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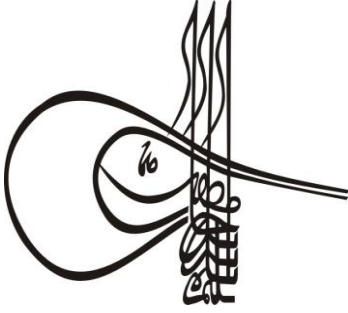
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A NEW METHOD IN EDUCATION: LEAN

*Filiz YALÇIN TILFARLIOĞLU**

ABSTRACT

Lean has been in use, especially in automotive industry and other sectors of the manufacturing industry, healthcare, insurance and legal sectors, but its application in education sector is quite new. Lean is a systematic approach that removes waste from processes and adds value to the procedures. Lean aims to remove all the factors that can be described as the waste of sources in various jobs and purposes by creating value and by creating value and observing the processes of time, labor, money and other resources. When examined from the educational framework, Lean is an organizational development program that strengthens the performance and job satisfaction of every individual in the education system. Lean adds value to the process by defining and eliminating stages which are not necessary and add no value, or even prevent the work from being done or completed. Schools are more effective in providing their activities and services through maximizing the learning skills of all students and creating an environment of success and satisfaction for all by incorporating a system-wide approach to its constitution. In other words, in the framework of Lean education, in a learning group, students and teachers collaborate as equal participants, taking decisions together for solving classroom problems while learning from each other. The problems encountered in the decision making process are not seen as obstacles for achieving goals, but as opportunities for generating new ideas and innovations. However opportunities are used in order to strengthen and renew the related educational process. Principles such as transparency, cooperation, speed and co-learning are the main building blocks of Lean Method.

Lean can be easily applied to the structure of every school, and if implemented with its all components, will create sustainable success-focused, human-centered learning environments at the point of evaluating the academic and social environment through the assessment-evaluation processes. While Lean principles, methods, and related tools are successfully used in the service sector, it has never been thought how aforesaid methods will contribute to education. In

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education, the greatest contribution that Lean will provide is to make the teaching program be balanced and purified from wastes. In this context, Lean will help to build a balanced curriculum, an effective education and training program and enable students to succeed in learning, by providing increased productivity in every stage of the educational processes. In other words, when Lean is adapted to the field of education, it will bring about an organizational development program which advances every individual of the institutions of education aiming at for increasing individual performance and job satisfaction. Lean will identify, interrogate and challenge the elements that slow down and impede the operation in the educational processes. Schools that aim to implement Lean development program will allow every student to experience success and raise their performance to the highest levels. These benefits gathered from Lean will help the schools perform continuous development and innovation movements that our century demands, so, the main purpose of this study is to lead the way how Lean will be effectively implemented by teachers and students in various education systems.

STRUCTURED ABSTRACT

Introduction: Lean approach includes the state of affairs which cleans wastes and adds value to the processes that it serves. Lean is a culture that is based on continuous improvement and respect, and directs each individual to be a part of the solution. In this context, Lean is a concept that allows each individual to take responsibility for her/his own success and for the success of the community to which she/he belongs. Lean approach refers to an organizational development program when it is adapted to the field of education, and it aims to improve individual performance and job satisfaction of people in the education system. Lean interrogates and sifts the elements which do not favour, hinder and slow functioning of the process in educational contexts. Schools that aim to implement Lean development program allow each student to experience success and transform student potential into top performance.

Method: In this descriptive research study, the main objective is to present adaptability of Lean in educational systems. In addition, it has been tried to clarify how education-training experience can be regulated in the framework of the thinking styles in Lean education system.

Findings: Lean thinking is a system that is based on the effective use of all necessary educational components and elimination related to the components that are not necessary in education, in other words, which create waste in the processes. Through Lean thinking, teachers and students will easily identify the requirements for top-level learning and use Lean thinking in an effective way to catch up with the curriculum without losing time to reach that goal (George & George, 2003). Lean culture is a continent that has always been dedicated to development, encouraging and empowering every one to be a problem-solver, enabling recognition of success, and not misleading others because of failure.

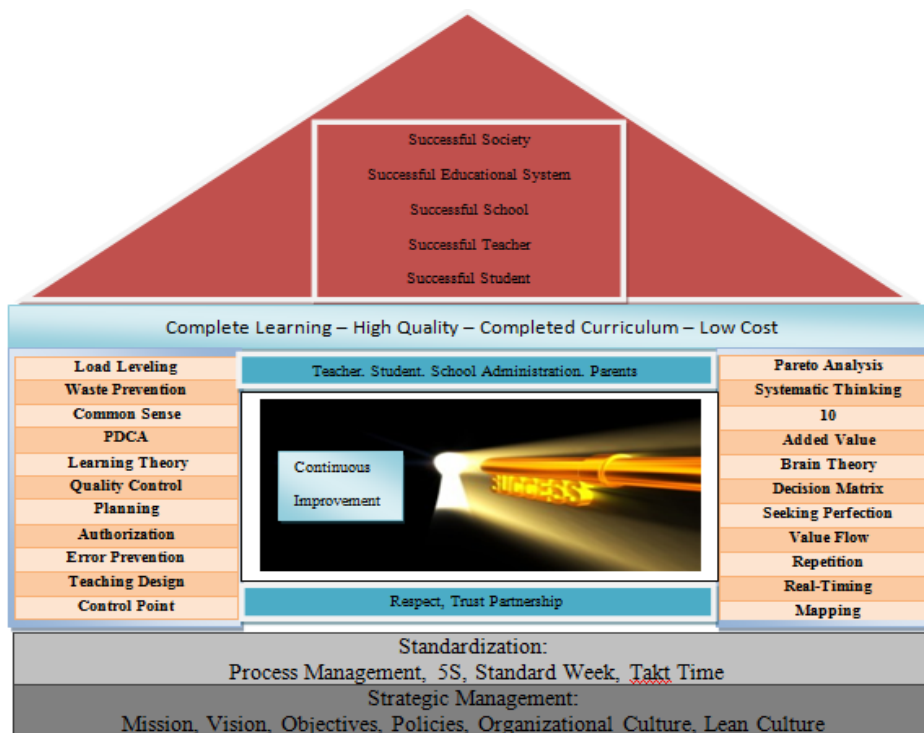
The biggest waste in Lean education is the use of all the elements in the education process, namely teachers, students, parents and school

administrative staff, below the capacities of their abilities. Our most valuable asset in Lean education is our human resources, and if it is so, we must use those people's time as efficiently as possible. In other words, we should minimize the time waste. Therefore, we can list the wastes in the education processes as follows:

- Students who failed in exams due to unprogrammed education,
- Students who graduate from educational institutions with an intention to find a good job and do not have lifelong learning ability,
- Giving lessons that will not be used by the students in their professional lives and which will not contribute to the concept of value,
- Planning mistakes in curricula and other mistakes in the training process. The training staff, who have to correct the problems due to these problems,
- Quality, cost, measurement systems and scheduling problems in the construction of educational materials and facilities due to planning errors,
- The fact that the lessons and the activities for students, teachers, and graduates do not respond to the needs of these people in the education system (Eaker & DuFour, 2015).

When Lean education methods are put into practice in schools on the whole, the curriculum may become available to be improved, the academic success of students including the school achievement averages in the standardized exams will be increased as a result of waste prevention principle of Lean Method.

Conclusion:In the early days of lean, its implementation was limited to a tool-based manufacturing approach which aimed at providing high- quality products with lower costs. Applying lean innovative method in education will avoid unnecessary wastes in teaching-learning processes by supplying the learners with continuous improvement in education and culture. This study describes how Lean can be used in the education sector and how the quartet of teachers, students, parents, and school administrations will reach the fertile lands of eternal success in terms of the relevant Lean terms. In the perspective of this research, the model of an ideal Lean School is presented in Figure 1.

Figure 1: Lean School

When Lean education is revised within the framework of its processes, it is seen that the supportive and reassuring relationship between the teacher and the student is the main source of success. All people act with their emotions in the process of learning, and it is suggested that if students are required to fully participate in the Lean learning processes, mutual love and respect should be formed on the first day without losing any time. It is our greatest negative habit in education to blame others when students fail in standardized exams or when the curriculum is not completed. As educators, we must first break these negative habits and make school management, teachers, students, and the family most productive participants using Lean thinking system based on the system of continuous thinking. Otherwise, if the desired productivity in education is not achieved, the future of the society will be in danger. It should also be noted that education is a living phenomenon. With Lean culture this phenomenon can be used with a different energy and angle. Many problems experienced in this human-focused process can be reduced or eliminated by resorting to Lean culture. In this regard, the education process is economized and many students can be educated in the most effective way. Lean educators will be a complete guide for all educators in front, field and post-works of this process.

Keywords: Lean, Effective Instruction, Innovation in Education, Continuous Improvement.

EĞİTİMDE YENİ BİR YÖNTEM: YALIN

ÖZET

Önceleri, özellikle, otomotiv sanayii, son yıllarda ise imalat sanayisinin diğer alanlarında; sağlık hizmetleri, sigorta ve hukuk sektörlerinde uygulanmakta olan Yalın'ın eğitim sektöründe kullanılması oldukça yenidir. Yalın; süreçlerde israfı ortadan kaldıran ve onlara değer katan sistematik bir yaklaşımdır. Yalın, zaman, emek, para ve diğer kaynakların yer aldığı süreçleri gözden geçirerek, herhangi bir işe, amaca yönelik kaynak israfı olarak nitelendirilebilecek tüm etkenleri süreçten çıkarmayı ve değer yaratılmasını hedefler. Eğitim çerçevesinden Yalın incelendiğinde ise Yalın'ın öğrenciden veliye, öğretmenden okul müdürüne okul sistemindeki her bireyin süreç gelişimiyle performansını ve iş doyumunu güçlendiren örgütsel bir gelişim programıdır. Yalın, okul içerisindeki herkesin kendi iş süreçlerindeki fazlalık yaratan, gerekli olmayan ve hiçbir değer katmayan, hatta işin yapılmasını veya tamamlanmasını engelleyen aşamaları tanımlama ve eleme suretiyle sürece değer katar. Okullar, sistem çapında değer katan bir yaklaşımı bünyesine katarak, faaliyetlerini ve hizmetlerini sağlamada daha etkili olurlar, tüm öğrencilerin öğrenme performanslarını en yüksek düzeye çıkarırlar ve herkes için bir başarı ve doyum ortamı oluştururlar. Diğer bir deyişle, Yalın eğitim çerçevesinde, bir öğrenme grubunda öğrenciler ve öğretmenler eşit katılımcılar olarak işbirliği yaparlar, birbirlerinden öğrenirken sınıf problemlerini çözmek için de birlikte kararlar alırlar. Karar alma sürecinde karşılaşılan sorunlar sadece amaçlara ulaşmada karşılaşılan engeller olarak değil, yeni fikirlerin ve yeniliklerin ortaya çıkmasını sağlayacak fırsatlar olarak değerlendirilir ve bu fırsatlar eğitim sürecinin yenilenmesinde ve güçlendirilmesinde kullanılır. Sorunlar ele alınırken şeffaflık, işbirliği, hız ve birlikte öğrenme gibi ilkeler sürecin ana yapı taşlarıdır.

Yalın, her okulun yapısında kolaylıkla uygulanabilir ve bütün bileşenleriyle uygulandığında, akademik ve sosyal ortamın, ölçme-değerlendirme süreciyle değerlendirmesi noktasında, sürdürülebilir başarı odaklı, insan merkezli, öğrenme ortamları oluşturacaktır. Hizmet sektöründe başarılı bir şekilde kullanılan Yalın ilkeleri, yöntemleri ve ilgili araç gereçleri kullanırken, söz konusu yöntemlerin, eğitime nasıl bir katkı sağlayacağı daha önce hiç düşünülmemiştir. Eğitimde ise Yalın'ın sağlayacağı en büyük katkı, çeşitli sebeplerden dolayı tamamlanamayan öğretim programının, israflardan arındırılarak dengeli bir hale getirilmesidir. Bu bağlamda Yalın; dengelenmiş bir öğretim programını, etkili bir eğitim - öğretim süreci oluşturulmasını ve öğrencilerin tam öğrenmeyi gerçekleştirmelerini sağlamada yardımcı olacaktır ve Yalın, eğitim süreçlerinin her aşamasında verimliliğin artırılmasını sağlayacaktır. Başka bir deyişle, Yalın eğitim alanına uyarlandığında, eğitim kurumunun parçası olan her bireyi geliştiren, bireysel performansı ve iş memnuniyetini artırmayı hedefleyen örgütsel bir gelişim programını meydana getirecektir. Yalın, eğitim sürecinde işleyişi yavaşlatan ve engelleyen sürece fayda sağlamayan unsurları belirleyecek, sorgulayacak ve eleyecektir. Yalın gelişim programını uygulamayı amaç edinen okullar, her öğrenciye başarıyı tatma ve performanslarını en üst düzeye

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yükseltme olanağı sunacaktır. Yalın'ın eğitim-öğretim kurumlarına getireceği bu faydalar da okulların, çağımızın gerektirdiği sürekli gelişim ve yenilik hareketlerini gerçekleştirmesinde yardımcı olacaktır ve bu çalışmadaki asıl amaç Yalın'ın gerek öğretmenler, gerekse öğrenciler tarafından etkin bir şekilde nasıl uygulanacağına öncülük etmektir.

Anahtar Kelimeler: Yalın, Etkili Öğretim, Eğitimde Yenilik, Sürekli Gelişim.

Introduction

Lean which was previously used in industrial sector and has also been implemented successfully in non-industrial sector is based on behaviour change and continuity. As a waste removing approach, Lean has begun to demonstrate its effectiveness in the developmental processes of education as well as innovations it has made in other industrial field development processes. The field of education is very new in this context and Lean practices has shown that it can create value-added by keeping the awareness at a high level, reducing school costs, reducing preparation time, recovering waste, and allowing processes to proceed in a planned manner (Womack & Jones, 1996).

As an organizational development and change program, the main purpose is to increase productivity. The problems encountered are not considered just as a problem, but an opportunity to transform. Factors such as transparency, participation, speed and cooperative learning processes are very important for problem solving (Dennis, 2007). Lean educational management is a model of change that can be easily implemented in all schools (Cleary & Duncan, 1997).

The biggest hurdle facing Lean's educational adaptation is the negative habits in education. In other words: refraining from progress and innovation. Education is a system that covers all the processes involved in the distribution of knowledge. All of these processes may be improved by examining the management, teaching, and learning processes in our educational institutions. Sustainable success may be achieved by effective use of workforce including teamwork. Thus, we can make school management, teachers, students and families most efficient (Scott, 2008).

The strategy and standardization of the institutional education is the basic components of Lean Education. Load levelling, waste prevention, PDCA (plan, act, check, adjust), pareto analysis, systematic thinking, number 10, value adding, learning theory, brain theory, quality control, decision matrix, planning, search of excellence, authorization, value flow, error prevention, repetition, teaching design, real timing, checkpoint, mapping tools are the basic Lean components that can be used to enhance the quality of training in institutions (Eaker & DuFour, 2015). Communication, respect, and trust are the basic principles within the student-teacher-parent-administration quadrant.

Continuous improvement is a key used at all stages of Lean. The process including all these, a complete curriculum and complete learning at low cost will create a chain of success starting from a single student and reaching the whole society. Lean education requires every individual who takes part in the cycle of educational institutions to find innovative solutions to problems, dynamics of learning and teaching activities, and to work together. Using Lean tools to increase productivity in educational institutions will enable educators to put Lean education culture into practice (Cleary & Duncan, 2008).

The curriculum is the whole of the information that students need to get at the level they are in. The sum of the information at each level is the information that the learner has to learn throughout his / her learning life. However, the curriculum can not be completed at almost any level in the learning lives of the students due to some problems encountered. Incomplete curriculums that

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students are exposed to throughout their learning life cause the formation of incomplete information, and the growing holes of knowledge that can not be learned at previous levels prevent obtaining new information. For this reason, the completion of the curriculum is crucial.

While Lean principles, methods and related tools are successfully used in the service sector, it has never been thought how such methods will contribute to education. This study describes how Lean can be used in the education sector and how the quartet of teachers, students, parents, and school administrations will reach the fertile lands of eternal success in terms of the relevant Lean terms.

Method

In this study, descriptive research method was used. To explain the descriptive research methodology, it should be noted that this research method aims to collect information about an existing phenomenon. In other words, the main objective of this research method is to present the current situation in full clarity. In addition, the purpose of the descriptive research is to confirm the hypotheses which refer to present state in order to clarify the existing situation (Grimes & Schulz, 2002). Moreover, this research method requires a flexible approach to the current situation, so that it enables further research if significant new topics and inquiries emerge during the research process. The descriptive method is used to explain the existing situation during the research and to examine the causes of the identified phenomena. Besides, the purpose of the descriptive research method is to form a proper image related to people, events, or situations. That's to say, the researcher must have a clear view of the subject before starting any data collection process related to the topic. The researcher uses the descriptive research method to get logical and reliable results and suggestions in order to obtain direct and reliable information about the present situation (Fraenkel, Wallen, & Hyun, 1993). By using descriptive research design, it has been tried to clarify how education-training experience can be regulated in the framework of the Lean thinking system in detail, because descriptive research "defines a given situation as fully and carefully as possible" (Büyükoztürk, Çakmak Kılıç, Akgün, Karadeniz, & Demirel, 2008, p19). The reason for classifying and identification of phenomena according to their common characteristics, descriptive research design has been used (Simon & Burstein, 1985).

Findings

Lean in education refers to an organizational development program that focuses on enhancing the performance and job satisfaction of each individual in the school system and that advances everybody from school management to parents and from students to teachers. Lean involves each individual in arranging their own business processes and the identification and purification of unnecessary, ineffective, or even preventive things that are found in each process. Educational institutions serve more successfully and effectively in their works adopting a system-wide value-adding approach. They will maximize the performance of all students. They create an atmosphere of success and pleasure for all (Flumerfelt, 2008). It is necessary to explain the processes of Lean education management in order to understand the adaptation of Lean into education better.

The first component to be understood in order to put Lean education into practice in schools is Lean thinking. Lean thinking is a thinking system that is based on the effective use of all necessary educational components and elimination of all the components that are not necessary in education, in other words, which create waste in the processes. Through Lean thinking, teachers and students will easily identify the requirements for top-level learning and use Lean thinking in an effective way to catch up with the curriculum without losing time to reach that goal (George & George, 2003). To understand Lean thinking, five principles of Lean education must also be understood. The basic principles of Lean education are:

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1-Definition of value: Once the values for each education or curriculum are defined clearly, it must be considered when, how and why the activities in the curriculum are put in order to achieve these values. At the same time, it is also related to this principle how we can change these activities for greater success.

2-Value stream: When this principle is adapted into education, it refers to the continuity of education-training, support, and measurement. Continuous learning should continue between students, teachers, and supportive staff. Most effective learning is the one which provides continuity. The reason is that opinions and reflections are made on the learned subject for the effectiveness of education and training. In addition, the curriculum must be constantly updated and developed in accordance with the needs of students, teachers, and the community.

3-Continuous flow: The logical ordering of events in the value stream from one to the other. It is the provision of continuous learning by eliminating wastes without sacrificing quality.

4-Pull System: In Lean system, making production according to customer needs is known as pulling. The involvement of teachers and supportive staff, who play an effective role in the education process, in the implementation process, clarification of value, determination of value flow is very important in terms of flow. In addition to this, these people's participation in the implementation process will also bring numerous benefits for the development of the curriculum. On the other hand, the fact that the students have individual and additional learning opportunities according to their personal characteristics and abilities is also a benefit of the pull principle for the students. Each person has a different learning style and different needs. Students can also contribute and make suggestions on the development and change of lessons in the curriculum according to their needs.

5-Perfection: In order to apply the last principle of Lean management, the other four principles need to be fully implemented. In other words, the last principle means excellence in the first four principles. This principle is seeking answers to the questions such as how to improve value, value stream, and the flow, how the curriculum is more effective, and how to improve the education service provided. It explains the quest for continuous research and development and excellence (Jenkins, 2003).

The second component in Lean's educational adaptation is Lean culture. Lean culture is a continent that has always been dedicated to development, encouraging and empowering every one to be a problem-solver, enabling recognition of success, and not misleading others because of failure. Lean culture is based on respect for people because of the work they do and the essential contribution each individual makes to the institution (Flinchbaugh & Carlino, 2006). In Lean culture, we can reach the components of the educational process, namely teachers, students, parents and school administrators to the highest yield point within their capacities.

The next Lean education component is load balancing, and load balancing is one of the key points in adaptation of Lean into education. Load balancing is a term used to balance the curriculum in the field of education, and it is a calculation of how much time should be devoted to the topic to be taught. Load balancing has two basic building blocks, the first is to determine what needs to be accomplished, and the second is to decide which tasks should be done in how much time (Maguad, 2011). A healthy load balancing plan can be created when these two basic building blocks are analyzed in their exact sense.

When creating the load balancing plan, a preliminary study is carried out, and the planning is done step by step. Primarily, the academic calendar is prepared, and the necessary teaching and learning materials are listed within the frame of the academic calendar. The resources that will be used the most are put in the nearest spot, and if everything is arranged, it will be seen during the

period that the prepared materials are more comfortable to use, and also the waste of time will be avoided. With Lean strategy, there are nine stages of work development, and these stages are taken into account when creating a load balancing scheme. These stages can be listed as follows:

- 1- Identifying of the current situation.
- 2- Making an external environment analysis.
- 3- Determining what purpose the school serves.
- 4- Determining critical success factors.
- 5- Comparing school's current educational strategy with what it needs today.
- 6- Making predictions about the future of the school.
- 7- Determining the school's vision and vision.
- 8- Determining annual targets in line with the mission and vision.
- 9- Preparing the education and training plan in line with the objectives (Ziskovsky & Ziskovsky, 2010).

The most basic points among these stages are those related to the mission, because Lean thinking system aims to increase the degree of harmony between action and mission. The class mission is describing the purpose of existing in the class through the description of the work itself. It is the explanation of why the teacher and the student should work together in this job as well as the personal acquirement of doing it (Stecher, 2004). The classroom mission is often used synonymous with the purpose of the class.

Load balancing, in other words, the preparation of weekly work programs is of special importance when determining the curriculum, because people learn in the form of patterns, and it is essential that lesson presentations and activities should be taught within a framework that the students are familiar to. In addition, students need a pattern, which is a basis for them to understand the meaning, to follow when the subjects are covered (Fitzgerald, 2006). In addition, one of the important points in load balancing is the time to make up for the curriculum against the unexpected situations. If there is no time in the curriculum for compensation, the curriculum can go into great danger in the case of a shortest delay. Teachers can create a new solution by starting from the tail and working backwards to gain a new perspective while creating their own load balancing plans, and they can also develop different perspectives by coming to the head from the tail (Ziskovsky & Ziskovsky, 2010).

One of the Lean methods that need to be used when building the load balancing plan is 5S (Sort, Set in order, Shine, Standardize, Sustain). The 5S model uses the sequential step that starts with the letter S, and it can be described as a method of organizing any workplace to resume the built-in scheme, to activate the ability of working efficiently removing the disordiance, to set a logical place for each action, and to create a system (recently sixth S has been added).

1. Sort is used to remove unnecessary materials from the environment and to divide them into groups.
2. Set in order is used to put the classified materials into the logical use order.
3. Shine is used to clean materials or keep them in proper working condition.
4. Standardize is used to protect the on-board system as long as the change is not necessary.
5. Sustain is used to do the necessary things to maintain the built system.

6. Safety is used to organize the workplace so that it does not jeopardize the safety of employees or the visitors (Ziskovsky & Ziskovsky, 2010).

To conclude, load balancing is seen as a means of equilibrium of the teaching of the curriculum that may be given over the period in education. However, completing the curriculum does not mean that the student has learned this entire curriculum. It is necessary to incorporate brain and learning theories into load balancing and development processes to ensure that students are fully trained in the curriculum given to them (Ewy, 2009).

Brain theory is about how the brain stores information in memory in general, and is based on real research findings. According to the brain theory, the brain is said to absorb more information by continuously recording information in small quantities, rather than receiving much information at once. If too much information is presented at one time, the human brain can neither learn nor remember it. In this context, we can give an example of what happens to a dry sponge when we hold it under a faucet. The sponge that is exposed to excess amount of water absorbs the water up to the saturation point, and the rest of the water flows. In other words, this situation causes loss of power because the information flood comes suddenly. The brain is not created to operate like this. For this reason, students should be provided with enough information that they can only process at a certain time, and should be reinforced by sleep processes so that this information can be passed to permanent memory (Jenkins, 2013).

Research conducted in the advertising industry has revealed how to hold information in long-term and short-term memories, and how to remember it exactly. Storing information in long-term memory is about how we are influenced by them. Each repetition contributes to recall the information easily. In order for the acquired information to pass from the short-term memory to the long-term memory, at least four different repetitions are required, and ten different repetitions must be made strictly to ensure complete learning (Connell, 2005). In other words, the information can be stored in long-term memory through ten different repetitions of it at least. Besides, the human brain needs innovations in order to concentrate on one subject. If the same thing is done ten times, the only way to ensure that the human brain maintains the relevant repetitions is to diversify the resources and formats (learning styles) utilized. So, something can be read or watched, then notes can be taken, the student can read these notes on their own, another person can read for them. Another way of remembering the learned course topics may be the use of written information cards. In this way, kinesthetic activity (movement use) will be made during learning. Of course, the purpose of these activities is to think about the information in ten different ways, in different activities. However, as mentioned earlier, every repetition in the process must be completely separated and differentiated from the others.

When learning theory is examined, it is emphasized that people learn better when they have a model, especially a repetitive model. The learning theory is based on the fact that each individual has his/her own unique intelligence and skill areas during the comprehension of knowledge. Every individual learns in a way that is special to his or her person. The way one learns is called the learning style in general. Indeed, in order to provide value-added educational services for all students, a teacher's responsibility is to offer student-centered learning using the best methods and to give information. Good teaching means to allow all learners to use their own learning styles while providing ten times of recall / remind with different activities. In this way, every student will have the best chance of achieving full learning goals. The issue is the high level of learning theory (Jenkins, 2003). In reality, the answer to how exactly this is achieved and how much time is required depends on the teacher and the students. On the one hand, the brain theory tells us that we must have a constant, steady stream of information that can be easily absorbed by the brain. On the other hand, the learning theory is including multiple types of intelligence in ten times repetition process to

support and empower our students while they are learning. Besides this, the trust relationship makes it possible for the process to take place.

Another component of educational adaptation of Lean is the concept of waste in education. The biggest waste in Lean education is the use of all the elements in the education process, namely teachers, students, parents and school administrative staff, below the capacities of their abilities. Our most valuable asset in Lean education is our human resources, and if it is so, we must use those people's time as efficiently as possible. In other words, we should minimize the time waste. In addition, we can list the wastes in the education process as follows:

Students who failed in exams due to unprogrammed education, support, and measurement systems.

Students who graduate from educational institutions with an intention to find a good job and do not have lifelong learning ability,

Giving lessons that will not be used by the students in their professional lives and which will not contribute to the concept of value,

Planning mistakes in curricula and other mistakes in the training process. The training staff, who have to correct the problems due to these problems,

Quality, cost, and scheduling problems in the construction of educational materials and facilities due to planning errors,

The fact that the lessons and the activities for students, teachers, and graduates do not respond to the needs of these people in the education system (Eaker & DuFour, 2015).

Applying Lean management in education is also about removing the above-mentioned wastes that have taken place in this process. Schools wishing to apply the lean system should firstly evaluate any wasted space that may be involved in the education process. They can make use of the following strategies to help schools work more effectively and avoid unnecessary waste:

Organizing educational areas and throwing unnecessary materials, files, and supplies,

Organizing offices and work areas,

Standardizing the location of instruments, files, and training equipment,

Cleaning work areas and school and preventing problems that may arise from the confusion and pollution,

Keeping these four principles disciplined (Dahlgard & Østergaard, 2000).

In summary, the main purpose of Lean education is to try to realize the philosophy of personal or planned development, which is expressed as a dedication to a continuous development, that is, a situation that will never end in order to do the best, by removing the waste from all the processes of education (İpbüken, 2009). When Lean education methods are put into practice in schools to the full, the curriculum will be able to be improved, the course success and the school achievement averages in the standardized exams will increase as a result of the waste prevention principle of Lean method.

Discussion and Conclusion

One of the key components of the Lean education process is undoubtedly common sense and trust. Lean thinking is based on unconditional respect to the all staff, irrespective of the amount and type of work they do. Respect is to inform everyone that all participants are equal in the process of

contributing to the organization regardless of the work being done in order to provide relevant working conditions. In a respect-based Lean approach, to achieve the process development, all participants are empowered and fully authorized for the improvement of works they do. In order to be able to perform Lean education, a necessary and serious relationship based on sincerity and respect is established between the teacher and the student in the framework of the trust partnership. The students are convinced of the trainers and the process, and they are given clear answers. Then Lean culture is tried to be explained to the students in a proper way according to their levels. The principles of Lean are explained and their priorities are underlined. Effective opinions of the learners are gotten and they are definitely evaluated at feedback-change stage (Flumerfelt, 2008). In this context, mutual common sense and trust partnership underpin the success in Lean education management. It is impossible to achieve full learning unless trainees do not see students' views as a part of themselves.

One of the biggest aims of Lean education is to realize the ideal situation in schools. The ideal situation can also be defined as the desired point to be reached. The desired work to be done, the desired place to be arrived, the ideal situation in which all your plans are realized as you want, and the final result desired to be reached at the most appropriate level (Ziskovsky & Ziskovsky, 2010). The ideal situation in the framework of Lean thinking is to accomplish the formation of full learning of the students through the completion of all subjects in an academic year. Two lean techniques can be used to achieve ideal learning within a Lean education framework, the first of them is kaizen.

Kaizen is the term used to refer to small and continuous improvement, which is everyone's individual share (Zimmerman, 1991). The word comes from the Japanese words kai (small, little, good) and zen (good, change for better). Kaizen is the purpose on which one or more participants focus to fix and improve a specific process or work. Kaizen involves the process of testing, analysis, and the action plan generated by the development of the hypothesis to provide brainstorming, analysis, and improvement. The Kaizen process is used by individuals or larger groups to develop personal situations or processes.

The other Lean technique that will help teachers in having the ideal situation is PDCA (plan, do, check, adjust). A process known as Deming transformation is the Shewart cycle of development (Womack & Jones, 1996). The constantly renewed transformation of these four steps is a scientific method based on the proclamation of accepting or rejecting a hypothesis. PDCA transformation, which is easy to set up and easy to use, makes the concerned process easy, target-specific, perfectly verifiable, and applicable for young people, students, and teams when assessing development at the organization or personal level. As a result, thanks to the techniques provided by Lean education management, educators can more easily achieve the intended ideal (Steher, 2004).

When Lean education management is applied to schools in full, real-time scheduling can also be actualized in the learning process. The basis of the real-time scheduling is strategic planning. Strategic planning is the identification of planned activities to achieve and support a minimum number of goals within a specified timeframe (Jenkins, Roettger, & Roettger, 2007). Hoshin planning is a high level of strategic planning with developing tactical plans and integrating simultaneous development rather than transferring the responsibility to be taken and the work to be done to department heads or managers as a part of the planned purpose. In other words, with the help of strategic planning and hoshin planning which are Lean education management techniques, real-time scheduling in the learning process is achieved. So that the learning level of the students can be taken to the highest levels taking the right decision in the right place and at the right time and putting them into practice in the classrooms (Güler, 2010).

One of the crucial processes in Lean education management is quality control in education. Undoubtedly, the first thing comes to mind related to quality control is exams. Under normal circumstances, students take two or three tests in every subject in a teaching period. However, these exams are very insufficient to determine the learning deficits of students in a timely manner and are far behind to determine what points the process is missing (Cleary & Duncan, 1997).

On the other hand, in Lean, both in production and output processes, quality control refers to the periodic evaluation of the production process determining whether the relevant process is correct and open for improvement as well as the elimination of errors or the excellence at the expected level, and these periodic evaluations can be realized by weekly small exams (Ziskovsky & Ziskovsky, 2010). Pareto analysis should be carried out after the mini exams that measure the learning levels of students in the subjects they learned that week. Pareto analysis is a statistical analysis based on the works of Vilfredo Pareto, an Italian sociologist and economist. Pareto principle is based on the fact that 80% of the problems are caused by twenty percent (80/20 rule) of the reasons (Akin, 2005). Pareto analysis puts the problems in an order, from most frequent ones to the fewest. This method is used to identify test items that are frequently overlooked by students in order to indicate the point on which innovation or development efforts in education should concentrate.

In Lean education, the main purpose of Pareto analysis is to prevent mistakes. In addition to the natural needs of the resources used to place errors and mistakes, any event or chain of events that occur in order to prevent errors and mistakes are a form of misrepresentation. In education, these mistakes can be used in conjunction with control schedules, rubrics, family signatures, and other tools that can help teachers, students, and principals (DuFour & Eaker, 2005). Pareto analysis can also be controlled by people who are responsible for conducting all the relevant steps in a job or completed project. Besides, when Pareto analysis is performed, both macro evaluation and micro evaluation can be benefitted. Macro evaluation is used to measure performance improvement from a wider perspective while micro evaluation is used to measure lower and individual level of development. The results of the Pareto analysis are announced to the students at the beginning of each week, and in the light of these results, the subjects related to the questions that the students had most difficulty to answer revised. It enables immediate intervention and resolution. It also facilitates the access to real-time performance information (Jenkins, 2013). Behind the quality control in Lean is the aim of reaching perfection.

When Lean education management is implemented in schools, authorization, which is another component of Lean, can be actualized, and the main purpose of the authorization is to ensure learning. By linking with what they know and do not know, people take new input into their brains and print by adding into new comprehension process (Fitzgerald, 2006). The learning action is best when the learner understands the process knowledge depending on the individual characteristics and learning needs. Learning is not equal to teaching. Learning may not come into play during the instruction. Hence learning depends on teaching, but independent of the teaching process.

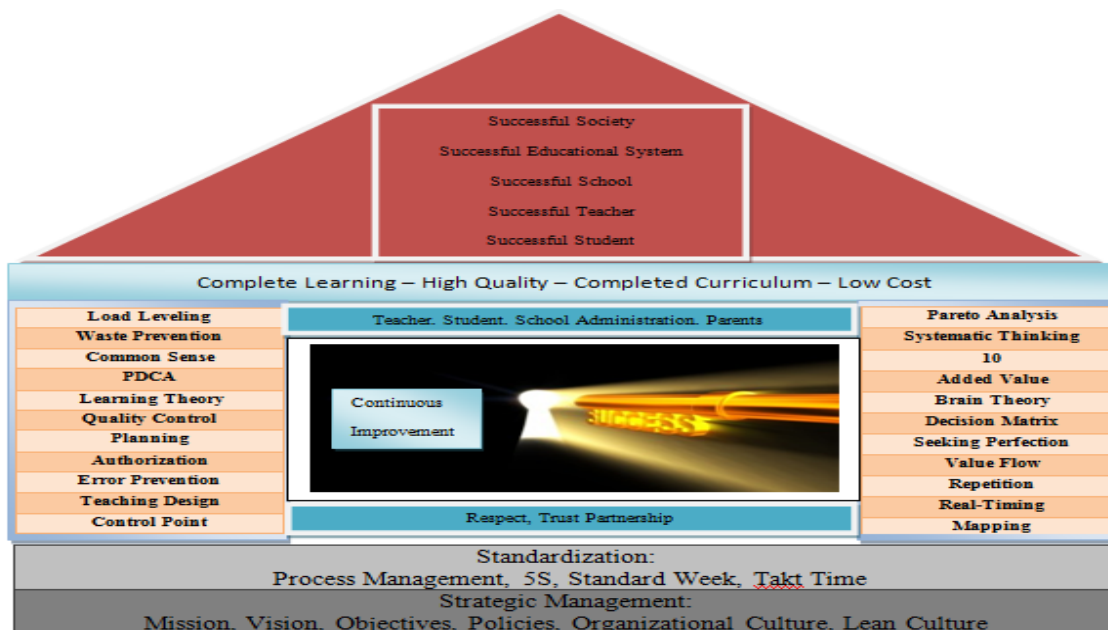
Authorization is giving responsibility and authority to do a job. In Lean education, all related people in the school, including managers, teachers, staff, students, parents, taxpayers, and community members are authorized and charged with taking part in improving the methods of their works within the school organization; (Ziskovsky & Ziskovsky). If the process is to be effective and supported, then the authorization should be realistic, actively involved, and supported in the school organization both from top to bottom and from bottom to top. In addition, authorization is on all-or-none principle. No one can be partially or limitedly authorized, either you are authorized or not. In the classroom environment, the authorization principle is to announce the reasons for all the activities done during the course and the assignments to the students. In this way, it is possible to enable students to voluntarily participate in the Lean learning process.

Turkish Studies

One of the important processes of Lean education management is the production line. If we consider K-12 basic education as a train journey, we can regard each station as a travel process that is acquired from previous stations and added to experience and knowledge. In this train journey, each year of basic education represents a station. In other words, it can be defined as a production line consisting of thirteen stations. Ideally, students finish all classes of the school and arrive at the thirteenth station on the train journey after learning the fully implemented curriculum and then graduate. In the training process, operation is based on the process integrity. In other words, if the student does not have the necessary curriculum in the lower grades, he or she will have difficulties in the present grade and in following grades (Jenkins, Roettger, & Roettger, 2007). If there is a problem in any educational station and if the student crosses that station without learning the necessary curriculum, the future of the stations to be arrived at is also endangered. So from an educational point of view, the student starts the next year without learning the topics that need to be learned before and he or she will find himself or herself in an endless vicious cycle, since these unlearned topics form the basis of the present level of the student. Lean education system allows students and teachers to recover themselves from this vicious circle by using the necessary Lean tools and techniques at all these stations (Dennis, 2007).

In the perspective of this study, the shape of an ideal Lean school is formulated and it can be seen from figure 1.

Figure 1: Lean School



When Lean education is revised within the framework of its processes, it is seen that the supportive and reassuring relationship between the teacher and the student is the main source of success. All people act with their emotions in the process of learning, and it is suggested that if students are required to fully participate in the Lean learning process as well as at the desired level, mutual love and respect should be formed on the first day without losing any time. It is our greatest negative habit in education to blame others when students fail in standardized exams or when the curriculum is not completed. As educators, we must first break these negative habits and make school management, teachers, students, and the family more productive by using Lean thinking system based on the principles of continuous improvement. Otherwise, if the desired productivity in

education is not achieved, the future of the society will be in danger. It should also be noted that education is a living phenomenon. With Lean culture this phenomenon can be used with a different energy and angle. Many problems experienced in this human-focused process can be reduced or eliminated by resorting to Lean culture. In this regard, the education process is economized and many students can be educated in the most effective way. Lean educators will be a complete guide for all educators. Additionally, lean means fostering a culture of continuous improvement, maximizing value and minimizing waste. A Lean Programme offers a great contribution to education system via standardization of the institution. This innovative model may also help the operation staff have more time to do other tasks, eliminating the need for and the cost of hiring additional employees.

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