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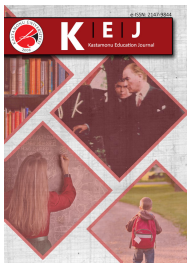

| Research Article / Araştırma Makalesi |

Data-Driven Decision-Making Process In School Management

Okul Yönetiminde Veriye Dayalı Karar Verme Süreci[1]

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Keywords

1. Data
2. Data usage
3. Data-driven decision-making
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Abstract

Purpose: The aim of this study is to examine school administrators' perceptions of the concept of data-driven decision making, the functioning of data-driven decision processes, the factors affecting this process, and suggestions for improving it.

Design/Methodology/Approach: In this study carried out using a qualitative method, a phenomenological approach was adopted. Maximum diversity and criterion sampling techniques were used while selecting participants among purposeful sampling methods. 17 school administrators assigned in Kahramanmaraş city center were included in the study group. The data were analyzed first by descriptive analysis and then by content analysis.

Findings: As per the results of the research carried out, administrators interpret the data mostly as numerical values, thus conceptualizing data-driven decision-making as making decisions based on numerical values. Student performance data has been the most mentioned data type among the data types used in schools. Administrators use the data mostly to create a budget. Data is generally collected from their respective systems and organized accordingly. Administrators benefit from such data either by analyzing them or using the ready-to-use reports that have already been analyzed. Then, the data is discussed in the board meetings and the decisions taken accordingly are implemented. The most important factors affecting data-driven decision making are the completeness of the data and the attitude of the person using them.

Highlights: Administrators prefer the data to be reported and presented to them in the form of detailed feedbacks.

Öz

Çalışmanın amacı: Bu araştırmanın amacı; okul yöneticilerinin veriye dayalı karar verme kavramına ilişkin algılarını, veriye dayalı karar sürecinin işleyişi, bu sürece etki eden faktörleri ve sürecin iyileştirilmesine yönelik önerileri incelemektir.

Materyal ve Yöntem: Nitel yöntemle gerçekleştirilen çalışmada olgu bilim deseni benimsenmiştir. Katılımcıların belirlenmesinde amaçlı örnekleme yöntemlerinden maksimum çeşitlilik ve ölçüt örnekleme teknikleri kullanılmıştır. Kahramanmaraş il merkezinde görev yapan 17 okul yöneticisi çalışma grubuna dâhil edilmiştir. Verilerin analizi önce betimsel ardından içerik analiz yapılarak çözümlenmiştir.

Bulgular: Araştırmanın sonuçlarına göre; yöneticiler veriyi daha çok sayısal değer olarak anlamlandırmakta dolayısıyla veriye dayalı karar vermeyi sayısal değerlere göre karar verme olarak kavramsallaştırmaktadır. Okulda kullanılan veri türlerinden öğrenci performans verisi en çok sözü edilen veri türü olmuştur. Yöneticiler verileri en çok bütçe oluşturmak için kullanmaktadırlar. Veriler genellikle ilgili oldukları sistemlerden toplanarak düzenlenmektedir. Verilerden yararlanma şekli yöneticiler tarafından verilerin analiz edilmesi şeklinde olduğu gibi; yöneticilerin analiz edilmiş halde bulunan hazır raporlardan yararlanması şeklinde de olabilmektedir. Ardından kurul toplantılarında tartışılmakta ve alınan kararlar uygulanmaktadır. Veriye dayalı karar vermeyi etkileyen en önemli faktörler, verinin tamlığı ve veriyi kullanan kişinin tutumudur.

Önemli Vurgular: Yöneticiler verilerin raporlaştırılarak ayrıntılı dönütler şeklinde kendilerine sunulmasını istemektedir.

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INTRODUCTION

The success or the failure of a decision made in education systems can create a "butterfly effect" and have an effect on many fields. Since schools are required to meet the interests, needs and expectations of the society, failure of reforms as well as failure to meet expectations at a desired level lead to questioning and criticism of the decisions taken (Kuchapski, 2001). For this reason, the decisions taken for educational institutions should be based on scientific foundations, predictions should be made and their effectiveness should be well designed. Academic performance indicators of international (PISA, PIRLS, TIMSS, etc.), national (ABIDE / monitoring and evaluation of academic skills) exam reports for schools and students in Turkey which are currently low, and ideological and arbitrary practices in education policies in Turkey from past to present have created problems and reactions. Problems that have turned into a vicious cycle cause the debate on accountability in education to continue to be relevant. This makes it essential to provide evidence in terms of the decisions taken.

The difference in success between schools and regions in Turkey requires realistic improvements in the education system within the scope of "equal opportunity in education" principle, as well as accurate reading and interpretation of digital realities. This will only be possible by addressing the problems in the Turkish education system with a holistic, realistic and rational approach taking into account the respective data (Sezgin, 2018). *Data-driven decision making* is defined as a purposeful process of selecting, collecting and analyzing relevant data in order to define problems, develop alternatives, compare the results of alternatives, and select the preferred alternative (O'Reilly, 1983). School data is the information that is systematically collected from multiple sources of information that helps educators better understand the flow of teaching practices and students' learning. The practice of analyzing school data, using analysis results for school development, and then evaluating these practices are defined as *data-driven decision making in education* (Schildkamp, & Kuiper, 2010).

The data-driven decision in education emerged after the enactment of the No Child Left Behind (NCLB) law in 2001 in the United States (USA), with the examination of accountability in education and school-based decision making. It then developed as a process advancing beyond accountability (Childress, 2009). Within the scope of the 2023 Vision Document aiming to make changes in the Turkish education system, the practices stated under the heading of "*Data-driven management with learning analytics tools*" to be carried out at macro and micro levels are the harbinger of gradual transformations in all components of the system. (Ministry of National Education [MoNE], 2018).

In Turkey, modules have been created by the Ministry of National Education in order to provide the administrators with the information as a whole, and to facilitate their decision-making and workflows (Önal, 2016). These web-based modules that record data, reports and documents about the school, students, teachers and families, and provide access to these data are e-School, Management System of Education Financing and Education Expenses (TEFBIS), Ministry of National Education Information Systems (MEBBIS), Public Expenditure and Accounting Information System (KBS), and Mobile Registration and Management System. The data stored in modules called data warehouses are named as *input, process and output* data in the literature. Data such as the characteristics of the teacher, student and school are input data, data such as the management of the school and training of teachers are process data, and data such as performance data at the end of the term refer to output data (Ikemoto, & Marsh, 2007).

In studies examining the conditions of a school that support the use of data in schools, it is observed that the most basic condition is the leadership behavior of principals who are the decision-makers in schools. (Datnow et al., 2007; Ikemoto & Marsh, 2007). Principals are required to be data literate and provide support with incentives such as establishing strong communication with teachers in particular and setting examples, providing guidance, creating opportunities for data use, setting measurable goals, creating a data culture, and involving the teachers in the data-driven decision process. (Goldring, & Berends, 2009). Data literacy, which is indicated as the premise of data-driven decision-making, is defined as "the ability to understand and use data effectively" and refers to the knowledge and skills that need to be acquired (Mandinach & Honey, 2008, p. 20).

The literature reveals that, despite the importance of school administrators in the data-driven decision-making process, the school administrators have limited knowledge in terms of data use, they only benefit from data to support their decisions, they misuse or do not use the data at all, but instead make decisions based on their intuition. (Datnow et al., 2007; Lachat & Smith, 2005; Young, 2006). Despite the fact that data is collected in schools in Turkey for many applications such as planning, organizing activities, and evaluating and even though there is a rich data potential, it is seen that the number of empirical studies conducted (Demir, 2009; Doğan, 2021) is very limited. Since there is no approach for systematically collecting and analyzing data in Turkey, it is clear that there is a lack of information and uncertainty on this matter. There is a need for studies to reveal the use of data in decisions taken in school management in Turkey and to address the problems in a comprehensive way. Therefore, it is aimed to contribute to the macro and micro level studies of data-driven management with the learning analytics tools that the Ministry of National Education has recently included in its agenda. It is believed that this study will support administrators in gaining the conceptual, human and technical skills they need to have, and will establish an important awareness and guide in the methods they follow in decision-making and will fill an important gap in the literature in Turkey on this subject. In addition to the foregoing, it is expected that data-driven decision-making based on realistic and solution-oriented foundations will be emphasized in the formulation, development and implementation of educational policies.

Purpose of the research

The aim of this study is to examine the data-driven decision-making process in schools according to the opinions of school administrators. In this framework, it is aimed to investigate the types of data used in schools, the purpose of using these data, the functioning of the process, the factors affecting this process and the solution suggestions that would improve this process. It is further aimed to reveal the necessary resources, structures and processes for the effective use of data-driven decision making by examining the data-driven decision-making situation, manners and experiences of school administrators. In this context, sub-purposes have been determined in terms of implementation.

1.How do school administrators conceptualize data-driven decision-making?

2.What types of data do school administrators use within the course of data-driven decision-making processes?

3.For what purposes do school administrators use data during the decision-making process?

4.How do school administrators implement data-driven decision-making process?

5.What are the factors affecting data usage according to the opinions of school administrators?

6.What kind of suggestions do school administrators have for the creation and development of data-driven decision making in schools?

METHOD

Research Model

In this study, it is considered that it is important to examine the opinions of school administrators on data-driven decision making, who have the most significant role in terms of data use in data-rich schools. To this end, qualitative research method and phenomenology pattern was used. Yıldırım and Şimşek (2006) emphasize in their study that phenomenology pattern focuses on the phenomena that are recognized but lack an in-depth and detailed understanding.

Study Group

The study group consists of 17 school administrators assigned at official primary, secondary and high schools in Onikişubat and Dulkadiroğlu districts of Kahramanmaraş province during the 2019-2020 academic year. While creating the study group, it was aimed to choose school administrators who have spent enough time in their respective schools to use the data-driven decision-making approach and to examine the use of data-driven decision-making approach from different perspectives, and thus maximum diversity and criterion sampling methods were used. Maximum diversity was tried to be achieved with variables including gender, seniority, undergraduate branch, education level and school type, and the criterion sampling was tried to be provided with the criterion of having been an administrator for at least one year.

Table 1. Demographic Characteristics of Administrators

Column 1	Gender	Seniority	Branch	Educational Level	School Type
A1	Female	24 Years	Primary school teacher	-	Primary
A2	Male	23 Years	Primary school teacher	-	Primary
A3	Male	15 Years	Primary school teacher	Master's Program	Primary
A4	Male	20 Years	Geography	Master's Program	High School
A5	Male	13 Years	Primary school teacher	Master's Program	Primary
A6	Male	15 Years	Primary school teacher	Master's Program	Primary
A7	Male	32 Years	Primary school teacher	Master's Program	Primary
A8	Male	24 Years	Primary school teacher	-	Primary
A9	Male	25 Years	Literatüre	Master's Program	High School
A10	Male	22 Years	History	-	High School
A11	Male	15 Years	Mathematics	-	Secondary
A12	Male	16 Years	Primary school teacher	Master's Program	Primary
A13	Male	11 Years	Counselor	Master's Program	Secondary
A14	Female	10 Years	Informatics	Master's Program	Secondary
A15	Male	13 Years	Informatics	Master's Program	Secondary
A16	Male	17 Years	Turkish	Master's Program	Secondary
A17	Male	14 Years	Primary school teacher	Master's Program	Primary

2 of the school administrators who were included in the study group were female, and 15 of them were male, and their seniority varied between 10 and 32 years. Nine of the administrators were primary school classroom teachers, two of them were

informatics teachers and the other six participants were geography, literature, history, mathematics, Turkish and counselor teachers. 8 of the school administrators graduated from a master's program with thesis, 4 of them graduated from a master's program without thesis, and 5 of them did not receive any postgraduate education. 9 of the school administrators work in primary school, 4 in secondary school and 3 in high school.

Data Collection and Analysis

A standardized interview form was used in this study in order to determine the data usage of school administrators in decision-making. There are six main questions in the interview form, and there are also questions at the end in addition to the main questions that will provide a better understanding of the questions. During the form preparation stages, foreign publications were examined and a conceptual framework was created regarding the use of data in Turkey, and six questions were created based on this framework, expert opinions were received from the field of education management, and then the content validity was ensured by asking the opinions of an administrator outside the study group, and thus a six-question interview form has been created. The interviews were carried out face to face and recorded with a tape recorder. Then the sound recordings were deciphered and converted into a written format upon giving each one of the administrators a code with the abbreviations A1, A2…A17. Prior to the qualitative data analysis techniques, descriptive analysis and then content analysis were carried out, and the categories and codes were determined.

FINDINGS

Findings Related to Defining the Concept of Data-Driven Decision-Making

Within the scope of the first sub-problem of the study, school administrators were asked the following question: "What does the concept of data-driven decision-making mean to you?" Administrators have defined data-driven decision-making in four categories: "decision-making based on current numerical values", "decision-making based on knowledge and experience", "evidence-based decision making" and "decision making based on demographic characteristics". It can be said that in the decision-making based on current numerical values category majority of the participants were considering data as figures with the following codes; decision-making according to the figures and statistics available in the systems (A4, A7, A10, A12, A14, A15, A16, A17), using mathematical signs and numbers in decision making (A1, A13), decision-making according to the numerical values of previous years (A6). In the decision-making based on knowledge and experience category, they stated that they consider the experiences and individual experiences as data as well with the following codes; decision-making based on experience (A3, A7, A8, A9) and decision-making based on knowledge (A1). In the evidence-based decision making category, two participants stated that the data are scientific evidence with the code scientific, valid and evidence-based decision making (A2, A5). In the decision-making based on demographic characteristics category, one participant brought the demographic characteristics to the forefront as data with the code (A11), as decision-making taking into account the data about the socio-economic status of the family, education level and living conditions. The opinions of some of the school administrators regarding the meaning of the concept of data-driven decision making were as follows:

> *"Decision-making according to the figures and statistics available in the system." A7*
>
> *"Decision making based on the experiences gained" A9*
>
> *"It means taking into consideration the economic situation of the family, the neighborhood the student comes from, and the education level of the family when examining the student's situation." A11*

Findings Regarding the Data Types Used

Within the scope of the second sub-problem of the study, school administrators were asked the following question: "What types of data do you use within the course of data-driven decision-making?" The data types used by the participants were classified under the categories of "input data", "process data" and "output data". A great number of codes emerged from the participants within the input data category, and input data was the most mentioned data type. Within these codes, data regarding family structure and parents' status (A2, A6, A8, A9, A11, A12, A13, A14, A16) and the number of students in the school (A6, A7, A8, A10, A11, A12, A13, A14, A17) has been the most mentioned input data types. In addition to these, socio-economic status of the family (A2, A12, A15, A16, A17), health information (A1, A5, A7, A15, A17), the number of students who will be enrolled in the next year (A6, A7, A14, A16), the number of foreign students (A7, A15, A16, A12), physical equipment data (A4, A15), inclusive student (A10, A12), educational materials (A4), parents' education status (A12), student's living conditions (A8), number of classes, class size (A15), number of siblings (A12), height-weight of students (A16), veteran or orphan child (A16), and parents' profession (A13) data were the input data types used in the data-driven decision-making process.

When the opinions that arise in the category “process data” are examined, it is seen that the data of the guidance study (8) performed by the guidance teachers is important and appears as the most expressed data. Then participation in social activity (4), the PTA Budget (3), sportive and artistic activities (2), the change in student enrollment (1), the number of staff who have attended courses (1) the student's documents and awards (1) Occupational Health and safety (1), the use of Information Technologies (1) data are stated as opinions . When the opinions that arise in the category of “output data” used by school administrators are

examined, it is seen that student performance data (10) is the most expressed type of data. Student absenteeism (6), teacher observation and opinion (5), and parent surveys (2) were then listed. Classroom attendance, staff absenteeism, school achievement data, surveys with teachers, and perceptual benefit scales are also specified as the type of data used by one participating administrator in the data-based decision-making process. The opinions of some of the school administrators regarding input, process and output data were as follows:

"I always ask every classroom teacher whether the students' parents are separated or together and learn the numbers and situations in this regard. I use these data when there is a problem regarding the child…" A2

"We always check the health information data of the students at the beginning of the year. We try not to assign children with health problems to the same class one after another not to have them hinder the lessons..." A15

"...the social events the students attend give me an idea about them… their participation in the competitions... I use the results we obtain from these. " A1

"We also consider the success of students, their socio-economic level and the opinions of teachers about them, although most of the time there are no official data in these regards." A2

"We use the data we keep regarding the parent-teacher association in the decision-making to be able to use it more effectively in the next year or to see where and what we have spent." A7

"I examine the results of the perceptual benefit scales one by one which we obtain the opinions of stakeholders…" A17

The striking finding observed about this sub-problem of the study is that the types of data frequently used by school administrators of primary and high school levels were different. School administrators working in primary schools use input and process data more, which show the social and psychological characteristics of the student such as social activity, parents' status, health data, guidance service data, etc., and school administrators working in high schools use output data more in which academic results such as student performance are prominent. School administrators working in secondary schools, on the other hand, use data that reflect both the academic data of the student and their social and psychological characteristics as well. The opinions of a participant who expressed this situation and the challenges experienced by the secondary school level regarding data are as follows:

“Most of the fifth grade students usually come with only their first and last names. This maybe because there is no examination system in primary schools and it creates a big crisis in secondary schools. In secondary schools, there is such a problem: Since there is no exam etc. in primary school, classroom teachers analyze their students on their own and continue with them for 4 years. In high schools, they continue with the students who will take the university exam. They can expel students who have disciplinary issues. However in secondary schools, there is no such thing like expelling from school. We have to analyze the children well. Therefore, we examine all the data of the children. The teachers in primary schools do not engage exactly. The teachers in high schools do not care about them either. Since they are exam-oriented, they don't care much. Secondary schools are the places with the most information confusion and unfortunately, the children cannot go to the next level without us solving these confusions..." (A15)

Findings Regarding Purposes of Data Use

Within the scope of the third sub-problem of the study, the school administrators were asked the following question: "For what purposes do you use the data?" The data usage purposes of the participants were classified under three categories as "educational activities", "school development" and "accountability". A17 stated the areas where data are used more briefly as follows: "*We use them for education and economical purposes or in the performance of personnel-related business and transactions*." Among the opinions within the educational activities category, determining the achievement level of the learning outcomes (A5, A7, A16) and creating classes (A8, A11, A15) were the prominent ones. In addition to the foregoing, identifying the areas where children are lacking (A5), identifying the students in need of support (A3), organizing course or study activities (A4), identifying the source of discipline problems (A9), determining class success (A10), assisting students in choosing their field (A11), determining the courses and classes that teachers will attend (A14) and creating student feedback (A12) codes have also revealed.

School development category was the category in which the participants expressed the most amount of opinions. Using the data to provide a budget (A1, A2, A11, A14, A15) has been the prominent opinion. In addition to these, school administrators explained their data usage for purposes with the following codes: organizing parent-teacher association income and expenditure (A3, A5, A7), preparing a strategic plan (A2, A14, A16), providing data for financial aid and support (A2, A15, A16), organizing a canteen tender (A2, A11), preparing a school development plan (A2), providing occupational safety (A15) preparing a plan for the next year (A14), providing data for organizing seminars (A8), providing data for participation in in-service trainings (A13).

School administrator opinions in the accountability category were as follows: providing data for the purpose of presenting parent-teacher association information to parents (A2, A3, A17), providing data to submit information to Provincial and District Directorate of National Education (A3, A13, A17), providing data to submit information to parents (A1, A12), internal audit focused data provision (A2, A13), providing data for the purpose of submitting evidence to auditors (A2, A13) and providing data to submit

data and evidence to external stakeholders (A15). Some of the opinions of the administrators regarding the use of data for educational activities, school development and accountability are presented below:

> *"We use physical data on occupational safety modules. We ensure that security measures for children are taken. We use them for the locations and gaps in exercises and how we will distribute classes in the future. For instance, in some cases, certain physical characteristics of students change as they move from 5th grade to 6th grade. Then we have to change the classes of the students. We try to put the 5 grades in places that are far from the laboratory… A15*

> *"We enter the expenditures we have made throughout the year for parent-teacher association into a system called TEFBIS (Management System of Education Financing and Education Expenses in Turkey). We state in our meetings what we have entered in this system item by item for all the expenditures we made with the proper data we retrieve from this system for example, in the context of stationery, in the context of information technology, or even for cleaning." A17*

> *"...likewise, when we see that sufficient participation is not ensured in in-service trainings, we, as the administration, lead our team and encourage our fellow teachers to participate in these in-service trainings…I was going get a training on intelligence games, but I saw that none of the teachers was receiving intelligence games training. So, I got them to participate as well. Currently, four of our teachers have received intelligence games training" A13*

Findings Regarding the Functioning of the Data-Driven Decision-Making Process

Within the scope of the fourth sub-problem of the research, the school administrators were asked the following question: "How is your data-driven decision-making process carried out?" Based on the answers, data-driven decision-making processes of school administrators have been categorized as "data collection", "sorting and organizing", "analyzing", "interpreting" and "taking action". In the data collection category school administrators explained the sources from which they collected the data as follows; obtaining data from existing systems (A1, A2, A3, A4, A5, A6, A9, A10, A11, A13, A16), obtaining guidance service file data (A2, A4, A8, A11, A12, A15, A16, A17) and obtaining classroom teacher file data (A11, A13, A14, A15, A16, A17). It is seen that school administrators mostly benefit from the data that are available in the system in data-driven decision making. Opinions of the participant explaining the sources from which they collect data are as follows:

> *"The data are being obtained from Ministry of National Education Information Systems (MEBBIS), Management System of Education Financing and Education Expenses (TEFBIS) and e-school... e-school has a lot of graphics and statistics" A6*

> *"A letter requesting the number of children who are the kids of martyrs and veterans as well as number of orphans to be reported has been received recently. Now, in very crowded schools, it would require certain skills to respond to such a daily letter accurately and completely at the same time. Counselling came to my mind. The counselor has a risk map. There are nine or ten criteria in that risk map such as children living separately from their families, orphans, disadvantaged children, children living in dormitories alone or children under protection. The teacher can gather information about the children whose parents are separated and learns about their financial situation and all the necessary socio-economic status of the family and shares this info with the administration; and the administration acts accordingly when required in the future." A17*

> *"There is also the data we receive from classroom teachers. They are much more realistic. They can see the valid exam results or some other similar information and see the success and progress of students." A11*

In the sorting and organizing data category, codes such as grouping data (A1, A11, A13, A16) and organizing data in a list (A6, A7, A16, A17) were seen. Participants think that providing the data in the system in regular lists will facilitate their job, reduce their workload and that it is a necessity for the process to function well. The opinions of the participants on this matter are as follows:

> *"For example, there is health data, ok, but we cannot find them among many students. Nowadays, we think that we should take precautions for the corona virus, and children with diseases such as diabetes and psoriasis are more at risk because their immunity is suppressed. However when we enter the system for this info, we cannot only see the list of sick children. It is very difficult for us to find such information one by one" A7*

In the analysis category of the data-driven decision-making process, the participants stated that the data were analyzed in the system by examining reports based on performance analysis (A1, A6, A10, A11, A17) and performing descriptive analysis when needed (A1, A2, A11, A12, A15). At this phase, data is transformed from raw form to information that will affect decisions. The opinions of the participants, who stated that some of the data were in raw form in the systems, some of them were being obtained through presented reports upon being analyzed, and sometimes by analyzing upon establishing simple descriptive statistics, are provided below:

> *"... most of the analysis are received as being completed. The success rate of a class for a certain subject can be seen…" A6*

> *"…we conduct learning outcome assessment exams, for that, I consider a difference as follows. I keep the English lesson as a constant variable since the same teacher attends this lesson. Then I look at math courses. While the English course averages are close to each other, we can see differences in mathematics. Then it can be said that there is a difference regarding the teacher's performance, classroom management, pedagogical perception etc..." A12*

Although some of the administrators think the reports were insufficient with the statements, "*We do data analysis if we want, but since this is not an obligation, we do it only in some special, troublesome situations (A11)*" since there is no obligation for them to make data-driven decisions, it is understood that they do not carry out any analysis. Others on the other hand stated as follows: *"...I don't need to analyze the data. I generally understand the situation when I look at a class's grades or absenteeism status. I don't necessarily need to deduct a percentage of these to conclude the amount of success or absenteeism in a certain class. When you look at the results roughly, you understand the situation anyway… (A3)*", and they stated that they did not need to analyze, therefore they did not do it.

In the interpretation category, they stated their opinions as follows: talking to teachers and evaluating their opinions (A2, A3, A4, A5, A14, A16), evaluating student results with parents (A4, A11, A12), and holding meetings with the administration (A8, A13). The opinions of the participants, stating that they discuss the data through meetings with colleagues and parents and made decisions by discussing what should be done, are provided below:

> *"When we receive the data, we hold a meeting as the administration. I organize meetings with teachers as well. We make decisions according to this." A8*

In the taking action category, which is the last stage of data-driven decision making, school administrators mostly stated with the code informing the result (A2, A4, A11, A12, A16) that, in terms of the information they obtain from the data, they inform the related people about the situation. In addition to the this, there are also codes that appear in the form of organizing activities or courses in the school (A2, A4, A16), organizing a visit or trip (A7, A8), taking measures (A1, A7), and referring the situation to relevant authorities (A4, A12). The data is first transformed into information, then interpreted with relevant stakeholders and then a decision is made. It is now important to act according to this decision made. The opinion of a participant describing this situation is provided below:

> *"I made some decisions at the end of the meeting as well. We thought that we had to open an extra course on these and study times would be beneficial… According to the results of our trial exams, we can meet with the children and the parents. We tell them the level of their child according to the class… We can organize courses… We tell the parents of the students who are doing good to get additional resources"A4*

Findings Related to the Factors Affecting Data-Driven Decision-Making

Within the scope of the fifth sub-problem of the research, the school administrators were asked the following question: "What are the factors affecting your data-driven decision making process?" Opinions of participants on factors affecting data-driven decision-making in schools are grouped under the categories of "data properties", "data user characteristics", "organizational characteristics of the school" and "political factors". In the data properties category, it is stated that data completeness (A1, A2, A3, A6, A7, A10, A11, A13, A14, A15, A16, A17), data accessibility (A8, A9, A10, A11, A15), data quality (A2, A4, A12, A16), data availability (A1) support data-driven decision-making. It can be said that the participants do not want to have incomplete data since they want to evaluate the students holistically. Some of the opinions regarding this are summarized below:

> *"E-school has almost all of the data. I think e-school is very useful… The data on the emotional and psychological development of the students are insufficient… student observations should be made in terms of design classes, game therapy, etc... The child may be hardworking, but he may be mischievous or hyperactive as well. Then, hyperactive children can be assigned to the same classroom. This causes us to lose a lot of time in the process. Rather than academic data, other data such as teachers' opinions about the students should be considered more important." A1*

A13, who attributes the reason for the uncertainty regarding them not knowing the amount of foreign students to enroll in school next year, to not having a address requirement for foreign students, stated as follows: *"...last year, 250 Syrian students enrolled to our school due to the closure of temporary education centers. Since our students have address requirement, we can know them, but since foreign students did not have such a requirement, there were intense amount of students in the classrooms and we couldn't prevent it...*" and included that the failure in making plans for foreign students in schools affects the functioning of the school negatively. The administrator with the code A7 continued to state his opinion and explained that for some of the data that was not entered, the parents were concerned about the security of the data, therefore they were keeping the real data. Participant's opinion is as follows: "*We sent a form to parents to see if the children have permanent illnesses or anything like that. Then the parent sent an answer: Will MoNE take this data and comply with the personal data protection law? Actually, the parent is right to be sensitive about this matter.*"

Opinions of the participants on data access, being up-to-date and usability are presented below:

"...how can a data-driven decision-making process work when even the internet is not working properly in a village school, for example there are 2 computers in the teachers' room. If only 2 computers are given to 45 teachers, how should the teacher look at the data." A11

"Data obtained from the field can sometimes be unreliable. That being said, the results regarding the data obtained from e-school or electronically are completely up-to-date and reliable. When there is data that the other party cannot just make up, the reliability level of the data increases. School administrators have an essential role in updating the data. If you, as the school administration, do not give teachers the necessary forms and do not follow-up the progress, it is not possible to have the current state of such data in the e-school. For example, the data such as the number of students participating in the activities held in your school throughout the year or the number of activities held in your school for the last five years and the number of teacher participation related to this, I do not think that there is an administrator who fills in such information clearly and properly. They often make up such information. ...We direct our students to family physicians to have an annual examination. A physician said to a parent that it was a very chore job, and asked "is it you again? Even this situation may prevent us from obtaining data on health. If the administration is also indifferent about this and the inspectors ask how many of them went to the examination, and he might say 50-100-150 with a round number and decrease the reliability of the data by not providing the actual number of students. A12

"The data should be in a way we can understand it, with graphics or something like that. I should be able to say "okay now I know what to do." (A1)

In the organizational characteristics of the school category administrators stated their opinions with the following codes: date usage culture (A2, A3, A4, A10, A11, A14, A15, A16, A17), time (A8, A9, A10, A11, A14) and leadership (A2, A4, A8).

"...when you give a survey to the teacher or the student or ask something, they should be able to tell you the answers without hesitation, without thinking that they will be accused. They should be able to feel your sincerity. Then, when they see that these conversations are transferred into the decisions, they will easily talk to you on any type of data. It's important that they get positive feedback from you. ...sometimes when I look at the data, I can just see fixed things, but someone else can see other things as well. I feel that we are a team in this way." A2

"Time is our biggest problem. ...managerial procedures and tasks take a lot of time. ...the data are discussed in the board or the teachers discuss them among themselves in the group meetings. ...separate meetings should be held to examine these data in detail. ...it should be explained to us by higher authorities that we need to organize meetings." A8

"...in fact, administrator appointments should be based on data as well. For instance, if I have become an administrator, yes I should have personal rights, but the state should also tell me that it is assigning me as the principal of this school for 4 years, and that this school is like this and expectations from me is this, so you should do this amount of education activity, and you should do this amount of social aid activity, and you should carry out this amount of family training. and in my opinion the data in this context should not be like this; when I say data I do not mean the level achieved by the students... I think there should be concrete data when assigning a school administrator so that one can ask about the activities carried out in the school." A14

The codes that are observed in the "data user features" categories are user attitude (A1, A2, A3, A4, A5, A6, A9, A11, A12, A15, A16, A17) and data literacy (A1, A2, A4, A7, A15, A13, A16, A17). A12 clearly and briefly summarized the reason for having a positive attitude towards data use with the following statement: "Data show the facts, make us verify our decisions, and add strength to the direction we are going towards… even if the final decisions are not made according to them…". The opinions of administrators who have a positive attitude towards data use but complain about teachers' slackness on this matter are summarized and presented below:

"…data will push the teacher to show extra effort. Teachers just want to conduct their lessons and do not want to do anything else. Therefore, they only collect data and enter them into the system when it is mandatory. Of course, not all the teachers are the same, but most of them are unfortunately like this. After they enter and check the data shallowly, they say okay we're done. If they look at the situation as these students are their children and try to find ways to help them they will extract a lot from the data, but they cut corners." A6

"Data analysis should be managed effectively and at a level that can be examined longitudinally, where one can measure the significance of the difference between the semesters, and even lacking knowledge on this matter, comprehend whether this difference is significant or insignificant. Analyzing data in integration with the previous data and interpreting them requires skill. I do not think that the administrators are very skilled in this regard." A17

In the political factors category, the participants stated that they appreciate the efforts and breakthroughs of the MoNE in this regard with the codes of MoNe practices (A15, A17) and provincial and district organizations' practices (A3, A7), and that there were problems in the practices of provincial and district organizations. Some of the participants' opinions on this matters are as follows:

"The Ministry is doing the best it can do…" A15

"Provincial and district organizations do not make decisions driven by data. Next to us there is a school with around 600 students. I have 1300 students. They have 5 cleaning personnel. I have 4. They provide single education. We provide double education. Those kids leave the school at 14:30. The attendant can clean the school completely until five o'clock. My students leave at 17:30. Here, MoNE has to carry out data-driven decision-making. The same happens like this as well: For instance, a budget is received by the directorate general for basic education. This budget is received by every school bases on number of students. It seems fair, but distributing resources according to the number of students is actually unfair. For example, let's say there is a school in a good location. While the parents of their students are judges, doctors, the best of the parents of my students are working for minimum wage, they are mostly unemployed or foreign parents. Now if I distribute that budget solely according to the number of students, it would not be fair. Other data need to be taken as criteria as well in this regard." A7

Findings Related to the Suggestions for the Development and Improvement of Data-Driven Decision Making Process

Within the scope of the sixth sub-problem of the research, the school administrators were asked the following question: "What are your suggestions for effectively conducting the data-driven decision making process?" Opinions of school administrators on improving data-driven decision-making in schools are classified in two categories as "micro level" and "macro level" recommendations. In the micro level category; codes such as data should be reported (A1, A2, A3, A5, A6, A7, A10, A13, A17), data literacy training should be given (A1, A2, A4, A7, A13, A15, A16, A17), decisions should be taken in a democratic environment (A1, A2, A3, A4, A13), the functionality of the modules should be increased (A5, A14, A15, A16, A17), support should be provided in managing the data process (A8, A9, A10, A11, A12), school capacity should be reduced (A10, A11, A12, A13), data diversification should be ensured (A2, A9, A11), and data-driven criteria should be created (A5, A15) were seen. Opinions of administrators on this matter are as follows:

"We can access information. However we cannot see the correlation between the information. Even more detailed correlations can be established. Even in the reports, the missing information and the improvements to be made should be written…" A1

"MoNE should inform stakeholders on this matter and raise awareness..." A4

"It would be better if we had access to health screenings and see them, for example, how many students are missing vaccination, it is given us as a document but if it was registered in a system, if we had a button in the e-school where we can see which students are vaccinated or not and which did not have eye screening, it would be much better." A5

"I think there should be a data field where parents of students can also enter data. We have sensitive parents, parents who want to reach us. Maybe there are a few, but I think it is still important. For instance, they need to come to school and tell that the student is ill and have a medical report. This is because we do not accept any statement made on the phone. A parent cannot initiate leave processes via phone. But if we had a system where we can see the medical reports through a module, for example, through the health module, and if we could get them directly from there, it would be great. Or it would be nice if there was a field where they can see the sports activities in our school together with the sports activities in public education. It would be nice if when the parents enter the system, they can see the sports areas in the nearest place. Or the physical education teacher might say, preferably these children should be directed to the so and so public education centers. Or, our Turkish teacher can say that the student can benefit from these literacy courses in public education. I really wish there was such a common system." A15

"When I imagine an ideal school where data-driven decision-making is carried our, I think it should be "boutique school" where there a small number of students. A school that is more controlled, where you can observe everyone… then you use the data better. You can see each child's data much better. The number of students in schools should definitely be reduced for data-driven decision-making." A10

"Numerical data are definitely useful. However, for example, there are people who leave the EBA open so that the EBA usage rates would be more and those who leave it open and go away and do not sit in front of it for hours, perhaps just to increase the rate. I think it is wrong to just take certain data into consideration… The same is true for the students as well. If I only acted based on certain data, I would have too many students by now that I suspended or expelled from school. I also consider the family situation of the child, etc. when making a decision. Otherwise, half of the students in this high school would receive disciplinary punishments… I think intuition and data should be used together" A9

"There should be criteria based on data. Everything should be standard and measurable." A5

In the macro level category, the opinions were as follows with the following codes: there should be legal regulation/sanctions (A2, A4, A5, A7, A9, A11, A12, A14), data-driven group directorates should be established for each region (A17). With the code there should be legal regulation/sanctions it was suggested that necessary legislative changes should be made for data-driven

decision-making and their powers should be increased. The opinions of the participants, stating the lack of legislation and legal regulations regarding data use and the need to establish group directorates in regions, are summarized below:

> *"Legal regulation should be prepared, our powers should be increased, the political pressure on us should be reduced. It is stated that the data should be analyzed in group meetings, but we cannot do anything to the teacher who does not do it. I do not have the authority to dismiss teachers... Legal arrangements must be made about this, a regulation must be issued., We, as a society, do not do anything without receiving orders from higher authorities." A5*

> *"A higher organization can be established in seven regions that can include the data of these seven regions and group directorates can be established that can represent each region on the basis of these regions. For instance: A data-driven group directorate based in Diyarbakır in the Southeastern Anatolia region or in Mardin. This information can be processed in a timely manner so that it can be processed properly and ultimately the data obtained by those group directorates can be transferred to the ministry. Yes, it is possible for the ministry to access all data in 81 provinces at the same time, but it is more important to assign a lower level authorization and make arrangements accordingly for the more sound and fast execution of the procedures. A17*

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

The purpose of this study is to identify the type of data used in schools, the purposes of using such data, the functioning of the data-driven decision-making process, and the factors affecting this process, and to offer suggestions for solution. In terms of the perceptions regarding the concept of data-driven decision-making, it was defined by most of the participants as decision-making based on numerical values, but also as decision-making based on knowledge and experience, decision-making based on evidence, and decision-making based on demographic characteristics. The data concept is mostly seen as numbers by the participants. The participants, while defining data-driven decision-making, they consider data as a reliable basis, a tool for reaching qualified results and as an indicator of professional behavior. Administrators with a professional seniority of 20 years or more consider the data as knowledge and experience, while administrators with less professional seniority consider it as numerical values. The fact that professional seniority brings experience with it may cause administrators with more professional seniority to think that they have sufficient knowledge or that their experience and knowledge are more instructive and is a factor helping them in taking better decisions.

The results obtained according to the data types used by school administrators in making decisions are classified as input, process and output data. The data on the family and parent status of the student and the data of the number of students in the school were the most mentioned data among the input data. Anderson et al. (2010) found out that administrators mostly use data showing students' characteristics (socioeconomic status, etc.) in evaluating school and student performance, and McCray (2014) observed that the administrators who were asked to rank the data according to their importance placed demographic data in the first rank among 32 data. However, the input data that countries attach importance to varies according to their specific situations. For instance, in the research carried out by Mnyasenga (2014) in the context of Tanzania, it is found out that data on diseases such as cholera, HIV, malaria and distance between home and school are important there.

Students' performance data were the most emphasized data among the output data, which are mostly considered to be the behavior and academic indicators of students and personnel members. It is consistent with the findings of this study that Schildkamp et al. (2014) identified student performance data as the most used data. The fact that the most mentioned data is related to counselling studies in the process data category can be due to the fact that the data of counselling service which examines the students in more detail in detecting many problems, is found to be more reliable and up-to-date. The fact that high school administrators mention academic data more and primary school administrators mention psychological and sociological data more may be due to the educational expectations and pedagogical differences of the students at these levels.

Based on the opinions of the administrators, the data are used for educational activities, school development and accountability. Using data to determine the achievement levels in terms of learning outcomes and to form classes are the most frequently shared opinions in the educational activities category. The fact that administrators are held responsible for the performance data of the school and that they can closely observe the education-training process cause them to use data in the development of educational activities. Consistent with the findings of this study, Shen et al. (2010) revealed that administrators use data to group students, identify areas of weaknesses and increase students' academic achievement. The study of Aydın (2016) revealed that administrators try to do jobs for their superiors such as telephone calls and official correspondence, and this situation takes them away from educational leadership thus devoting too little time for educational activities. Considering the results in the context of Turkey, administrators' use of data for educational activities can be deemed as an accountability practice for their superiors. The data is used by administrators mostly for school development and it is emphasized that it is also used for budgeting in school development. It is consistent with the findings of this study that in the study of Brunner et al. (2006) it is found out that administrators mostly use data for school planning, identifying resource needs, and organizing professional development activities for teachers.

Presenting parent-teacher association data to parents and presenting data to provincial and district Directorate of National Education are the most frequently mentioned opinions in using data for accountability. In addition to these, data are also used to

inform parents, to provide internal control, to provide evidence to auditors and to provide evidence to external stakeholders. Abdusyakur (2015) found out that parental control contributes to accountability, Ezzani (2009) found out that administrators' use of data for internal accountability improves the culture of inquiry, and Heilig (2014) found out that use of data facilitates the provision of evidence by administrators about their decisions to auditors. When the findings of this sub-problem are examined in general, it is seen that administrators need to use data in planning, execution and evaluation. However, it was understood from the participant's opinions that the data was being used just for accountability, rather then being used deliberately to make changes / improvements.

The data-driven decision-making process is classified as "data collection", "sorting and organizing", "analyzing", "interpreting" and "taking action" stages. In this study, it is complained that the process of sorting the data takes a long time, while Lachat and Smith's (2005) study states that the lack of skills causes difficulty in sorting the data. This situation can be attributed to the software difference of the systems in which the data is stored. In this study, data analysis was carried out by examining the reports presented from the system in the form of analyzed reports or by descriptive analysis made by administrators themselves when they need it. Even the administrators who stated that they are analyzing data only analyze in times of problems or crisis. Heilig (2014), in his research conducted in the context of America, attributed its conclusion that administrators were not obliged to use data and they were analyzing the data only in challenging times. It can be said that this interpretation is also correct in the context of Turkey as well. It is also understood that some administrators directly move to the interpretation stage without analyzing or examining the analyzed reports. In short, this stage is not understood clearly by the administrators and that the data literacy competence of the administrators is very low. Data literacy requires a certain level of competence so that one can make sense of the data collected (Mandinach, 2012). After analyzing the data, discussing them with the personnel members, with parents or just the administration before making a decision indicates that the stakeholders are involved in the decisions. The data of the previous periods are compared at class, school, district and regional levels, therefore the status can be seen as a whole. In the context of Turkey, Demir's (2009) research also shows that analyzes are carried out by comparison. Coburn and Turner (2011) found out that the recommendations at this stage are an essential link in the chain, and Spillane and Miele (2007) also found out that they strengthen the link between decision making and taking action. At this stage, which is also known as the synthesis of knowledge, the point to be considered is that the specific situational conditions of each school, the ideologies of the educators, and their social interactions affect the quality of the decision. In fact, Pollard (2018) revealed that administrators and teachers evaluate data depending on the culture and expectations surrounding their schools. Once the data transformed into information is interpreted, action is taken.

Factors affecting data-driven decision-making according to school administrators are categorized as data properties, data user characteristics, organizational characteristics of the school and political factors. The completeness, accessibility, quality and usability of the data affect the data-driven decision-making process. Even though administrators think that most of the data are generally complete, they still want to have access to more detailed data on students and personnel members. It is explained that there were certain incomplete data due to the reasons such as parents' not sharing the necessary information specifically because they are suspicious of data security, and Syrian students not having an address record. Lachat and Smith (2005) found out that as soon as the data that were initially incomplete and inaccurate were started to be verified, it was started to be used in a much more effective way as well. In recent years, data indicating different characteristics of students have also started to be entered into e-school. However, as we are in the early stages of data-driven management and data-driven decision making, there are still some incomplete data in the systems. Difficulties can be experienced in accessing data due to certain problems such as the insufficiency of technological infrastructure, the amount of people within the system during report card time, the inability to access some systems from outside of school environments, and web access problems in rural areas. Kerr et al. (2006) found out that access to data encourages data use, and Wayman and Stringfield (2006) also revealed that inaccessibility to data prevents data use. The study of Noyce et al. (2000), which is similar to the findings of this study, revealed that high-performance technological resources should be used for the effective use of data. The accuracy and up-to-dateness of the data are mostly linked to the attitude of the administrators and the controllability of the data.

In the organizational characteristics the school category, data usage culture, time, support and leadership codes were seen. One of the indicators of data culture is that, when the data culture is established, the participants can discuss the data with the stakeholders. Wayman et al. (2010) revealed in their research that open and clear communication is not threatening for teachers and supports data use. In the findings of this study, it is also seen that the data are used to find solutions, not to blame someone else. By doing so, different perspectives are used as well, team spirit is kept alive, colleagues share their expertise in data use among themselves and contribute to professional development. However, except for official meetings, the data are not discussed that much. For this reason, it cannot be said that a data culture is fully established.

Among the organizational characteristics another factor affecting data usage of the school is time. Administrators, complaining about the shortage of time due to excessive bureaucratic and managerial workloads, stated that there is no obligation to talk about and discuss the data, therefore they do not allocate a separate time frame for this. In fact, they admitted that they sometimes move away from the core of education due to the excessive amount of paperwork controlled by senior administrators. In similar studies, Ingram, Louis and Schroeder (2004), Lachat and Smith (2005) and Francis (2009) found out that administrators and teachers had time constraints, and revealed that a significant factor in data use was "providing time for adequate and

uninterrupted data usage environment". In the 2023 Vision Document, it is mentioned that the bureaucratic burden will be reduced by improving the processes within the scope of data-driven management (MoNE, 2018). It is believed that this practice will reduce the time constraint problem.

It is determined that a small number of administrators were setting an examples, encouraging and providing guidance for data use under the code of leadership. The research carried out by Murnane et al. (2005) revealed that even though the personnel adopt data-driven decision-making, the inability to get support from the administrator was an obstacle in terms of data usage. In this study, the participants stated that they want the emphasis to be on competence in assignments and the selection of administrators to be driven by data. In researches carried out on selecting, training and assigning administrators (Altın & Vatanartıran, 2014; Arabacı et al., 2015), competency was also found to be the most emphasized factor. Doğan (2019), examining the 2023 Vision Document in terms of various stakeholders, found out that the biggest expectation and desire is the selection of a competent manager.

In the user characteristics category, under the user attitude code, administrators had a positive attitude towards data use due to the properties of data such as eliminating uncertainties, persuading and pleasing stakeholders. Even though administrators had a positive attitude towards data use, the lack of sufficient awareness indicates the lack of a shared vision, in other words a common language. Shared vision, which is one of the five disciplines of organizational learning theory, also affects and directs personal efforts and individual expertise. In this study, it is understood that the administrators could not go beyond the pre-existing patterns, did not have sufficient training, and therefore did not show the necessary sensitivity in terms of data use. In the national literature, three competency areas have been defined for school administrators: technical, humanistic and conceptual competence (Töremen & Kolay, 2003). These competency areas defined are in compliance with data literacy and are required competencies. As stated in the findings of this study, administrator selection processes should be driven by data and the quality of training processes should be increased within the scope of relevant competencies.

In the political factors category, under the code of MoNE practices, the practices of the Ministry of Education and its efforts on this issue were appreciated and the practices of provincial and district Directorate of National Education that are not driven by data were criticized. Reichardt (2000) found out that policy-making that supports and encourages data-driven decision-making increases and improves data-driven decision making processes. Education Reform Initiative (ERI) (2012) stated that, given the centralist structure, it will not be possible for the provincial organizations to implement data-driven plans and policies, unless detailed policies are determined by the central organization of the Ministry of National Education. Some of the administrators stated that the data were symbolic values for their superiors, that the specific situation of schools was being ignored, and favoritism comes to the fore when it comes to decision-making. Slavin et al. (2013) revealed that the region's and the district's unfair practices in school financing and resource allocation were among the problems identified in terms of data-driven decision-making. Doolittle & Browne (2008) stated that laws enacted by the state require the use of data, but ironically, the biggest obstacle to data use is the insisting of higher authorities. This situation is defined as "organizational inconsistency" in the literature. It will be fair to say that inconsistency in statements and actions, which is the second stage of organizational inconsistency (Charette, 2006), is inevitable for all organizations that do not carry out data-driven decision-making.

Suggestions of administrators on the development and improvement of data-driven decision making have been grouped in two categories as macro and micro level. In the micro level category; suggestions such as data should be reported, data literacy training should be given, decisions should be taken in a democratic environment, the functionality of the modules should be increased, support should be provided in managing the data process, school capacity should be reduced, data diversification should be ensured and data-driven criteria should be created were stated. Previously, administrators' lack of analysis, interpretation and understanding of data was coded as insufficient data literacy. Administrators' insufficient data literacy causes them wanting the data to be reported and presented to them. This finding may also be due to the administrators' desire to make the right decision by learning the correct result of the data at the knowledge level. If practices are to be based on data-driven management as stated in the Ministry of National Education's 2023 Vision document, and if schools across the country are to be shaped on the basis of data-driven decisions, the schools where all data are collected and the personnel, who are the most basic part of this matter, should be educated to be aware of this procedure.

According to Holcomb (1999), schools that are effective in terms of data use provide continuous feedback in this respective cycle. Francis (2009) emphasizes with the "feedback loop" code the data should be returned to the user as a report after it is sent and the importance of the time passed in the meantime. It can be said that not getting feedback for the data causes data-driven norms not being established in the school, and measurable goals not being set at school and classroom levels. In the "accountability" category among the findings regarding the data usage purposes of administrators, administrators stated that they give feedback to students, teachers and parents on school basis. However, at the macro level, administrators complained that they could not get enough feedback for the data they upload to the system. It can be concluded that the fact that the administrators cannot receive feedback causes the data to be ignored.

Considering the fact that 12 of the 17 administrators participated in the study have graduated from a master's program, it can be said that master's programs need reform, since an administrator graduated from a master's program is expected to have the knowledge of using and interpreting data. Frey and Schmitt (2007) found out that data collection, analysis, and interpretation skills were not included in administrator training programs, while Khanna et al. (1999) found out that administrators were able to

use data actively after receiving data literacy training once and had no difficulty in understanding it. These results explain the importance of administrators and teachers to receive data literacy training at all levels in the learning community schools.

The proposal to make decisions in a democratic environment indicates the lack of participation in decisions stemming from the centralist structure. As per Feldman and Tung (2001), the lack of stakeholder participation in the decision-making process can lead to resistance to changing its practice and prevent the data from reflecting its functions such as critical view. As a matter of fact, the fact that the studies on decision-making in education (Büte & Balcı, 2010; Özmusul, 2018) are generally aimed at examining the participation of stakeholders in decisions, and the findings of resistance to such change confirms this view in the context of Turkey.

Even though the administrators like the modules, they made suggestions to complete some of their functional deficiencies. Francis (2009) determining with the "flexibility" theme that there should be more than one way to access systems, and identifying the need to integrate the systems with the "interoperability" code, and Shaw's (2017) study findings showing that 93% of the systems of the administrators were disconnected and there were no links between them are consistent with the findings of this study. Opinions on the modules indicate the need for an "Educational Data Warehouse". With the educational data warehouse, it is planned to integrate data systems that work independently from each other and have access to the big data. Therefore, the data will not show different values in different systems and can be updated at the same time and faster reports can be created and it will be a more efficient process. It can be concluded that making the modules more functional will facilitate the workflow of the administrators, the workload will decrease and the reliability of the data in the system will increase.

The administrators who stated that they experience an uncontrolled amount of students with the addition of foreign students in these regions also stated that it would be more appropriate to upload student data to an analytical program instead of an expert. They complained that they could not examine the data in detail and suggested that the student amount in the school should be reduced or a person who would only deal with the data should be assigned. Bischel (2012) stated that it would be more appropriate to install an analytical program instead of an expert. Ho (2016) discussed that taking into account the disadvantaged people in terms of ethnic origin, race, socio-economic status, language fluency, etc. was emphasized however, in the study he carried out in the context of Los Angeles, the USA, he revealed that students who are not white and socio-economically disadvantaged are only identified and no remedial measures have been taken. Similarly, the integration of Syrian students into schools has been continuing in Turkey for about eight years now, and data regarding the problems are also present in this study, but the improvements regarding these data cannot be made at a sufficient level.

A small number of administrators stated that a great amount of data should be taken into consideration in decision-making and experiences should not be ignored. Participants stated that data such as student performance would not be sufficient for decision-making on their own, and that the student's individual background, cultural-environmental context, habits and behaviors should be evaluated as a whole as well. Epp (2011) found in his study that focusing only on the performance data of students has negative effects such as grouping in students and not being able to go beyond the curriculum for teachers. Abdusyakur (2015), who observed that schools in rural areas only make decisions based on students' performance data, attributed the research findings to the development level of the country and the lack of data literacy of educators in the context of Indonesia. Even though it seems paradoxical with the data-driven decision that some participants suggest using experience and intuition, Gary Klein, author of the book "The Power of Intuition" and Malcom Gladwell, author of the book "Blink" emphasized that people who make successful decisions also benefit from their intuition, and that intuition is the ability to "think without thinking" that emerges at the time of need of knowledge accumulated over the years. Clarifying this issue, Schmoker (1999) stated that general evaluations can be made about teaching and programs through intuition, but it is inevitable to use data to investigate individual or group learning in detail and to better understand strengths and weaknesses.

Some administrators who suggested creating data-driven criteria stated that it is important to set everything to a standard and to set realistic goals for data use. Referring to the importance of determining measurable goals at system, school and classroom levels and developing a curriculum for these goals, Datnow et al. (2007) state that the level desired to be reached will get closer to each other with the activities performed in this way, otherwise it will not be possible to reduce this difference. It would be fair to say that the elimination of uncertainties in schools and the establishment of data use culture will be achieved by setting data-driven realistic targets.

The suggestions of the administrators which are at the macro level are mostly that there should be legal regulations/sanctions. The centralized structure of the Turkish education system leads to actions taken only with directives from above levels, thus bringing the necessity of legal regulation. It is mentioned that necessary legislative changes will be made within the data-driven management action plans of 2023 Vision Document of Ministry of National Education. Otherwise, it does not seem possible to have data-driven decision-making in schools. Reichardt (2000), who examined the role of government policies and legislation in facilitating and promoting the use of data in decision-making processes of schools found that policy-making and legal regulations to encourage and support data-driven decision-making increase and improve the use of data-driven decision-making in schools. Another suggestion regarding the actions to be taken at a macro level is to establish data-driven decision centers on a regional basis. Danielian (2009) and Ezzani (2009) found out in their research that the support received from regions and districts guided school administrators in eliminating problems, creating vision, and establishing opportunities for cooperation.

Data usage awareness may be created among stakeholders by way of making their roles and responsibilities in data-based decision more specific, and including their expectations within their job descriptions. This study was performed with school directors serving at city centrum. It may further be performed at rural regions, or with teachers thereat. Leadership characteristics of the director comes to the for in terns of data-based decision-making. More in-depth studies can be performed on the school directors' impact on the creation and development of a data culture.

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Statements of publication ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

Ethics Committee Approval Information

All stages of the study were carried out in accordance with ethical principles. At the meeting of Gazi University Institute of Educational Sciences Ethics Committee on 19.10.2020, it was decided that this study was in accordance with the ethical rules. The authors declare that they have no conflict of interest.

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