develop tests and exam questions" and "for drill and practice". The Cronbach alpha coefficient of the scale is .84. For the purpose of the current study, the Cronbach alpha values of the scale was also computed and reported as .89. Regarding model fit, a measurement model was tested, and the details were presented in the results part. In addition, permission was obtained from the developer to use the scale in this study.

3.5. Data Analysis

Within the scope of the study, it was aimed to test a model exploring the relationship between the variables of teacher collaboration, trust in school principal, technology leadership, enabling school structure and technology integration. The study is planned as a correlational research. In this regard, as a multivariate statistical analysis technique, Structural Equation Modelling (SEM) was used because it is useful to

evaluate direct, indirect and correlated effects of several variables in a hypothesized model (Kline, 2011). This method is often used to model a multivariate association, run a concurrent correlation-based test to correct the measurement bias and check the entire prediction instead of part, and provide knowledge regarding causal interactions between variables (Byrne, 2010). Besides, in order to do descriptive analysis about demographic characteristics of the participants and school-level variables, to conduct Missing Value Analysis (MVA), to hold bivariate correlations among the variables of interest and to do assumption checks, IBM SPSS 24 was used. Then, CFA was performed before operating the structural model to confirm the measurement model fit and then the structural model was checked using AMOS 18 tool. As a final step, the structural model was checked.

In model testing, Kline' (2011) iterative steps were followed. These steps consist of specification, identification, estimation and evaluation. The recommended steps actually iterative since problems in the last step may need to a return to an earlier step (Kline, 2011).

3.6. Description of Variables

In this study, the main analysis technique is SEM using latent variables that are unobserved hypothetical constructs and cannot be observed directly. In SEM, latent variables were categorized into two, which are exogenous and endogenous variables (Byrne, 2010). Exogenous latent variables are identical to independent variables, which affects the model's other variables. However, endogenous latent variables have the same value with dependent variables, which are affected by the exogenous variables (Byrne, 2010). Within the scope of this study, the exogenous variables are teacher collaboration, trust in school principal, technology leadership and enabling school structure while the endogenous variable is technology integration.

3.7. Limitations of the Study

There are some limitations of the study, which are essential for the interpretation of the findings revealed in the study. First, the research is limited to the qualities measured by the measurement tools used and the results obtained from these

measurement tools. The second limitation is associated with the nature of questionnaires, which are self-report measures. This type of measures are limited in terms of gathering honest and reliable responses because given responses cannot be controlled. Therefore, this kind of data collection tools give rise to the risks for gathering socially desirable replies rather than genuine answers. Third, the data was collected only from of teachers working in countrywide schools affiliated to the General Directorate of Basic Education and General Directorate of Religious Education. Thus, the results of the study can be generalized just for this population. Lastly, in this study, the correlational research method, which is not competent for revealing a cause and effect relationships between variables, was used. Thus, causality cannot be deduced from the findings of the current study, even though results could be reached implying a cause and effect relationships because of the usage of SEM technique.

CHAPTER 4

RESULTS

Within this part of the study, first, the findings regarding SEM assumptions were presented. Second, the findings of descriptive statistics were reported in terms of the means, standard deviations and bivariate correlations between the variables. Next, findings of the measurement model, which was checked to provide proof of the validity of the measurement instruments, were demonstrated . Finally, detailed findings relating to the structural model were identified.

4.1. Assumptions of SEM

In this part, assumptions of SEM recommended by Tabachnick & Fidell (2007) were controlled and reported in the below respectively.

4.1.1. Sample Size Criterion

To conduct SEM, it is crucial to have a sample of more than 200 cases (Kline, 2011). In the research, the model was tested through the sample consisting of 13487 cases, which is appropriate for SEM testing.

4.1.2. Missing Value Analysis

According to Kline (2011), the first approach is to avoid missing data when dealing with it. In this study, during data collection, the researcher used a data collection tool provided by MoNE. Passing the questions without answering was prevented by the option offered by the data collection tool, so all items are marked by the participants. Overall, as a result of the MVA, it was seen that there is no missing value.

4.1.3. Influential Outliers

Outliers are the values affecting the mean, standard deviation and correlational values (Schumacker & Lomax, 2004). In this regard, univariate outliers identify the extreme values in a single case, while multivariate outliers are the cases that show an unusual

combination of values in several variables. Univariate outliers were explored via standardized (Z) scores in the present research. In this direction, the cases with z scores under -3.29 and above + 3.29 was classified as outliers. However, within the large sample sizes, a few Z scores exceeding the given range are possible (Tabachnick & Fidell, 2007). In this regard, in the current study, the results indicated several cases with z-scores exceeding the suggested value on teacher collaboration, trust in school principal and technology integration variables. Nevertheless, these cases were kept in the data set, and the multivariate outliers were controlled by computing Mahalanobis distance via operating linear regression by receiving age as the dependent variable. In computing Mahalanobis distance, age was included as the dependent variable because DV does not influence the outcome of the regression analysis (Tabachnick & Fidell, 2007). As a result of the Mahalanobis distance, several multivariate outliers were detected. Thus, two different data sets were generated, and the measurement model was checked for both of these data sets. One of these was the data set omitted of outliers both univariate and multivariate, and the other was data set that held all these outliers. The analysis showed equivalent findings, so outliers were held in the data sets.

4.1.4. Normality

Univariate normality assumptions were tested via Q-Q plots, normality tests, histograms, box plots and the examination of skewness and kurtosis scores (Kline, 2011). Visual analysis of O-Q plots, histograms, and box plots revealed that the majority of items strayed away from normal distribution, while some items displayed a relatively regular distribution. Next, skewness and kurtosis values were examined. In this regard, Kline (2011) asserts that a skewness value greater than 3 and a kurtosis value greater than 20 suggest a non-normal distribution. In the study, it was concluded that the values below the boundaries suggested by Kline (2011). In that, skewness values of the items were between the range of -1.7 and -0.4 and kurtosis values were between the ranges of -0.4 and 4.00 (see Table 11).

Table 11

Means, Standard Deviations, Skewness, and Kurtosis Values

	N	*M*	*SD*	Skewness	*SE*	Kurtosis	*SE*
TC1	13487	3.9	0.9	-1.4	0.021	2.2	0.042
TC2	13487	3.9	0.9	-1.3	0.021	1.8	0.042
TC3	13487	4.0	0.8	-1.4	0.021	3.0	0.042
TC4	13487	3.9	0.9	-1.2	0.021	1.8	0.042
TC5	13487	4.0	0.8	-1.4	0.021	3.1	0.042
TC6	13487	4.0	0.9	-1.4	0.021	2.9	0.042
TC7	13487	4.0	0.9	-1.4	0.021	2.9	0.042
TC8	13487	4.1	0.9	-1.5	0.021	3.1	0.042
TSP1	13487	4.7	1.2	-0.7	0.021	-0.1	0.042
TSP2	13487	4.5	1.3	-0.5	0.021	-0.4	0.042
TSP3	13487	4.5	1.3	-0.6	0.021	-0.3	0.042
TSP4	13487	4.4	1.3	-0.5	0.021	-0.3	0.042
TSP5	13487	4.6	1.3	-0.6	0.021	-0.2	0.042
TSP6	13487	4.6	1.3	-0.6	0.021	-0.2	0.042
TSP7	13487	4.6	1.3	-0.6	0.021	-0.1	0.042
TSP8	13487	4.8	1.2	-0.7	0.021	0.2	0.042
TSP9	13487	4.4	1.3	-0.6	0.021	-0.3	0.042
TSP10	13487	4.5	1.3	-0.7	0.021	-0.1	0.042
TSP11	13487	4.8	1.1	-0.8	0.021	0.2	0.042
TSP12	13487	4.7	1.2	-0.7	0.021	0.0	0.042
TL1	13487	3.9	1.1	-1.0	0.021	0.3	0.042
TL2	13487	3.9	1.1	-1.0	0.021	0.2	0.042
TL3	13487	3.7	1.2	-0.8	0.021	-0.3	0.042
TL4	13487	4.0	1.1	-1.1	0.021	0.6	0.042
TL5	13487	4.0	1.1	-1.0	0.021	0.3	0.042
TL6	13487	3.8	1.1	-0.9	0.021	0.0	0.042
TL7	13487	3.9	1.1	-0.9	0.021	0.0	0.042
ESS 1	13487	4.0	1.0	-1.0	0.021	0.8	0.042
ESS 2	13487	4.0	0.9	-1.0	0.021	1.0	0.042
ESS 3	13487	3.8	0.9	-0.9	0.021	0.7	0.042
ESS 4	13487	3.8	1.0	-0.8	0.021	0.6	0.042
ESS 5	13487	3.8	1.0	-0.9	0.021	0.4	0.042
ESS 6	13487	3.7	1.2	-0.9	0.021	0.0	0.042
TI1	13487	4.4	0.7	-1.2	0.021	2.1	0.042
TI2	13487	4.5	0.6	-1.1	0.021	2.0	0.042
TI3	13487	4.4	0.6	-0.9	0.021	1.2	0.042
TI4	13487	4.3	0.8	-1.7	0.021	4.0	0.042
TI5	13487	4.0	0.8	-0.7	0.021	0.7	0.042
TI6	13487	4.1	0.7	-0.8	0.021	1.2	0.042
TI7	13487	4.3	0.7	-0.9	0.021	1.4	0.042
TI8	13487	4.0	0.8	-0.8	0.021	0.8	0.042
TI9	13487	3.6	1.0	-0.4	0.021	-0.3	0.042
TI10	13487	3.9	0.9	-0.6	0.021	0.2	0.042

In addition, multivariate normality assumption controls were examined by operating Mardia's tests (Kline, 2011). The results indicated that the multivariate normality assumption was violated by variables. Thus, to eliminate the limitations resulted from

non-normality, bootstrapping, a computer-based method of resampling was used as a remedy in the test of measurement and structural models (Byrne, 2010). In this regard, for large sample sizes and slightly non-normal distributions, bootstrapping is useful to remove the negative effects of non-normality in SEM (Kline, 2011).

4.1.5. Linearity, Normality and Homoscedasticity of Residuals

Linearity, normality, and homoscedasticity of residuals were examined via scatter plots, normal p-p plots, histograms, and partial regression plots of residuals (Tabahnick & Fidell, 2007). Linearity and homoscedasticity are the two assumptions that associate to multivariate normality. Specifically, linearity checks the linear association between values that is necessary for all association analyses. Then, homoscedasticity points out "the assumption that dependent variable(s) exhibit equal levels of variance across the range of predictor variable(s)" (Hair, Black, Babin, & Anderson, 2010). In this context, residual plots were created via SPSS Version 24 (IBM Corp., 2016) and samples was added to Appendix C. For normality of residuals assumption, histograms and normal p-p plots were analysed. Majority of them showed random fashion in the data, but there were some deviations too. Next, to test the linearity assumption, partial plots of residuals were examined, and it was seen that bivariate relationships did not deviate much from linearity. That is, checks of the plots displayed that they were almost elliptical, indicating linearity was not much violated (Stevens, 2009). Then, to confirm homoscedasticity, scatter plots were examined, and dispersed dots showed that there were not much deviations. As a result, all three assumptions for the present analysis were considered to be validated.

4.1.6. Multicollinearity

When two or more IVs associate more than desired, multicollinearity problem arises (Tabachnick & Fidell, 2007). In the current study, multicollinearity assumption was controlled by examining bivariate correlations, variance inflation factor (VIF) and tolerance values (Kline, 2011; Tabachnick & Fidell, 2007). According to Tabachnick and Fidell (2007), the existence of bivariate correlations, exceeding .90 demonstrates multicollinearity. Related to the strengths of correlations, the cut-offs for Pearson correlations, suggested by Field (2009), was adopted as ±.10 is small correlation, ±.30

is medium correlation, and ±.50 is large correlation. The results were showed in table 12.

Table 12

Bivariate Correlations between Variables

Variable	1	2	3	4	5
1. Teacher Collaboration	-	.37**	.33**	.32**	.22**
2. Trust in School Principal		-	.73**	.70**	.27**
3. Technology Leadership			-	.71**	.29**
4. Enabling School Structure				-	.29**
5. Technology Integration					-

**$p < .01$.

As depicted in table 12, the examination of correlation matrix revealed that most of the variables were significantly associated, but no association exceeded .90 (Tabachnick & Fidell, 2007). In this sense, results revealed that the variable of technology integration is positively and significantly correlated with the variables of teacher collaboration, trust in school principal, technology leadership and enabling school structure. However, these effects are either small or small to moderate. On the other hand, teacher collaboration shows a medium correlation with trust in school principal, technology leadership and enabling school structure variables. Moreover, trust in school principal variable shows a large correlation with the variables of technology leadership and enabling school structure. Similarly, technology leadership indicates a large correlation with enabling school structure variable.

In addition, Kline (2011) suggested that multiple regression analysis be carried out separately by using each variable as DV and others as IVs and computing VIF ($1/1-R^2$) and tolerance ($1- R^2$) scores depend on the generated R^2 score for each check. The multicollinearity cut-offs were suggested as $R^2 > .90$, VIF > 10, and tolerance < .10. VIF and tolerance scores were calculated for each variable, after each multiple regression analysis was performed. The findings revealed that all values of R^2 (between the range of .11 and .61), VIF (between the range of 1.12 and 2.56), and tolerance (between the range of .38 to .93) were in the recommended limits; thereby, the assumption of multicollinearity was confirmed for this analysis.

4.2. Descriptive Analysis Results

Within the scope of the study, means and standard deviations of the variables was computed and presented in Table 12.

Table 13

Means and Standard Deviations of the Variables

Variables	***N***	***M***	***SD***	***Range***
Teacher Collaboration	13487	3.98	.73	1↔5
Trust in School Principal	13487	4.60	1.13	1↔6
Technology Leadership	13487	3.90	1.05	1↔5
Enabling School Structure	13487	3.86	.81	1↔5
Technology Integration	13487	4.15	.56	1↔5

According to table 13, teachers' mean and standard deviation scores for the variables is like following: Teacher Collaboration (*M*=3.98, *SD*=.73), Trust in School Principal (*M*=4.60, *SD*=1.13), Technology Leadership (*M*=3.90, *SD*=1.05), Enabling School Structure (*M*=3.86, *SD*=.81), Technology Integration (*M*=4.15, *SD*=.56). These results revealed that teachers are not at the desired level on the basis of all variables.

4.3. Structural Equation Modelling Results

In this part of the study, the measurement and structural models were analysed, and the results were presented.

4.3.1. Results for the Measurement Model

The measurement model is the CFA technique, which measures the relationship between latent variables and their indicators within the SEM structure (Byrne, 2010). Within the current study, the five-factor measurement model with the variables of teacher collaboration, trust in school principal, school principal's technology leadership, enabling school structure and technology integration was tested via CFA.

Table 14

Cronbach Alpha Values of the Scales

Scales	**Cronbach Alpha Values**
Teacher Collaboration	.94
Trust in School Principal	.97

Table 14

Cronbach Alpha Values of the Scales

Scales	Cronbach Alpha Values
Technology Leadership	.97
Enabling School Structure	.89
Technology Integration	.89

Reliability values were also calculated for each variable in terms of Cronbach's alphas scores. They were found as .93 for teacher collaboration, .97 for trust in school principal, .97 for technology leadership, .89enabling school structure, .89 for technology integration.

The measurement model is showed in the below:

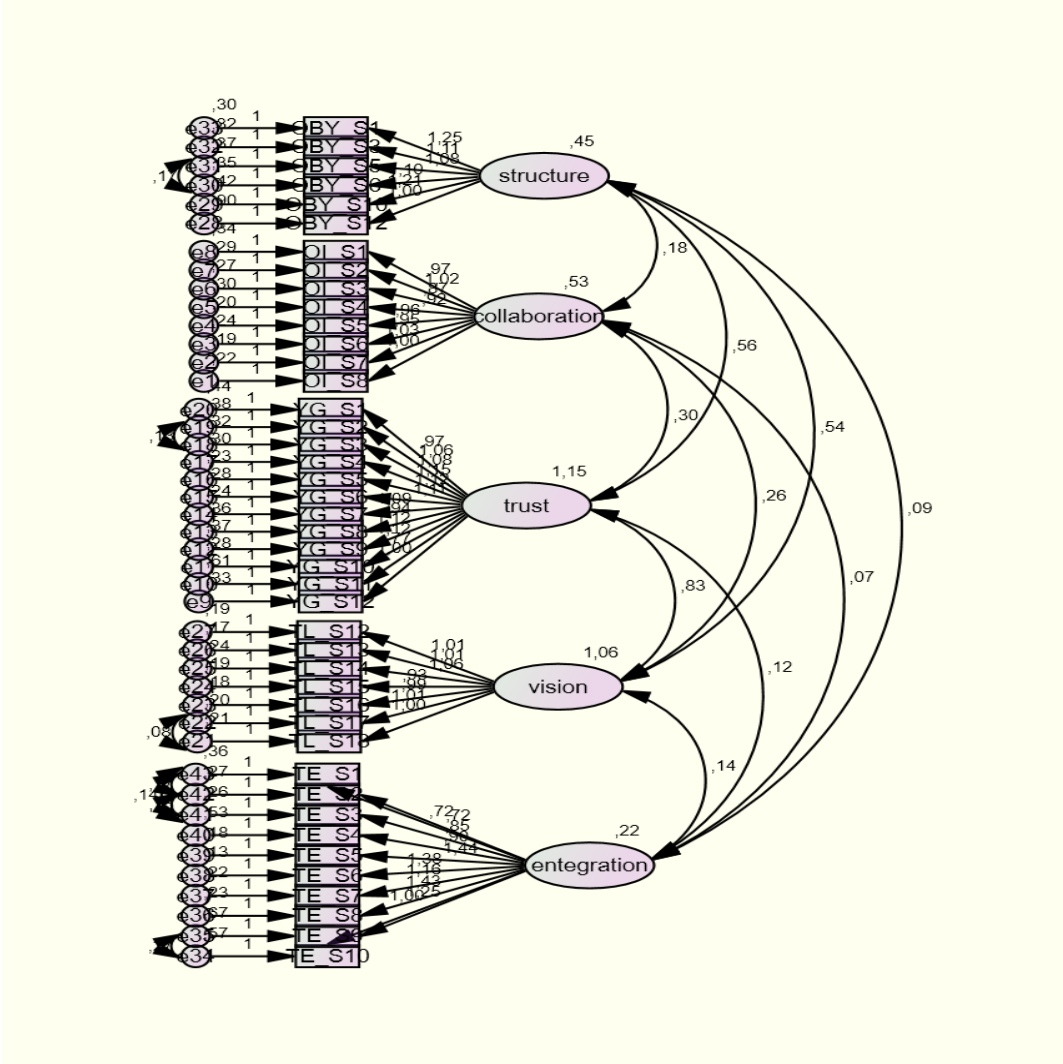

Figure 3. Measurement Model with Estimates and Associations

Initially, the fit indices of SRMR, RMSEA, CFI and TLI were analyzed. In this context, SRMR value was .04, and it showed a good fit. Then, RMSEA value was .059 (90% CI = .059-.60), and it indicated a mediocre fit (Hu & Bentler, 1999). As for CFI and TLI values, Hu and Bentler (1999) recommend that these values must be higher than .95. However, in the current study, CFI value was .93, and TLI value was .92. These results recommended that the model could be developed. Thus, modification indices were controlled, and error covariances were joined between the ones with highest scores that belonged to the same scales (i.e., ε42 – ε43 in technology integration scale; ε34 – ε35 in technology integration scale; ε30 – ε31 in enabling school structure scale; ε41 – ε42 in technology integration scale; ε18 – ε19 in trust in school principal scale; ε41 – ε43 in technology integration scale; ε21 – ε22 in technology leadership scale) in subsequent steps.

As a result of modifications, fit indices of SRMR to be .39, RMSEA to be .044 (90% CI = .044-.045, p_{close} = 1.00) indicated good model fit (Hu & Bentler, 1999). The results also showed TLI as .959 and CFI as .962, values higher than .95, indicated good model fit based on the cut-offs revealed by Hu and Bentler (1999). According to the standardized regression weights, it is indicated that all of them are significant and ranged between .498 and .929 (Table 15).

Table 15

Standardized Regression Weights with Confidence Intervals

Parameter			Estimate	CI		*p*
TC_S8	<---	TC	.842	.833	.852	.001
TC_S7	<---	TC	.861	.853	.869	.001
TC_S6	<---	TC	.815	.804	.825	.001
TC_S5	<---	TC	.843	.834	.852	.001
TC_S4	<---	TC	.776	.764	.787	.001
TC_S3	<---	TC	.773	.760	.784	.001
TC_S2	<---	TC	.808	.797	.817	.001
TC_S1	<---	TC	.773	.761	.784	.001
TSP_S12	<---	TSP	.881	.875	.887	.001
TSP_S11	<---	TSP	.726	.713	.740	.001
TSP_S10	<---	TSP	.916	.912	.920	.001
TSP_S9	<---	TSP	.892	.886	.898	.001
TSP_S8	<---	TSP	.858	.850	.866	.001
TSP_S7	<---	TSP	.921	.917	.925	.001
TSP_S6	<---	TSP	.915	.909	.920	.001
TSP_S5	<---	TSP	.929	.926	.933	.001

Table 15 (continued)

Standardized Regression Weights with Confidence Intervals

Parameter			Estimate	CI		*p*
TSP_S4	<---	TSP	.914	.909	.918	.001
TSP_S3	<---	TSP	.900	.895	.905	.001
TSP_S2	<---	TSP	.878	.872	.884	.001
TSP_S1	<---	TSP	.842	.835	.850	.001
TL_S18	<---	TL	.914	.910	.918	.001
TL_S17	<---	TL	.917	.913	.922	.001
TL_S16	<---	TL	.925	.921	.929	.001
TL_S15	<---	TL	.909	.903	.914	.001
TL_S14	<---	TL	.912	.908	.916	.001
TL_S13	<---	TL	.929	.925	.932	.001
TL_S12	<---	TL	.921	.917	.925	.001
ESS_S12	<---	ESS	.578	.560	.594	.001
ESS_S10	<---	ESS	.784	.771	.796	.001
ESS_S6	<---	ESS	.780	.768	.791	.001
ESS_S5	<---	ESS	.766	.753	.778	.001
ESS_S3	<---	ESS	.798	.786	.809	.001
ESS_S1	<---	ESS	.839	.829	.847	.001
TI_S10	<---	TI	.532	.515	.548	.001
TI_S9	<---	TI	.586	.572	.601	.001
TI_S8	<---	TI	.817	.808	.827	.001
TI_S7	<---	TI	.761	.748	.773	.001
TI_S6	<---	TI	.875	.868	.882	.001
TI_S5	<---	TI	.849	.839	.857	.001
TI_S4	<---	TI	.506	.485	.524	.002
TI_S3	<---	TI	.620	.604	.636	.001
TI_S2	<---	TI	.548	.531	.564	.001
TI_S1	<---	TI	.498	.480	.516	.001

Furthermore, CFA revealed that most of associations are significant among latent variables and are within the range of .20 to .79 (Table 16).

Table 16

Latent Correlations in the Measurement Model

Latent Variables	1	2	3	4	5
1. Teacher Collaboration	-	.38***	.35***	.37***	.20***
2. Trust in School Principal		-	.75***	.78***	.25***
3. Technology Leadership			-	.79***	.29***
4. Enabling School Structure				-	.28***
5. Technology Integration					-

*****p< .001**

4.3.2. Results for the Structural Model

Structural model, which tested the hypothesized correlations among latent variables, was recorded in this part of the study. The hypothesized model was tested using 2000 bootstrapped samples at a confidence interval of 95 per cent to explore direct and indirect connections between latent variables. In this context, fit indices indicated good fit with RMSEA value of .044 (90% CI = .044 - .045, p_{close} = 1.000), SRMR value of .045, CFI and TLI values of .96 (Hu & Bentler, 1999). As a result, the hypothesized structural model is demonstrated to fit current data. Furthermore, the model's measurement part showed that indicators significantly affected from their latent variable. Standardized estimates were indicated a range of .498 to .929. Table 17 indicates standardized direct, indirect, and total effects for the hypothesized structural model.

Table 17

Standardized Direct, Indirect, and Total Effects for the Hypothesized Model

		Technology Leadership (TL)	Enabling School Structure	Trust in School Principal	Teacher Collaboration	Technology Integration
Enabling School Structure (ESS)	Direct	.793***	-	-	-	-
	Total indirect	-	-	-	-	-
	Total	.793***	-	-	-	-
Trust in School Principal (TSP)	Direct	.349***	.51***	-	-	-
	Total indirect	.404***	-	-	-	-
	Total	.753***	.51***	-	-	-
Teacher Collaboration (TC)	Direct	-	.39***	-	-	-
	Total indirect	.308***	-	-	-	-
	Total	.308***	.389***	-	-	-
Technology Integration (TI)	Direct	.216***	-	.042**	.113***	-
	Total indirect	.066***	.065***	-	-	-
	Total	.282***	.065***	.042**	.113***	-

**p < .01. ***p < .001.

Within the scope of structural model, the following direct effects relationships were revealed. According to the results of the model testing, it was indicated that Technology Leadership (TL) was associated with Enabling School Structure (ESS) ($\gamma = .79$, $p < .001$), Trust in School Principal (TSP) ($\gamma = .35$, $p < .001$) and Technology Integration (TI) ($\gamma = .22$, $p < .001$). Then, ESS has significant positive direct effect on TSP ($\gamma = .51$, $p < .001$) and Teacher Collaboration (TC) ($\gamma = .39$, $p < .001$) while no direct effect was revealed for TI ($\gamma = .00$, $p < .001$). Moreover, significant positive direct effect was concluded for TSP on TI ($\gamma = .04$, $p < .01$). The last significant positive direct association is between TC and TI ($\gamma = .11$, $p < .001$).

The results also showed significant indirect effects between variables. In this context, the first significant indirect effect was concluded for the relationship between TL and TC via ESS (TC $\beta = .31$, $p < .001$). In addition, there is a significant indirect association between TL and TE via ESS, TSP and TC (TE $\beta = .07$, $p < .001$). The other significant indirect effect between TL and TSP through ESS (TSP $\beta = .40$, $p < .001$). The results also yielded similar significant indirect effects between ESS and TE via TC and TSP (TE $\beta = .65$, $p < .001$).

Table 18

Hypotheses Testing Results

	Hypothesis	Decision
h1	Teacher collaboration associates with teachers' technology integration.	Fully supported
h2	Trust in school principal associates with teachers' technology integration.	Fully supported
h3	Enabling school structure associates with trust in school principal.	Fully supported
h4	Enabling school structure associates with teacher collaboration.	Fully supported
h5	School principal's technology leadership associates with teachers' technology integration.	Fully supported
h6	School principal's technology leadership associates with enabling school structure.	Fully supported
h7	School principal's technology leadership associates with trust in school principal.	Fully supported

According to R^2 values, the results showed that TL, TC and TSP accounted for 9% of the variance in TE. Besides, TL and ESS explained 66% of the variance in TSP. TL explained 63% of the variance in ESS. Finally, ESS explained 15 % of the the variance in TC.

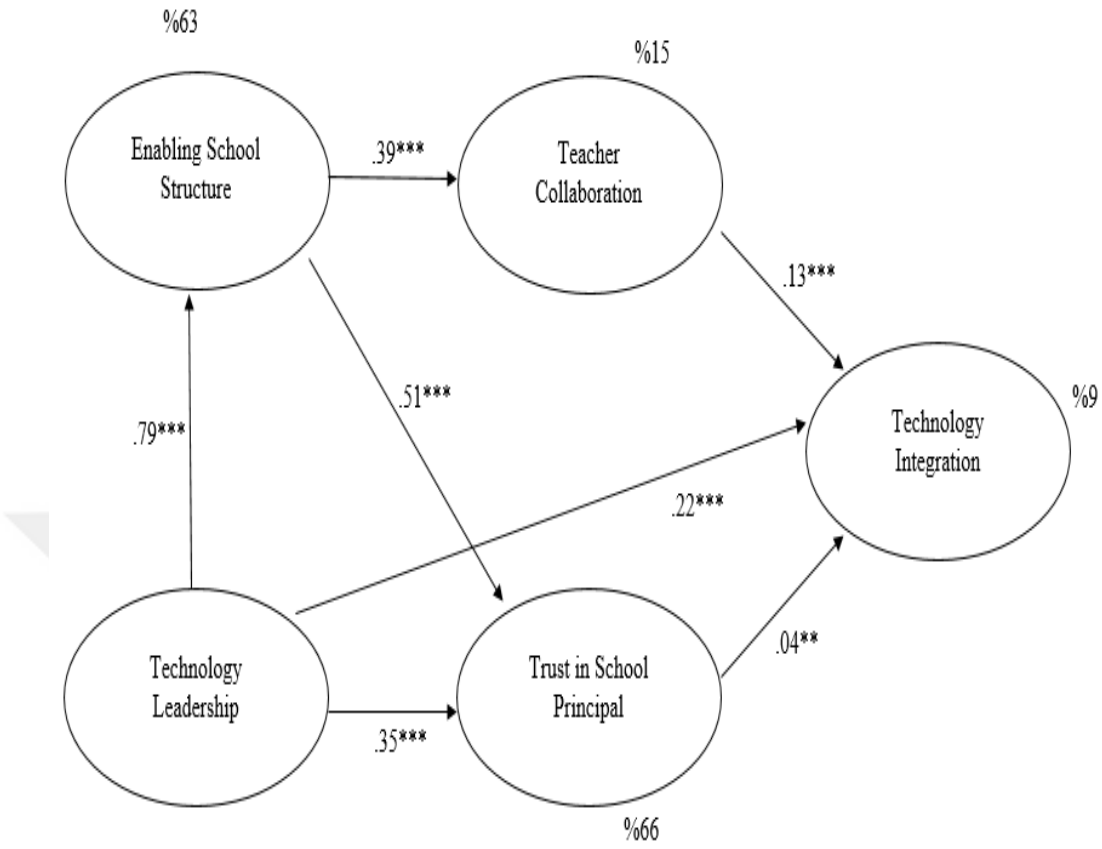

Figure 4. Standardized Estimates of the Structural Model

4.4. Summary of the Results

The main purpose of this study is to examine the relationship between school climate, leadership and teachers' technology integration into the educational activities. In this regard, descriptive and inferential statistical methods were used in analysing the collected data. Structural Equation Modelling (SEM) was used as the main inferential statistical technique in the study. Within the scope of this study, the exogenous variables are teacher collaboration, trust in school principal, technology leadership and enabling school structure while the endogenous variable is technology integration.

Firstly, when the mean scores were computed, it was found mediocre scores for all variables. Next, based on the measurement and structural model tests, it was observed that the model well fitted the data, and all hypothesised paths showed meaningful associations. The results revealed that cooperation and collaboration among teachers

at schools positively affect teachers' technology integration and enable technology to be integrated more intensively into educational practices. Moreover, teachers' trust in school principal relates to teachers' technology integration. Similarly, there is a strong positive association between technology leadership and teachers technology integration. Then, enabling bureaucracy in schools provided a positive indirect effect on teachers' technology integration teachers via teacher collaboration and trust in school principal variables. Finally, based on R^2 values, the results showed that technology leadership, teacher collaboration and trust in school principal accounted for 9% of the variance in teachers' technology integration into the educational activities. This value did not provide a full explanation for teachers' technology integration.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1. Discussion of the Results

Today, digitalization and technology integration in education is a central topic with the impact of developing technology and the imperatives required by the age. It is not possible for the change-transformation trends occurring in all sectors not to be in education. At this point, the necessity of blending education with smart technologies cannot be postponed. With the involvements of technological assets into instruction, it emerges as an undeniable reality that teachers have had the opportunity to move more comfortably in the educational processes and the face of education in modern classrooms has changed. Again, new generations have the chance to be trained in more interactive and fun ways with the integration of technology. Contrary to the mind-blowing, rote understanding and test method course flows applied in traditional classrooms, in modern classrooms equipped with educational technologies, problems can be solved in different ways. In fact, while problem-solving methods in modern classrooms can progress depending on creativity, social skills and teamwork, these methods cannot be used much in traditional classes. In this context, one way of education to produce effective results emerges as the integration of digital teaching tools into education and the design of digital contents with rich and creative tools. The reason for this is that today's children, which are called as the alpha generation, are growing with digital technologies that cannot be included in classical education methods. It is known that children in this generation cannot feel like a part of education in traditional classes because they also get used to interactive interaction at a younger age. Therefore, it is necessary to convey the knowledge to these children, who will build the future, with high sensitivity and in the technological form. When this is the case, it is an inevitable reality that countries have to improve their educational systems with educational technologies.

In this context, developed countries have tended to develop their technologies and design their education systems in this direction in order not to lose their technological power and in order to go further. Similarly, developing countries also tended to strengthen their society economically at the point of development. Therefore, a few steps behind in science, technology and education means a big waste of time in this age. For example, in many countries, during the coronavirus (COVID-19) pandemic, education was tried to transfer to online and distance education systems. This is valuable in terms of revealing the scope of digitalization in education and technology usage. Therefore, educational systems should be able to adapt itself to a new situation and to cope with these problems resulting from disasters or other issues. Specifically, teachers' unfamiliarity with novelties or negative attitudes towards innovations make it challenging to design education according to the needs of the age and lead the countries to be caught unprepared for various extra scenarios. The best and critical issue in the solutions of these problems to prepare the teachers to new technology and to encourage them to benefit it. In this sense, many countries have tented integrate new educational approaches into the field of education and develop new projects in this direction. In addition, steps have been taken and continue to be taken in our country in the form of technological development and digitalization of education. MoNE participated in this race with the educational technology projects such as FATİH Project, EBA and allocated big budgets to these projects.

In this context, the main emphasis in this study is to address actors that predict the use of technology in education from the perspective of teachers in terms of school climate and leadership based variables. In other words, the primary purpose of this study is to reveal the school climate and leadership based predictors of teachers' technology integration. In this regard, a model, examining the relationship among teacher collaboration, trust in school principal, technology leadership, enabling school structure and technology integration was tested using SEM, a correlational technique.

Within the first phase of the study, the mean values of the variables were computed. The results indicated that teachers' technology integration into education is not in the intended level and is in a mediocre situation. That is, teachers do not sufficiently

benefit from the opportunities provided by technology to construct better teaching-learning opportunities and settings. This striking result actually has a side that deeply affects continuity and quality, which are the basic vital functions of education. Namely, this result brings about big problems for the change efforts in education and the success of technology integration movements. That is, teachers should not be mediocre about technology integration in education.

The other variable examined in the study is technology leadership because it is crucial to prepare schools for successful technology integration. For this reason, the mean value for technology leadership scale was also computed and found mediocre situation. The result indicates that many principals are not completely prepared for this mission. This result is parallel with the literature which suggests that school principals' competencies are not sufficient to guide and to encourage the technology integration activities in the school (Esplin et al., 2018). Furthermore, in the average value analysis made regarding the teacher collaboration variable, it was seen that the result was not sufficient. This result may have a slowing effect on the realization of school reforms, achieving schools' shared goals and the professional development of teachers (Ferguson, 1999; Haddad & Draxler, 2002). Besides, in the analysis of the mean value related to the variable of trust in school principal, the value was found low. This has been evaluated as a significant result as it will have a negative impact on the functional work of school staff (Balyer, 2017). That is, trust in school principal is of vital importance, as it directly affects the teacher on job satisfaction, professional cooperation and so on (Hallam, Smith, Hite, Hite, & Wilcox, 2015).

Finally, the mean value analysis related to the enabling school structure variable was made, and it was found that the mean scores did not meet the expectation. Based on this result, it can be evaluated that schools are not able to benefit the opportunities, provided by enabling school structure, like engage in interactive dialogue, view problems as opportunities, foster trust, value differences, learn from mistakes, delight in the unexpected, facilitate problem-solving (Hoy & Sweetland, 2001). This situation can damage the organizational structure within the school and inhibits the effective technology integration.

In the second phase of the study, the proposed model was tested. The model well fitted the data, and all hypothesized paths showed meaningful associations. In this regard, firstly, the association between teacher collaboration and teachers' technology integration was examined. The results provided significant positive relationship for this path. This result revealed that cooperation and collaboration among teachers at school positively affects teachers' technology integration and enables technology to be integrated more intensively into educational practices. This finding is majorly parallel with the teacher collaboration proponents asserting that working with teachers has a positive impact on each other in terms of leaning, professional development, improving practices (Brown & Knowles, 2007; Drossel & Eickelmann, & Gerick, 2016; Ferguson, 1999; Goddard, Goddard & Tschannen-Moran, 2007; Mora-Ruano, Gebhardt & Wittman, 2018; Schleifer, Rinehart & Yanisch, 2017). At the same time, this result also suggests that teacher collaboration will make it easier to reach the common goal of using technological tools actively in teaching-learning processes. It is also parallel with the studies focusing on teacher collaboration and teachers' technology integration relationship. In this sense, this finding supports the study conducted by Vangrieken, Dochy, Raes and Kyndt (2015), proposing that the most prominent benefits of teacher collaboration are the improved technology competencies of teachers. In addition, revealed relationship between teacher collaboration and teachers' technology integration supports the studies asserting that teacher collaboration contributes to teachers' professional development in technology integration in schools (Becker & Anderson, 1999; Common, 1983; Stevenson, 2004; Wesley & Franks, 1996).

Second, the relationship between trust in school principal and teachers' technology integration was examined. The results implied that teachers' trust in school principal enhance the teachers' technology integration. This result supported by the literature, maintaining the positive effect of trust in school principal on technology integration. In this regard, Zayim and Kondakçı (2015) examined the relationship between readiness for change and organizational trust. Parallel to current study results, they revealed that teachers, trusting to their principals, usually believe in change and can adapt and implement changes. Besides, according to another view expressed by Balyer

(2017), when teachers trust their principal, they will do their best and be supported by them. From this finding, it can be interpreted that trust in principal relieves the teacher and triggers him to be more open to innovation and change.

Third, in the study, it was concluded that higher enabling school structure reports higher teacher collaboration and trust in school principal these were associated with higher technology integration. That is, enabling school structure indicated a significant indirect effect on teachers' technology integration via teacher collaboration and trust in school principal variables. This result is parallel with the literature maintaining that bureaucracies can also increase innovation, reduce role conflict and lessen feelings of alienation in schools as well as other organizations (Hoy & Sweetland 2001). In addition, the result supports the view maintain that rules and regulations guides to solve problems in enabling school structures. That is, enabling structures require two-way communication, see problems as opportunities to learn, support differences, support trust, cooperation, openness, common problem solving and innovation (Hoy & Miskel, 2005). In this context, the current study findings also support the study inspecting the relationship between the effective functioning of the bureaucratic school structure and the teacher leadership culture conducted by Parlar and Cansoy (2017). In their study, parallel with the current study results, they express that the effectiveness level of the bureaucratic school structure has positive and significant relationships with the supportive working environment. Finally, this finding is parallel with the idea that school with an enabling school structure adapt to change more easily and are more successful in being a professional learning community (Gilmore, 2007).

The fourth relationship inspected in the current study is between technology leadership and technology integration. In the conducted analysis, it was revealed that there is a strong positive association between technology leadership and teachers technology integration. Based on this result, it can be interpreted that the school principal's technology leadership skills affect teachers positively and encourage them to adopt technology into the education. In literature, there are studies examining the relationship between technology leadership and technology integration. In this direction, the literature see technology integration as a reform movement and giving a

crucial role to the school principal's technology leadership skills for the success of technology integration movements in education (Afshari et al., 2008; Creighton, 2003; Esplin et al., 2018; Schiller, 2003; Schrum et al., 2011; Thannimalai & Raman, 2018; Weng & Tang, 2014). Specifically, parallel with the current study, Irmak (2015) maintains that the level of the school principals' technology leadership skill is effective in teachers' technology integration. In this regard, he performed research to examine the extent of technology leadership for school principals and examine the correlation between principals' technology leadership and teachers' technology integration. The findings of the study showed an important correlation between technology leadership for principals and the integration of technology for teachers. Thannimalai and Raman (2018) conducted a study to identify the level of relationship between Principals' Technology Leadership and teachers! Technology integration. The study showed a significant relationship between Principals' Technology Leadership and Teachers' Technology Integration. Similarly, Afshari, Bakar, Luan, Samah, and Fooi (2008) asserts that schools need leaders to promote the cycle of change and to help the technology integration culture. Schools need leaders who can facilitate the change process and support a learning community for technology integration. Next, Creighton (2003) urges that technology integration into education is a significant systemic reform. Therefore, it is clear that technology leadership and implementing and sustaining systemic reform in schools are closely related with each other. Taken together, the findings all suggested that the school principal as technology leader have the responsibilities like discovering, evaluating, installing and operating new educational devices and technologies and guiding the other members of the schools.

Moreover, within the scope of the study, the relationships related to the variable of enabling school structure were hypnotized and tested. As a result of the analysis, there has been found significant positive correlations between enabling school structure-teacher collaboration and enabling school structure – trust in school principal. These findings are parallel with the idea that enabling school structure provide opportunities for engaging in interactive dialogue among school members and fostering trust in school (Hoy & Sweetland, 2001).

5.2. Implications

Within the scope of the study, the analyses and tested relationships revealed several implications for practice and theory. To begin with, revealed mean scores for the variables did not show the expected success. Specifically, considering the teachers' technology integration mean score, it is clearly seen that teachers still have no sufficient tendency for the integration of the technological devices and tools into the educational activities. The success of technology integration into education is closely related to the perspectives of teachers, who are the practitioners of these technologies in schools, and the issues that affect whether or not they use these technologies. This finding is essential to display the broad gap between ICT promises and school reality. That is, the ineffectiveness of the technology investments in education is closely related to the teachers who are the last user of the technology in the schools. Therefore, the insufficient technology integration stands out as a factor that hinders technology integration movements carried out by the ministry.

Secondly, within the frame of the study, the relationships among variables are examined, and several implications are inferred from these relationships related to the teachers' technology integration in schools. In this direction, one of the implication is that technology leadership is an important issue for the technology integration. Specifically, this finding clearly asserts that technology leadership is closely related to the adoption and sustainability of technology integration movements in schools. That is, once the result of the relationship is considered, it is clearly seen that technology integration is encouraged in schools in which school principal show technology leadership characteristics. In this context, it can be inferred that school principal as a technology leader must have competencies for discovering, evaluating, installing and operating new technologies. They must be a guide and driving force to run healthy processes of technology integration in the schools. They must help teacher to recognize the innovations' implementation to education. This means that school principals must understand new technology capabilities, have personal skills in their use, and can promote a school environment that encourages the development of innovative teaching, learning and management techniques.

The other implication arisen from the tested relationships is that teacher collaboration provides a positive contribution to the technology integration. From this finding, it can be inferred that teachers' talking about teaching strategies and new ideas, looking for solutions to the problems encountering with technology in their classrooms, sharing their course materials, affecting each other by their activities are crucial factors for the successful and healthy spread of technology in schools. In brief, educators can learn technology from their colleagues to improve the capacity of educators related to technology integration. Therefore, it is inferred that the importance of collaboration among teachers should be grasped and approaches promoting teacher collaboration on technology integration should be developed.

One another implication revealed from the tested relationships is that the settings feeding trust in school principal facilitate teachers' approaches toward technological tools positively and encourage them to integrate these tools educational activities. In this regard, this finding suggests that school principals should be explicit, honest, fair, objective, and sincere. Besides, they should be easily accessible by teachers and should deal with their problems. They should give priority to listen teachers' recommendations in decision-making span. In this way, School principals should be able to clearly demonstrate that they value teachers and see them as a people rather than a tool to reach the purposes of the school. Overall, it is concluded that establishing a trust-oriented climate in schools is an essential factor in the context of technology integration.

In the other relationship analysis, it was suggested that enabling school structure has an indirect effect on teachers' technology integration. This result implies that enabling structures encourages innovation in schools and promotes teachers' technology integration. So, within the scope of the study, building enabling structure among school members has been revealed as an important agent for the successful integration of technology in education. This result told that the administrative rules operating in the school should support reliable communication between teachers and principal, and the school should not be dragged into problems with unnecessary formalities, and the administrative hierarchy should enable teachers to do their jobs and carry out the

school's mission. In addition, with this study, it has been revealed that the managerial hierarchy should be in a promoting position, not an obstacle to innovation.

Lastly, in the analyses, it has been revealed that the variables in the tested model have a significant and meaningful effect on technology integration. However, it has been observed that these variables cannot fully explain the teachers' technology integration at the desired level. This result can be explained as that teachers' technology integration could be related to their individual activities like in-service training status, technology self-efficacy, and intrinsic motivation regarding the use of technology in education. In addition, the technological infrastructure of the school can have an impact on teachers' technology integration. That is, teachers working in schools whose technology infrastructure is provided properly and fully may be more prone to the use of technology in education and can achieve more successful results from this integration.

5.3. Recommendations

Related to the implications and methodological limitations of the study, some recommendations are proposed in this part.

5.3.1. Recommendations for Policy Makers

The results of this study revealed that policy-makers should handle school climate and technology leadership carefully and plan studies in this direction to accelerate technologic assets' integration into education and to save teachers' technology integration from mediocrity. Therefore, it is clear that technology integration is needed to be considered as an important issue in the selection and the training of the school principal. In this regard, to increase the use of technology in education, steps should be taken by policy-makers and decision-makers for enlightening school leaders on school climate and technology leadership issues that encourage technology integration.

In this context, the COVID-19 pandemic, in 2019-2020, clearly revealed the requirements such as digital transformation in education, progress in distance education and readiness for possible changes in the education system. In this context, it is crucial that policy-makers should equip educators with technology integration

skills to continue teaching and to provide flexible transitions in the possible disaster scenarios. To achieve this, giving educative trainings through the channels such as in-service training, distance education, and online education, whose qualities and quantities have been improved, can make a valuable contribution. In organizing trainings, platforms like LMS (Learning Management System), distance education systems may be developed to save time, to organize the training content in a single environment, to keep track of the progress and performance of the participants, to updates contents easily and to reduce training.

5.3.2. Recommendations for School Principals

This study suggests that school principal should pay attention to have technology leadership competencies and to build a supportive and positive school climate, in which vision is shared, bureaucracy is enabling, teacher collaboration is encouraged, and trust in school principal is dominant to enhance the use of instructional technologies. In this regard, school principal should be a strict follower of new technological developments and trends in education. Besides, they should be an effective instructional technology researcher so that they can guide teacher about new trends and technologies. In this sense, they can subscribe to several educational technology journals and can attend educational technology trainings, workshops, summits and conferences. In addition, within the school, they can create an instructional technology team consisting of teachers to obtain information for teachers about new and right technologies and the feasibility of these technologies for schools conditions. Further, school principal can create a rewarding mechanism for innovative teachers to promote technology-enhanced climate in school.

5.3.3. Recommendations for Further Studies

The results of the study revealed that school climate and leadership based variables could not fully explain the teachers' technology integration. Therefore, further studies can test another structural equation model, including the school's technology infrastructure variable and personal variables such as teachers' intrinsic motivation, self-efficacy, and in-service training.

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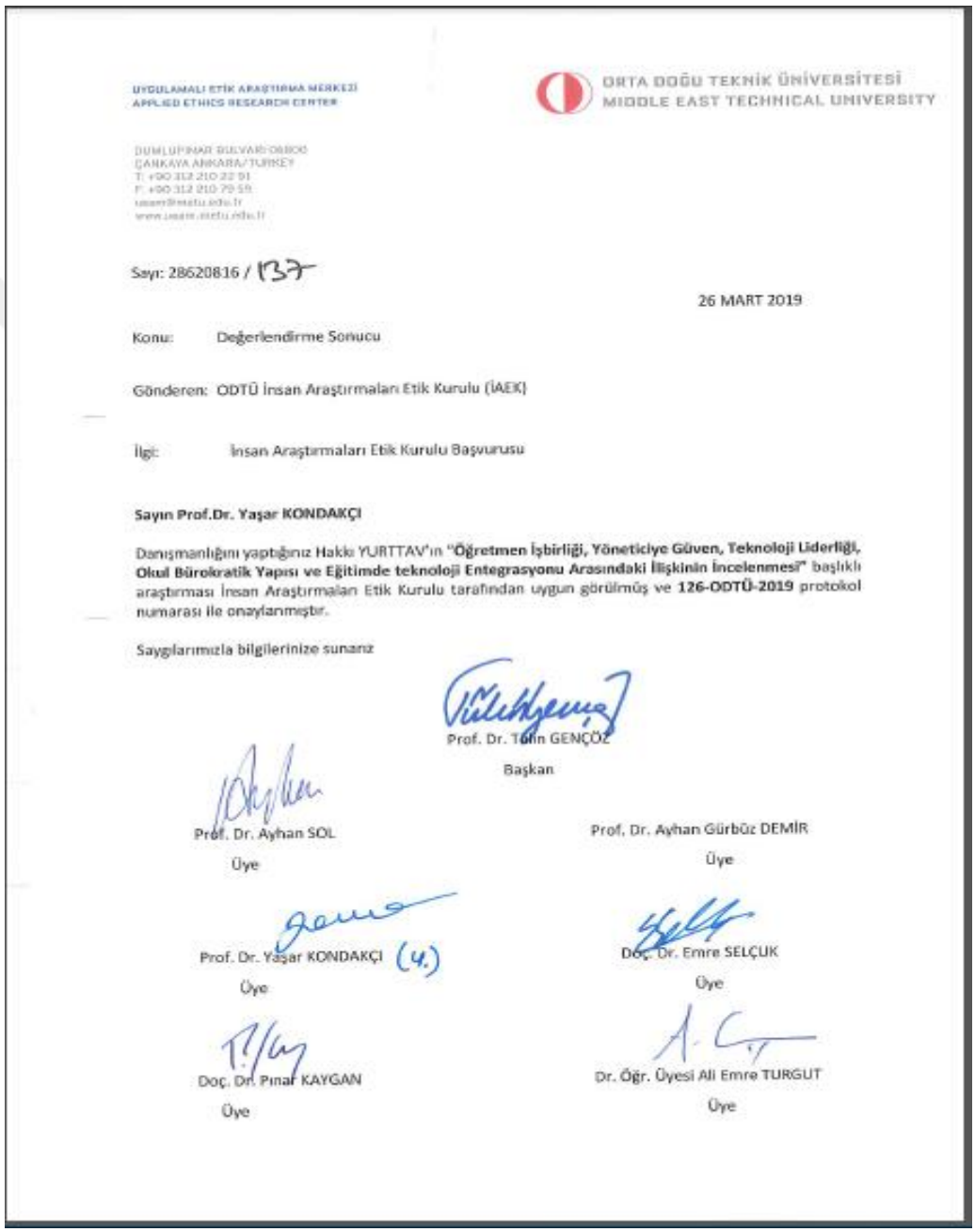
APPENDICES

A. METU HUMAN SUBJECTS ETHICS COMMITTEE PERMISSION



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APPLIED ETHICS RESEARCH CENTER

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26 MART 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Yaşar KONDAKÇI

Danışmanlığını yaptığınız Hakkı YURTTAV'ın "**Öğretmen İşbirliği, Yöneticiye Güven, Teknoloji Liderliği, Okul Bürokratik Yapısı ve Eğitimde teknoloji Entegrasyonu Arasındaki İlişkinin İncelenmesi**" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **126-ODTÜ-2019** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız

Prof. Dr. Tolga GENÇÖZ
Başkan

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Prof. Dr. Yaşar KONDAKÇI (4.)
Üye

Doç. Dr. Emre SELÇUK
Üye

Doç. Dr. Pınar KAYGAN
Üye

Dr. Öğr. Üyesi Ali Emre TURGUT
Üye

B. PERMISSION FROM MINISTRY OF NATIONAL EDUCATION

T.C.
MİLLÎ EĞİTİM BAKANLIĞI
Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü

Sayı : 81576613-605.01-E.8736043 02.05.2019
Konu : Araştırma Uygulama İzin Talebi

Sayın Hakkı YURTTAV
(Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü Eğitim Bilişim Sistemleri Başkanlığı/ANKARA)

İlgi: a) 11/04/2019 tarihli dilekçe
b) Din Öğretimi Genel Müdürlüğünün 17/04/2019 tarihli ve 98029973-605.01-E.7821352 sayılı yazısı
c) Temel Eğitim Genel Müdürlüğünün 26/04/2019 tarihli ve 70297673-605.01-E. 8361041 sayılı yazısı
d) Millî Eğitim Bakanlığının 22/08/2017 tarihli ve 35558626-10.06.01-E.12607291 (2017/25) sayılı genelgesi

İlgi (a) dilekçe ile Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünde Millî Eğitim Uzman Yardımcısı olarak görev yapan Hakkı YURTTAV'ın, Orta Doğu Teknik Üniversitesi Eğitim Yönetimi ve Planlaması Anabilim Dalı Yüksek Lisans Programı öğrencisi olarak "Öğretmen İş birliği, Yöneticiye Güven, Teknoloji Liderliği, Okul Bürokratik Yapısı ve Eğitimde Teknoloji Entegrasyonu Arasındaki İlişkinin İncelenmesi" konulu yüksek lisans tezi kapsamında hazırladığı veri toplama aracının MEB anket modülü aracılığıyla 81 il genelinde Temel Eğitim Genel Müdürlüğüne bağlı ilkokullar ve ortaokullar ile Din Öğretimi Genel Müdürlüğüne bağlı imam hatip ortaokullarında görev yapan öğretmenlere uygulanmasına yönelik izin talebi Genel Müdürlüğümüz ve ilgi (b) yazı ile Din Öğretimi Genel Müdürlüğü ve ilgi (c) yazıyla Temel Eğitim Genel Müdürlüğü tarafından incelenmiştir.

Denetimi il/ilçe millî eğitim müdürlükleri ve okul/kurum idaresinde olmak üzere, kurum faaliyetlerini aksatmadan, gönüllülük esasına göre; onaylı bir örneği Bakanlığımızda muhafaza edilen ve uygulama sırasında da mühürlü ve imzalı örnekten elektronik ortama aktarılmış veri toplama aracının ilgi (d) genelge doğrultusunda uygulanmasına izin verilmiştir

Gereği bilgilerinize sunulur.

Asaf Murat KARAPINAR
Bakan a.
Genel Müdür V.

Güvenli Elektronik İmzalı
Aslı ile Aynıdır
06.5.2019
Burhan TANRIVERDİ
Şef

Ek: İlgi Yazı ve Ekleri (6 Sayfa)

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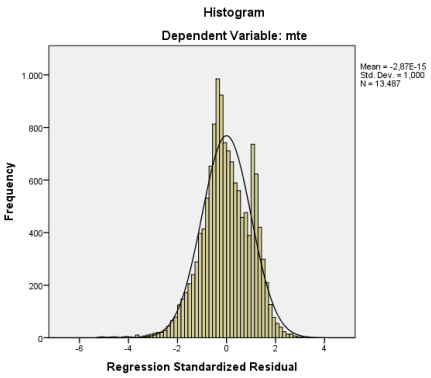
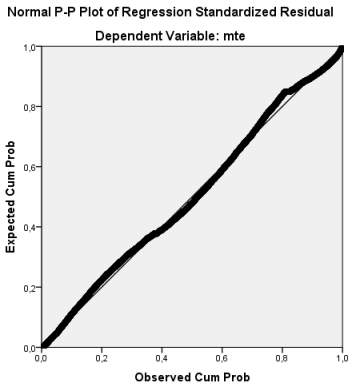
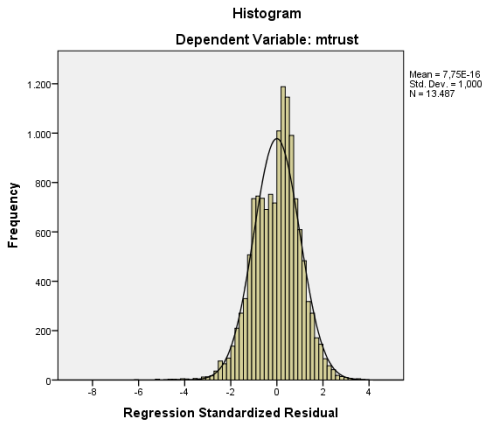
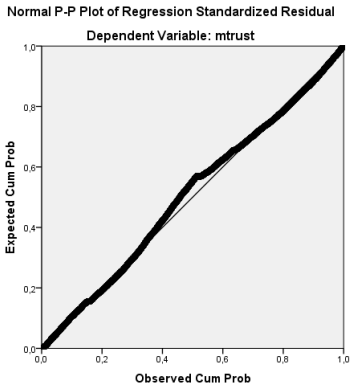
C. RESIDUAL PLOTS

Histograms and Normal P-P Plots of Residuals

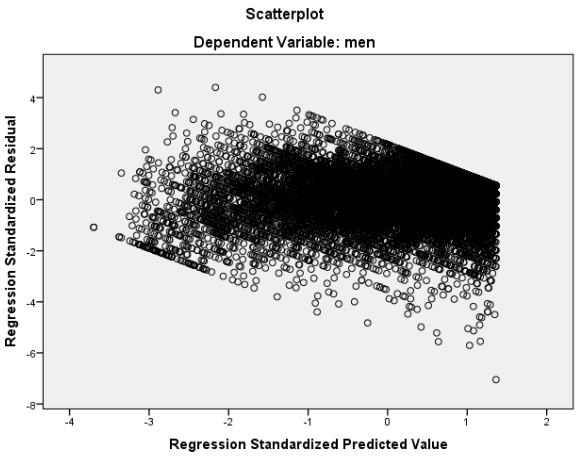


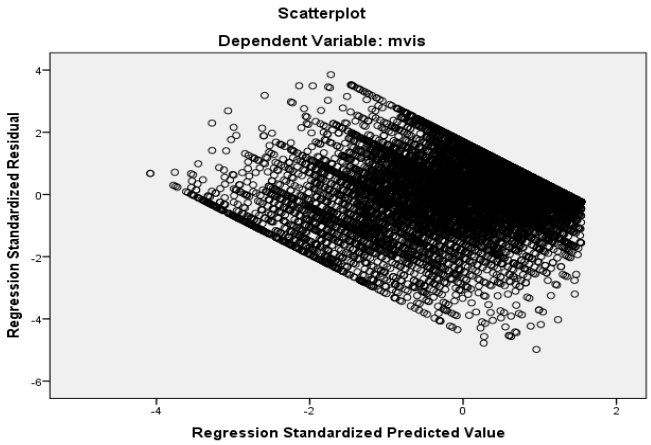




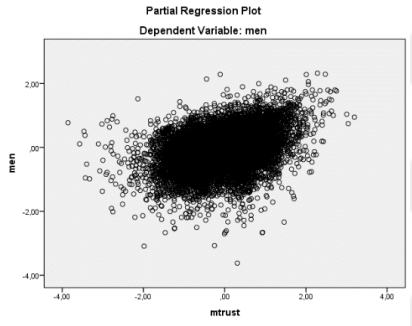


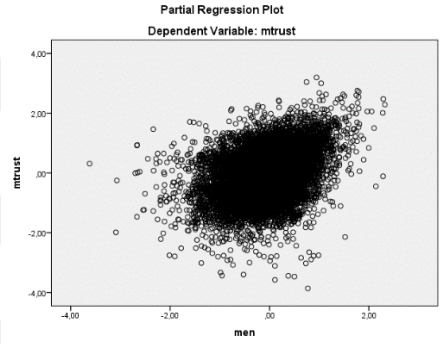
Scatterplots

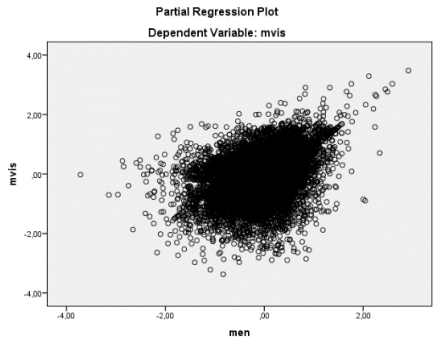


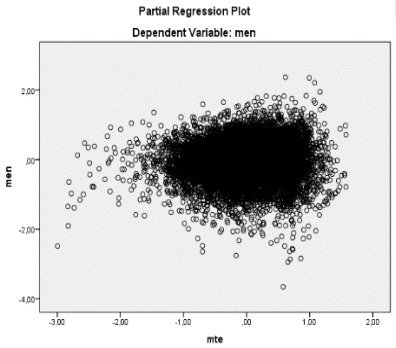


Partial Regression Plots









D. TURKISH SUMMARY / TÜRKÇE ÖZET

1. Giriş

Teknolojik gelişmelerden kaynaklanan yenilikler ve reform hareketleri, ekonomiden eğitime kadar yaşamın her alanında yaygın olarak kullanılmaktadır. Her toplumda yoğun bir dijital-entelektüel değişim ve dönüşüm olmaktadır (Robins & Webster, 1999). Bu bağlamda, bilgi üretimi ve aktarımı, sosyo-ekonomik değişim ve dönüşüm süreci için önem kazanmıştır. Teknolojik alandaki gelişmeler, bilgiyi toplumun ekonomik yapısına karar veren önemli bir faktör haline getirmiştir (Masuda, 1981). Bilgi, bireylerin ve ülkelerin refahı ve gelişmişlik seviyesi için en önemli unsur haline gelmiştir. Ayrıca doğru bilgiye ulaşmanın, ulaşılan bilgiyi işlemenin ve işlenen bilgilerin etkili ortamlar kullanılarak aktarılmasının önemi de artmıştır. Bu bağlamda, gelişen teknoloji ile birlikte, doğru ve faydalı bilgileri edinme, kullanma ve aktarmanın yolu teknolojinin faydalı ve başarılı kullanımına bağlıdır. Bir bilgi toplumunda, kalkınma hedefinde ilerleme sağlamak için kişilerden kurumlara kadar toplumun hemen hemen her kesiminde yüksek nitelikli insan sermayesine ihtiyaç vardır (Kivinen & Ahola, 1999).

Teknolojideki gelişmelerle ortaya çıkan değişim eğilimleri sadece insanların günlük yaşam alışkanlıklarını dönüştürmekle kalmamış, aynı zamanda eğitim dahil birçok alanda paradigma değişiklikleri getirmiştir. Bu doğrultuda, okullar yaşam alanı olarak yeniden yapılanma sürecine girmiştir. Ülkeler, varlık stratejilerini, küresel gelişmeler doğrultusunda yeniden yapılandırılan eğitim sistemlerinin başarısına dayandırmıştır (MEB, 2017a). Bu nedenle, ülkeler, yönetimsel süreçler ve öğretim süreçleri gibi çeşitli eğitim alanlarına teknolojik ilerlemeleri dâhil etmeye büyük ilgi göstermiştir. Dünya genelinde, teknoloji entegrasyonuna sağlanan kaynaklar ve bütçeler giderek artmaktadır. Bu noktada, diğer uluslar da olduğu gibi Türkiye Cumhuriyeti de teknoloji entegrasyonunu mümkün oldukça finanse etmektedir. Türk Milli Eğitim Sisteminde, geçmişten günümüze teknolojik ürünlerin eğitim ortamlarına entegrasyonunu teşvik eden politika ve projeler mevcuttur. Bu projeler arasında, en

kapsamlısı Fırsatları Artırma ve Teknolojiyi İyileştirme Hareketi (FATİH) projesidir. MEB, bu projenin temel amacını, eğitim ve öğretim ortamlarını bilgi teknolojileri araçlarıyla donatmak ve eğitimi çeşitli duyulara hitap edecek şekilde organize etmek olarak ifade etmiştir (MEB, 2017b). Bu proje ile MEB devlet okullarına çok fonksiyonlu yazıcılar, tablet bilgisayarlar, internet ağ altyapısı, yüksek hızlı internet, etkileşimli tahta, kablolu / kablosuz internet, sınıf yönetimi yazılımı gibi birçok eğitim teknolojisi aracı sağlamıştır. Ayrıca vizyon 2023 belgesinde, MEB (2018), dijital öğretme-öğrenme sürecinin ve öğretim materyallerinin geliştirilmesi için çeşitli paydaşların ve kurumların katılımıyla bir altyapının geliştirilmesi gerektiğini açıklamıştır.

Alanyazın incelendiğinde, ülkeler bazında teknolojinin eğitime entegrasyonuna yönelik bir eğilim olduğu görülmektedir. Teknolojinin entegre olduğu bir eğitimi destekleyen çalışmalar mevcuttur. Bu çalışmaların temel bakış açısı, öğretme ve öğrenme süreçlerine teknolojik araçların uygulanmasının, okul başarısı üzerinde olumlu bir etkisi olduğunu yönündedir. İşbirlikçi metodolojik yaklaşımlar ve etkili liderlik ile işletildiğinde teknolojinin yaratıcı düşünceyi teşvik etme, problem çözmeyi kolaylaştırma ve çalışma hayatında başarı hususlarında öğrencilerin başarılı olabilmesine fayda sağladığı ileri sürülmektedir (ISTE, 2018a). Bu bağlamda, teknolojinin, iletişim sağlamak, araştırmayı güçlendirmek, öğrencilerin kendini ifade etmelerini kolaylaştırmak, eğitim çıktıları oluşturmak ve yüksek enerji ve motivasyonlu öğrenme ortamları oluşturarak öğretim faaliyetlerinde yararlı olabileceği söylenebilir (Najdabbasi & Pedaste, 2014). Ayrıca teknoloji, öğrenme ortamlarına gerçek yaşam deneyimleri getirme, öğrencilerin karmaşık görevlere katkıda bulunmalarını sağlama, öğrenclerin karmaşık ve kişiselleştirilmiş yardım alma şanslarını artırma, eğitimcilerin olanaklarını genişletme ve okul üyeleri arasında iletişim kurabilme adına araçlar sunma gibi yetenekleri ile eğitim alanı için önem arz etmektedir (Bransford, Brown, & Cocking, 2000). Buna ilaveten, teknoloji, öğrencilerin öğrenme çıktılarını ve öğrenebilmeleri için gerekli olan öğrenme isteklerini geliştirir. Ayrıca kolektif eğitim deneyimlerini teşvik eder ve problem çözme yeterliklerinin geliştirilmesine yardımcı olur (Schacter & Fagnano, 1999). Teknoloji entegrasyonu sayesinde öğrenme ortamları, öğretim yöntem ve teknikleri

çeşitlendirilir, değiştirilir ve dönüştürülür. Bu nedenle, teknolojinin tüm bilgi üretim süreçlerinde sağladığı araçların etkin kullanımı, teknoloji destekli öğretimi ülkelerin eğitim sisteminde kaçınılmaz bir unsur haline getirmektedir (Güllüpınar, Kuzu, Dursun, Kurt, & Gültekin, 2013).

Teknolojinin eğitimi gerçekten değiştirip değiştirmediği konusu, politika yapıcılar ve okullar tarafından önemli ölçüde sağlanan bütçelerin tahsisine rağmen hala tartışmalıdır. Teknoloji entegrasyonunun yararlı olduğunu gösteren birçok kanıt olmasına rağmen, bu entegrasyondan beklenen faydaları artırmak için konunun çeşitli yönleriyle ele alınması yadsınamaz bir gerçektir. Bu bağlamda, teknolojik araçların eğitim ortamlarına aktarılması birçok faktörü dikkate almayı ve çok boyutlu düşünmeyi gerekli kılmaktadır. Aksi halde, diğer birçok eğitim reformu girişimi gibi, eğitimciler, entegrasyon teşebbüslerinde yeterince desteklenmediğinde, eğitimde teknoloji entegrasyonunun da başarısız olması muhtemeldir (Huberman & Miles, 1984). Bu bağlamda, başarılı değişim hareketlerinin temel bileşeni insan olmasına rağmen kuruluşlar değişimin ekonomik yönüne daha çok odaklanmaktadır (Beer & Nohria, 2000). Bir kuruluş olarak okullar, reformlar için uygun bir kültür oluşturmaya ve okulun ruh halini belirleyebilecek ve değişim hareketlerini etkileyecek olan insan tutumlarını, duygularını ve inançlarını göz önünde bulundurmaya öncelik vermelidir (Markus & Benjamin, 1987). Aksi takdirde, değişim çabaları ve inovasyon hareketleri, öğretmenlerde bilgi, beceri ve güven eksikliğinden kaynaklanan belirsizlik duygularına neden olabilmektedir. Oluşan belirsizlik nedeniyle, öğretmenler bazen mevcut durumları hakkında yetersizlik ve umursamazlık duygusuna kapılmakta ve bu durum yenilikçi mekanizmalarda hiç istenmeyen bir durumu beraberinde getirmektedir (Fullan & Hargreaves, 1992). Bu noktada, teknoloji entegrasyonu bir reform olarak değerlendirilmekte olup bu reformları uygulayan bireylerin deneyimi, yetenekleri ve algıları önemle dikkate alınması gereken bir husustur (Hoy & Ferguson, 1985).

Liderler, eğitimdeki hareketsizliğin kilidini açmak ve öğrenme-öğretme uygulamalarındaki değişiklikleri uygulamak için önemli aktörlerdir (Karagiannidis, Politis & Karasavvidis, 2014). Değişim ve reform hareketi olarak teknoloji, okulun

görünümü ve hissi üzerinde etkilidir. Başarılı bir şekilde inşa edilmiş bir iklimin ve kültürün eksikliğinde, teknolojik değişim, okul liderleri için harici bir tehdit olarak düşünülebilir (Hodas, 993). Teknolojinin gücü, okullar ve liderleri için hem en büyük şans hem de en büyük tehdittir. Teknoloji liderleri ancak teknolojik araçları öğretim faaliyetleriyle birleştirmede en yararlı yol üzerinde yoğunlaşmayı seçtiklerinde başarılı olabilirler (Creighton, 2003). Bu bağlamda, bilgi ve iletişim sistemlerini okullarda etkin bir şekilde kullanmak için faaliyetler ve politikalar düzenlerken teknoloji liderliği dikkate alınması gereken bir husustur (Anderson & Dexter, 2005). Teknolojik araçların eğitim faaliyetlerine entegrasyonunu teşvik eden ve öğretmenlerin okulda ve okullar arasında işbirliği yapmalarına olanak tanıyan liderler, inovasyon hareketlerinin kurumsallaştırılmasında kritik bir etkiye sahiptir (Hoy & Miskel, 2005).

Teknoloji okullarda ancak okul müdürü tarafından aktif olarak desteklenmesi, öğrenilmesi, uygun mesleki gelişim sağlanması ve değişim için insan faktörünün desteklenmesi durumunda etkili bir şekilde işlerlik kazanabilir (Wilmore & Betz, 2000). Bu bağlamda, ISTE standartları okul müdürlerinden beklentileri gösterme anlamında çok önemlidir. Bu standartlar, müdürlerin yetkin olması gereken konularla ilgili önemli ipuçlarını vurgulamaktadır. Özellikle, okul müdürlerinin, teknolojik gelişmelerden faydalanarak, eşitlik, katılım ve dijital vatandaşlık faaliyetlerini teşvik etmeleri ve okul üyelerini, öğretim faaliyetlerini dönüştürmek noktasında strateji ve kalkınma planı oluşturmaya dâhil etmeleri beklenmektedir. Ayrıca okul lideri, okul üyelerinin yaratıcı bir şekilde öğretme ve öğrenme yeteneğine sahip olduğu bir okul atmosferi oluşturmalıdır. Benzer şekilde, eğitim araçlarını geliştirmeleri ve teknolojik araçların öğretime entegrasyonunu tanıtmak, sürdürmek ve sürekli olarak güçlendirmek için ekipler ve yapılar geliştirmeleri gerekir. Bu şekilde, okul müdürleri kendilerine ve okul üyelerine rehberlik edebilir ve okullarda teknik gelişmenin devam etmesini teşvik edebilir (ISTE, 2018b). Buna rağmen, Rivard (2010), okul yöneticilerinin, etkili teknoloji uygulamalarını çevreleyen farklı yönetim ve geliştirme sorunlarını kavrama kapasitesindeki yetersizliğini vurgulamaktadır. Oysaki teknolojik aracın öğretme-öğrenme ortamlarına artan entegrasyonu, yöneticilerin hazır olmalarını

gerektirir. Bu nedenle, teknolojinin entegrasyonu ve teşvik edilmesi için eğitimcilere destek sağlanması önemlidir (Esplin, Stewart, &Thurston, 2018).

Ayrıca OECD çalışmaları daha yüksek performans gösteren ülkelerin aktif olarak daha iyi bir öğretim ve daha güçlü öğrenci performansı için öğretmen işbirliği oluşturmaya odaklandığını göstermektedir. Kolektif birimlerde insanların birbirleriyle çalıştığı, tasarladığı ve öğrendiği okulda, eğitim başarısının daha iyi olduğu keşfedilmiştir (Darling-Hammond, 2014). Bu görüşü destekleyen Wesley ve Franks (1996), teknolojik araçların eğitime entegrasyonu ile ilgili mevcut destek ve rehberlik sunarak ve mevcut stratejileri paylaşarak öğretmelerin birbirlerine fayda sağlayabileceğini savunmaktadır. Benzer şekilde, Stevenson (2004) öğretmenlerin yaygın olarak birlikte çalıştıkları okul kültürlerinin, personelin genellikle ortak çalışmaya istekli olmadığı okul kültürleriyle karşılaştırılmasının, yetenekli teknoloji gelişimini desteklemedeki farklılıkların nedenlerini aydınlatabileceğini belirtmektedir. Buna ek olarak, çalışma, eğitimcilerin teknolojiyi meslektaşlarından kolayca öğrenebilme fırsatları olmasına rağmen, teknolojiyi kullanma kapasitelerinin geliştirmede işbirliğinin rolünü yeterince kavrayamadıklarını ortaya konmaktadır. Bu nedenle, öğretmen işbirliği, teknoloji entegrasyonu hususunda önemli bir değişken olarak dikkate alınmalıdır.

Ek olarak, okullarda yürütülen reformlar için müdür ve öğretmenler arasındaki güven özellikle gerekli bir husustur (Kochanek, 2005). Koşar'a (2015), öğretmenlerin daha nitelikli eğitim ortamı oluşturmak ve derslerinde daha yetkin eğitim süreçleri yürütmek için müdürlerine güvenmeleri gerektiğini vurgulamaktadır. Okul müdürüne duyulan güven, öğretmenlere, öğretmen mesleki gelişiminin en önemli faktörlerinden biri olan özerkliği sağlamaktadır (Lai & Lo, 2007). Böylece, profesyonel olarak eğitilmiş öğretmenler, bilgi ve becerileri ile öğretim sürecinin sorumluluğunu alabilmekte ve çeşitli teknik ve yöntemleri sınıftaki uygulamalarına yansıtabilmektedir (Hargreaves, 1994).

Bunun yanı sıra, okul dâhil sosyal örgütlerin yapısı incelendiğinde, çoğunun bürokratik özelliklere sahip olduğu görülmektedir (Hoy & Miskel, 2005). Dolayısıyla, bir okul sisteminin engelleyici ya da kolaylaştırıcı yapısının, okulun genel işleyişi ve örgütsel davranışlar üzerinde önemli bir etkisi olduğu düşünülmektedir. Başka bir

deyişle, okullar bürokratik sistemlerdir, bu nedenle problemleri önlemek ya da kolaylaştırmak için yapılandırılmış ve örgütsel süreçlerin uygun şekilde planlanması gerekir. Bu bağlamda bürokratik yapı, eylemler için örgütsel yetenek, görevin netleştirilmesi, gerilimin azaltılması ve bireylerin güçlendirilmesi gibi avantajalar sağlayabilmektedir. Bu açıdan bakıldığında, bir okulun bürokratik yapısının, inovasyonu arttırmak, görev çelişkisini azaltmak, eğitim yapılarında dışlanma algılarını azaltmak açısından okulları doğrudan veya dolaylı olarak etkileyebileceği söylenebilir (Hoy & Sweetland, 2001).

Yukarıda belirtilen konulara istinaden, eğitimin ortamları ve koşulları geliştikçe, yönetimsel rollerin ve beklentilerin önemli ölçüde değiştiği söylenebilir. Bu bağlamda, eğitimde teknoloji entegrasyonu için yeterli teknolojik altyapı gerekli olmakla birlikte, teknolojik araçların verimli kullanımını sağlamak için liderlik çok daha kritiktir (Weng & Tang, 2014). Okul liderlerinin teknoloji entegrasyonunu teşvik eden bir iklim yaratmaları ve teknolojik araçların verimli bir şekilde faydalanmaları için teknoloji liderliklerini göstermeleri beklenmektedir. Durum böyle olunca, eğitime teknoloji entegrasyonu, okul iklimi ve liderlik ile yakından ilişkili görünmektedir. Bu nedenle, bu çalışma, okul müdürlerinden en fazla etkilenen konular olan okul iklimi ve teknoloji liderliği ekseninde teknoloji entegrasyonunu tartışmayı amaçlamaktadır.

1.1. Amaç ve Araştırma Soruları

Bu çalışmada okul iklimi ve liderlik temelli değişkenler ile öğretmenlerin eğitim faaliyetlerine teknoloji entegrasyonu arasındaki ilişkiyi inceleyen bir modelin test edilmesi amaçlanmıştır. Araştırmanın değişkenleri okul iklimi, liderlik ve teknoloji entegrasyonu olmak üzere üç düzeyde sınıflandırılmıştır: Araştırma kapsamında, öğretmen işbirliği, okul müdürüne güven ve kolaylaştırıcı okul yapısı, okul iklimine dayalı değişkenlerken ve teknoloji liderliği liderlik temelli değişkendir. Bu bağlamda, araştırma sorusu ve alt araştırma soruları şunlardır.

Araştırma Sorusu:

Okul iklimi ve teknoloji liderliği, öğretmenlerin teknoloji entegrasyonu ile nasıl ilişkilidir?

Alt Sorular

1. Öğretmen işbirliği ve öğretmenlerin teknoloji entegrasyonu arasındaki ilişki nasıldır?
2. Okul müdürüne güven ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki nasıldır?
3. Kolaylaştırıcı okul yapısı ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki nasıldır?
4. Okul müdürünün teknoloji liderliği ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki nasıldır?

1.2. Çalışmanın Önemi

Teknoloji, değişimin sebebi ve bunu başarmak için önemli bir araç olarak görülür. Teknolojinin öğrenme süreçleri, öğretmenler ve öğrenciler üzerindeki etkisini ileri süren kanıtlar artmaktadır (Levin & Wadmany, 2008). Ancak, vaatler ve okul gerçeği arasında geniş bir boşluk vardır. Büyük yatırımlara rağmen, birçok ülkenin eğitim sistemlerinde teknolojinin benimsenmesi tahmin edilenden daha yavaş ilerlemektedir (National Center for Education Statistics, 2005). Bu nedenle, teknolojinin okullardaki ana uygulayıcıları olan öğretmenlerin, teknolojiyi eğitime entegre etmeleri ile ilgili değişkenler ortaya çıkarılmalıdır. Bu bağlamda, bu çalışmanın ana odağı, öğretmenlerin, okul iklimi ve liderlik temelli değişkenler hakkındaki bakış açıları üzerine kurulmuştur. Bu nedenle, bu çalışma, okul iklimi ve liderliğin, öğretmenlerin teknoloji entegrasyonu üzerindeki etkisini ortaya koymada önemlidir. Özellikle, öğretmen işbirliği, okul müdürüne güven, teknoloji liderliği ve kolaylaştırıcı okul yapısı gibi öğretmenlerin teknoloji entegrasyonu üzerinde az etkisi olacağı düşünülen değişkenler üzerinde çalışması anlamında önemlidir. Ayrıca bu çalışmayla, sözkonusu değişkenlerin teknoloji entegrasyonu ile ilgili alandaki yansımalarının resmini çekilmekledir. Bu fotoğraf, hem politika yapıcılar hem de araştırmacılar için önemli ipuçları sunmaktadır. Yani, bu çalışma okul iklimi ve liderlik temelli değişkenler ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişkiye bütünsel bir bakış açısı sunmaktadır. Ayrıca bu çalışmadan uygulama ve alan yazın için önemli ve değerli çıkarımlar sağlaması beklenmektedir. Bu bağlamda, teknoloji entegrasyonu

projelerinin ve okullardaki yatırımların etkinliğini ortaya koyma noktasında bu çalışma önem arz etmektedir. Ayrıca teknoloji yatırımlarının ne ölçüde kullanıldığı, okuldaki teknoloji entegrasyonunun nasıl arttırılabileceği ve politika yapıcıların teknoloji entegrasyonu hareketlerinin etkinliğini artırmak için neler yapabileceği hakkında çalışmada ayrıntılı ve faydalı bilgiler sunulmaktadır.

2. Yöntem

Çalışmada, değişkenler arasındaki ilişkiyi incelemek için ilişkisel araştırma yöntemi kullanılmıştır. İlişkisel çalışma, yordayıcı çalışmalar için elverişli bir yöntem olarak değerlendirilmektedir (Fraenkel, Wallen, & Hyun, 2015). Çalışmada, ilişkisel analiz tekniği olarak, çok değişkenli bir istatistiksel analiz tekniği olan Yapısal Eşitlik Modellemesi (YEM) kullanılmıştır.

2.1. Örneklem ve Veri Toplama Süreci

Araştırmanın evrenini, Millî Eğitim Bakanlığı, Temel Eğitim Genel Müdürlüğü ve Din Öğretimi Genel Müdürlüğü'ne bağlı ülke genelindeki okullarda görev yapan, çeşitli branşlardan 610905 öğretmen oluşturmaktadır. Araştırmada, kolayda örnekleme yöntemi kullanılmıştır. Araştırmanın örneklemini, evren içinde ulaşılan ve bu çalışmaya gönüllü olarak katılan 13487 öğretmen oluşturmaktadır. Veri toplama süreci ile ilgili olarak, çalışmaya başlamak için, çalışmanın konusu ve içeriği ile ilgili Orta Doğu Teknik Üniversitesi İnsan Araştırmaları Etik Kurulu'ndan izin alınmıştır. Daha sonra, Türkiye genelinde, Temel Eğitim Genel Müdürlüğü ve Din Öğretimi Genel Müdürlüğünde görev yapan öğretmenlere veri toplama aracının uygulanması için Milli Eğitim Bakanlığı'ndan talepte bulunulmuştur. Bakanlık gerekli izni vermiş ve hedef gruba veri toplama aracı uygulanmıştır. Daha sonra, veri toplama aracı, çevrimiçi veri toplama modülüne girilmiş ve öğretmenler tarafından gönüllü olarak doldurulmuştur.

2.2. Veri Toplama Araçları

2.2.1. Öğretmen Liderliği Kültürü Ölçeğinin Öğretmen İşbirliği Alt Boyutu

Çalışmada, öğretmen işbirliği değişkeni ile ilgili veri toplamak için Demir (2014) tarafından geliştirilen öğretmen liderliği kültürü ölçeğinin öğretmen işbirliği alt ölçeği

kullanılmıştır. Ana ölçek, öğretmen işbirliği, yönetimsel destek ve destekleyici çalışma ortamı olmak üzere üç alt ölçeğe sahiptir. Öğretmen İşbirliği alt ölçeği için hesaplanan alfa iç tutarlılık katsayısı .88 ve bileşik güvenilirlik katsayısı .93'tür. Alt ölçek, 8 likert tipi sorudan oluşmaktadır. Bu çalışma kapsamında, öğretmen işbirliği alt ölçeğine yönelik güvenirlik değeri .92 olarak bulunmuştur.

2.2.2. Okullarda Örgütsel Güven Ölçeğinin Yöneticiye Güven Alt Boyutu

Okul müdürüne güven değişkenine ile ilgili veri toplamak için, Daboval, Comish, Swindle ve Gaster tarafından geliştirilen, Kamer tarafından Türkçe'ye çevrilen ve Yılmaz (2005) tarafından yeniden değerlendirilen, okullarda örgütsel güven ölçeğinin, yöneticiye güven alt ölçeği kullanılmıştır. Bu bağlamda, ölçeğin geçerlik ve güvenirlik çalışması Yılmaz (2005) tarafından yapılmıştır. Ölçeğin toplam güvenirlik katsayısı .97 ve yöneticiye güven alt ölçeği için güvenirlik katsayısı .95'tir. Yöneticiye güven alt ölçeği 12 likert tipi maddeden oluşmaktadır. Bu çalışma kapsamında, yöneticiye güven alt ölçeğine ait güvenirlik katsayısı .97 olarak bulunmuştur.

2.2.3. İlköğretim Okulu Yöneticilerinin Teknoloji Liderliği Rolleri Ölçeğinin Vizyon Alt Boyutu

Okul müdürlerinin teknoloji liderliği hakkında öğretmenlerin bakış açısından veri toplamak için ilköğretim okulu yöneticilerinin teknoloji liderliği rolleri ölçeğinin vizyon alt ölçeği kullanılmıştır. Bu ölçek, Sincar (2009) tarafından geliştirilmiş ve ölçeğin geçerlik ve güvenirlik çalışmaları kendisi tarafından yapılmıştır. Vizyon alt ölçeğine ait güvenirlik katsayısı .92 olarak bildirilmiştir. Bu kapsamda, vizyon alt ölçeği 7 likert tipi maddeden oluşmaktadır. Bu çalışma kapsamında, vizyon alt ölçeğine ait güvenirlik katsayısı .97 olarak bulunmuştur.

2.2.4. Kolaylaştırıcı Okul Yapısı Ölçeğinin Kolaylaştırıcı Bürokrasi Alt Boyutu

Okul bürokratik yapısıyla ilgili veri toplamak için Hoy ve Sweetland (2001) tarafından geliştirilen, Buluç (2009) tarafından Türkçe uyarlaması yapılan ve Özer ve Dönmez (2013) tarafından yeniden değerlendirilmesi yapılan kolaylaştırıcı okul yapısı ölçeğinin kolaylaştırıcı bürokrasi alt boyutu kullanılmıştır. Kolaylaştırıcı bürokrasi alt ölçeğine ait güvenirlik katsayısı .806 olarak bildirilmiş olup alt ölçek 6 likert tipi

maddeden oluşmaktadır. Bu çalışma kapsamında, kolaylaştırıcı bürokrasi alt ölçeğine ait güvenirlik katsayısı .89 olarak bulunmuştur.

2.2.5. Teknoloji Entegrasyonu Ölçeği

Öğretmenlerin teknoloji kullanım sıklıklarına ilişkin veri toplamak için Karaca, Can ve Yıldırım (2013) tarafından geliştirilen teknoloji entegrasyonu ölçeği kullanılmıştır. Geliştiriciler tarafından, ölçeğin güvenirlik katsayısı .84 olarak bildirilmiştir. Bu kapsamda, ölçek 10 likert tipi maddeden oluşmaktadır. Bu çalışma kapsamında, ölçeğe ait güvenirlik katsayısı .89 olarak bulunmuştur.

2.2.6. Demografik Bilgi Formu

Çalışmada, katılımcılarla ilgili genel bilgileri edinmek için, yaş, cinsiyet, mesleki kıdem, öğrenim durumu, öğretmenlik branşı ve mezuniyet alanı bilgilerini içeren sorular sorulmuştur.

2.3. Verilerin Analizi

Çalışma kapsamında toplanan veri ile ilgili ön analizler betimsel istatistik yoluyla ve SPSS 24 programları kullanılarak hesaplanmıştır. Çalışma kapsamında test edilen model ise Yapısal Eşitlik Modellemesi (YEM) tekniği kullanılarak AMOS 18 programında test edilmiştir.

3. Bulgular

Çalışma kapsamında, değişkenlere ait aritmetik ortalama (*M*) ve standart sapma (*SS*) değerleri hesaplanmıştır. Sonuçlar, değişkenler bazında, Öğretmen İşbirliği (*M* = 3.98, *SS* = .73), Okul Müdürüne Güven (*M* = 4.60, *SS* = 1.13), Teknoloji Liderliği (*M* = 3.90, *SS* = 1.05), Kolaylaştırıcı Okul Yapısı (*M* = 3.86, *SS* = .81), Teknoloji Entegrasyonu (*M* = 4.15, *SS* = .56) şeklindedir. Bu sonuçlar öğretmenlerin tüm değişkenler bazında istenen düzeyde olmadığını ortaya koymuştur.

Önerilen yapısal modelin test edilmesinden önce, ölçeklerin model içerisinde çalışıp çalışmadığı doğrulayıcı faktör analizi aracılığıyla 5 faktörlü ölçme modeli ile test edilmiştir. Yapılan modifikasyonlardan sonra ölçme modeli kabul edilebilir bir uyum

göstermiştir (SRMR =.39, RMSEA = .044 (90% CI = .044-.045, *pclose* = 1.00), TLI = .959, CFI = .962). Ölçme modelinde elde edilen tatmin edici sonuçlardan sonra yapısal model test edilmiştir. YEM analizi sonuçları, önerilen yapısal modelin uyum iyiliği indekslerinin kabul edilebilir olduğunu göstermiştir (SRMR = .045, RMSEA = .044 (90% CI = .044 - .045, *pclose* = 1.000), CFI = .96, TLI = .96).

YEM analizi sonuçlarına göre, önerilen ilişkiler hipotez edilen modeli destekler şekilde bulunmuştur. Bu bağlamda, okullarda, öğretmenler arasında oluşan işbirliğinin, öğretmenlerin teknoloji entegrasyonunu olumlu etkilediği ve teknolojinin eğitim uygulamalarına daha yoğun bir şekilde entegre edilmesine katkı sunduğu ortaya çıkmıştır. Ayrıca öğretmenlerin okul müdürüne yönelik duyduğu güvenin, öğretmenlerin teknoloji entegrasyonu ile anlamlı pozitif yönde ilişkili olduğu görülmüştür. Benzer şekilde, teknoloji liderliği ile öğretmenlerin teknoloji entegrasyonu arasında güçlü bir pozitif ilişki ortaya çıkarılmıştır. Benzer şekilde, kolaylaştırıcı okul yapısının, öğretmen işbirliği ve okul müdürüne güven değişkenleri aracılığıyla öğretmenlerin teknoloji entegrasyonu üzerinde dolaylı etkisi olduğu görülmüştür. Son olarak, hesaplanan R^2 değeri ile teknoloji liderliği, öğretmen işbirliği ve okul müdürüne güven değişkenlerinin, öğretmenlerin teknoloji entegrasyonundaki varyansın % 9'unu oluşturduğu görülmüştür.

4. Tartışma

Bu çalışmadaki temel vurgu, eğitimde teknoloji kullanımını yordayan aktörlere, öğretmenlerin bakış açısından okul iklimi ve liderlik temelli değişkenler kullanılarak değinmektir. Başka bir deyişle, bu çalışmanın temel amacı, öğretmenlerin teknoloji entegrasyonunda söz sahibi olaabilecek okul iklimi ve liderlik temelli yordayıcıları ortaya koymaktır. Bu bağlamda, öğretmen işbirliği, okul müdürüne güven, teknoloji liderliği, kolaylaştırıcı okul yapısı ve teknoloji entegrasyonu değişkenleri arasındaki ilişkiyi inceleyen bir model test edilmiştir. Analiz yöntemi olarak, ilişkisel bir teknik olan YEM kullanılmıştır.

Bu bağlamda ilk olarak öğretmen işbirliği ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki incelenmiş ve pozitif yönlü anlamlı bir ilişki görülmüştür. Bu sonuç,

okuldaki öğretmenler arasındaki dayanışma ve işbirliğinin, öğretmenlerin teknoloji entegrasyonunu olumlu etkilediğini ve teknolojinin eğitim uygulamalarına daha yoğun bir şekilde entegre edilmesini sağladığını ortaya koymuştur. Ayrıca ulaşılan bu sonuç, öğretmenlerin işbirliği içinde hareket etmesinin; öğrenme, mesleki gelişim, pratik geliştirme açısından birbirleri üzerinde olumlu bir etkisi olduğunu iddia eden öğretmen işbirliği taraftarlarıyla büyük ölçüde paralel olup alanyazını destekeler niteliktedir (Brown &Knowles, 2007; Drossel, Eickelmann, & Gerick, 2016; Ferguson, 1999; Goddard, Goddard, &Tschannen-Moran, 2007; Mora-Ruano, Gebhardt, & Wittman, 2018; Schleifer, Rinehart, & Yanisch, 2017). Benzer şekilde, bu sonuç, Vangrieken, Dochy, Raes ve Kyndt (2015) tarafından yürütülen ve öğretmen işbirliğinin en önemli faydalarından birinin öğretmenlerin gelişmiş teknoloji yeterlilikleri olduğunu öne süren çalışmayla paraleldir. Ayrıca bu çalışma kapsamında ortaya konulan öğretmen işbirliği ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki, öğretmen işbirliğinin öğretmenlerin okullardaki teknoloji entegrasyonundaki mesleki gelişimlerine katkıda bulunduğunu öne süren çalışmalarla benzer sonuç ortaya koymuştur (Becker & Anderson, 1999; Common, 1983; Stevenson, 2004; Wesley & Franks, 1996).

Çalışma kapsamında, ayrıca okul müdürüne güven ile öğretmenlerin teknoloji entegrasyonu arasındaki ilişki incelenmiştir. Ulaşılan sonuçlar, öğretmenlerin okul müdürüne duydukları güvenin, teknoloji entegrasyonunu artırdığını ortaya koymuştur. Bu sonuç, okul müdürüne duyulan güvenin teknoloji entegrasyonu üzerindeki olumlu etkisini savunan alan yazını desteklemektedir. Bu bağlamda, Zayim ve Kondakçı (2015) yaptıkları çalışmada değişime hazır olma ile örgütsel güven arasındaki ilişkiyi incelemişlerdir. Mevcut çalışma sonuçlarına paralel olarak, müdürlerine güvenen öğretmenlerin genellikle değişiklikleri kabul ettiklerini ve uygulayabileceklerini ortaya koymuşlardır. Buna ek olarak, Balyer (2017) tarafından ifade edilen başka bir görüşe göre, öğretmenler müdürlerine güvendiklerinde ellerinden gelenin en iyisini yapacağı şeklindedir. Mevcut çalışma kapsamında ortaya çıkarılan ilişki, müdüre duyulan güvenin öğretmeni rahatlattığı ve onun yeniliğe ve değişime daha açık olmasını tetiklediği şeklindeki bu görüşü desteklemektedir.

Çalışamda elde edilen bir diğer sonuç, kolaylaştırıcı okul yapısının, öğretmen işbirliği ve okul müdürüne güven değişkenleri aracılığıyla öğretmenlerin teknoloji entegrasyonu üzerinde anlamlı endirekt etkisinin olduğu görülmüştür. Bu sonuç, bürokrasilerin inovasyonu artırabileceğini, rol çatışmasını azaltabileceğini ve okullarda ve diğer organizasyonlarda yabancılaşma duygularını azaltabileceğini savunan alanyazınla paralellik göstermektedir (Hoy & Sweetland 2001). Ayrıca bu sonuç, kolaylaştırıcı okul yapısına sahip bir okulun, daha kolay değişime uyum sağlayabileceği ve profesyonel bir öğrenme topluluğu olmada daha başarılı olacağı fikriyle uyumludur (Gilmore, 2007).

Çalışmada incelenen diğer bir ilişki, teknoloji liderliği ile teknoloji entegrasyonu arasındadır. Yapılan analizde, teknoloji liderliği ile öğretmenlerin teknoloji entegrasyonu arasında güçlü bir pozitif korelasyon olduğu ortaya çıkmıştır. Bu sonuca dayanarak, okul yöneticisinin teknoloji liderliği becerilerinin öğretmenleri olumlu yönde etkilediği ve onları teknolojiyi eğitime entegre etmede teşvik ettiği şeklinde değerlendirilmiştir. Bu sonuç, okullarda gösterilen teknoloji liderliğinin, öğretmenlerin teknoloji entegrasyonu üzerinde olumlu etkisi olduğunu savunan alan yazını destekler niteliktedir (Afshari, Bakar, Luan, Samah, & Fooi, 2008; Creighton, 2003; Esplin et al., 2018; Schiller, 2003; Schrum, Galizio, & Ledesma, 2011; Thannimalai & Raman, 2018; Weng & Tang, 2014).

Son olarak, çalışmada kapsamında test edilen modeldeki değişkenlerin, teknoloji entegrasyonu üzerinde anlamlı bir etkiye sahip olduğu, ancak bu değişkenlerin öğretmenlerin teknoloji entegrasyonunu istenen düzeyde tam olarak açıklayamadığı gözlenmiştir. Bu sonuç, öğretmenlerin teknoloji entegrasyonunun, hizmet içi eğitim durumu, teknoloji öz-yeterlik durumu, teknolojinin eğitimde kullanımına ilişkin içsel motivasyon gibi kişisel değişkenler ya da okulun teknolojik altyapısı gibi kurum bazlı değişkenler ile ilişkili olabileceği şeklinde yorumlanıştır.

Öneriler

Politika Yapıcılar için Öneriler

Bu çalışmanın sonuçları, politika yapıcıların, okul iklimi ve teknoloji liderliğini dikkatle ele almanın ve teknoloji entegrasyonunu hızlandırmak için bu yönde çalışmalar planlamanın çok önemli olduğunu ortaya koymuştur. Bu nedenle, teknoloji entegrasyonunun, okul müdürünün seçimi ve eğitiminde dikkate alınan önemli bir konu olması gerektiği açıktır. Bu bağlamda, eğitimde teknoloji kullanımını artırmak için, politika belirleyiciler ve karar vericiler tarafından okul liderlerini teknoloji entegrasyonuna teşvik eden, okul iklimi ve teknoloji liderliği konularında aydınlatmak için adımlar atılmalıdır.

Bu bağlamda, 2019 yılında ortaya çıkan COVID-19 salgını, eğitimde dijital dönüşüm, uzaktan eğitimde ilerleme ve eğitim sisteminde olası değişikliklere hazır olma gibi gereklilikleri açıkça ortaya koymuştur. Bu bağlamda, politika yapıcıların eğitime devam etmek ve olası afet senaryolarında esnek geçişler sağlamak için eğitimcileri teknoloji entegrasyonu becerileri ile donatmaları önemlidir. Bu başarmada, nitelikleri ve nicelikleri artırılan hizmet içi eğitim, uzaktan eğitim ve çevrimiçi eğitim gibi kanallardan eğitici eğitimler verilmesi önemli bir katkı sağlayabilir. Eğitimlerin organize edilmesinde, LMS (Öğrenme Yönetim Sistemi), uzaktan eğitim sistemi, vb... platformlar kullanılarak, zamandan tasarruf edilebilir, eğitim içeriği tek bir ortamda düzenlenebilir, katılımcıların ilerleme ve performansları takip edilebilir ve eğitim içeriği kolayca güncellenebilir.

Okul Müdürleri İçin Öneriler

Bu çalışma kapsamında, eğitim teknolojilerinin kullanımını artırma noktasında, okul müdürlerine; teknoloji liderliği yeterliliklerine sahip olmaya dikkat etmeleri ve ortak bir vizyonun paylaşıldığı, bürokrasinin kolaylaştırıcı olduğu, öğretmen işbirliğinin teşvik edildiği ve okul yöneticisine güvenin baskın olduğu destekleyici ve pozitif bir okul iklimi oluşturmaları önerilmektedir. Bu bağlamda, okul müdürü, teknolojik yenilikleri ve eğitimdeki teknolojik eğilimleri sıkı bir şekilde takip etmelidir. Öğretmenlere, yeni eğilimler ve teknolojiler hakkında rehberlik edebilmeleri için etkili

bir öğretim teknolojisi araştırmacısı olmalıdırlar. Çeşitli eğitim teknolojisi dergilerini takip edebilir ve eğitim teknolojisi eğitimlerine, zirvelerine ve konferanslara katılabilirler. Buna ek olarak, okul içinde öğretmenlere yeni ve doğru teknolojiler ve bu teknolojilerin okul koşulları için fizibilitesi hakkında bilgi edinmeleri için öğretmenlerden oluşan bir öğretim teknolojisi ekibi oluşturabilirler. Ayrıca okul müdürü, okulunda teknoloji entegarsyonunu teşvik eden bir iklim oluşturma hususunda, yenilikçi öğretmenlere yönelik ödüllendirme mekanizması oluşturabilir.

Gelecek Çalışmalar İçin Öneriler

Çalışmanın sonuçları, okul iklimi ve liderlik temelli değişkenlerin öğretmenlerin teknoloji entegrasyonunu tam olarak açıklayamadığını ortaya koymuştur. Bu nedenle, gelecek çalışmalar, okulun teknolojik altyapı durumu değişkenini ve öğretmenlerin içsel motivasyonu, öz-yeterlikleri ve hizmet içi eğitimi gibi kişisel değişkenleri içeren başka bir yapısal eşitlik modelini test edebilir.

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