



Lean management implementation as a result in education quality change

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Abstract

Based on the successful experiences of foreign countries, we can say that the implementation of LEAN or Continuous Improvement in educational institutions systematises and standardises the educational process, as the whole community of the institution works in one direction, and teachers develop a tool to monitor the progress of the student. Pupils are empowered to track and take responsibility for their results. A standard for problem solving is created, and student outcomes improve (Zighan and Ahmed, 2020; Netland and Powell, 2016). The object of this article is to apply a new management system in a Lithuanian educational institution with an open/democratic organisational culture. The aim is to identify the factors that can influence the success of LEAN implementation and to take them into account when implementing a LEAN management system. The scientific literature related to LEAN management and its implementation in the public sector and in educational institutions was analysed. A research methodology was developed. LEAN management principle and examples were presented to the community of X organisation. The presentation of the examples and principles was based on a case study, discussed during an interview. The initial reaction of the teachers to the idea of LEAN initiative was analysed. Reactions to the LEAN approach were analysed and evaluated.

Keywords: Continuous improvement, educational institutions, LEAN methodology, quality

Introduction

Educational situation is facing huge challenges nowadays in Lithuania. We could specify some crucial drawbacks in Lithuanian schools even though the reforms have been going on for decades. The first is students' progress that is not improving. "Progress in pre-primary and general education is insufficient. <...> Not all schools monitor individual student progress." (National Audit Report, 2020). Lithuania is below the OECD average on PISA 2019 (Reading Ability), ranking 29-36 out of 78 countries. Mathematical and scientific literacy skills are also below the OECD (Organisation for Economic Co-operation and Development) average and are respectively in positions 32-37 and 30-33 out of 78 countries (Pečiulienė, 2021). The second factor is low leadership competences. Competency assessment is most often carried out by heads and deputy heads of educational institutions. As of 2019, only one-third of applicants had no experience and skills in managing an educational institution. The results of the assessment of candidates for heads and deputy heads of education showed that one third (32.8%) of deputy heads and almost half (46.4%) of heads of educational establishments have adequate competences (Survutaitė, 2021). Too little attention is paid to systemic management in educational institutions: pupils' progress and lack of competences of educational institution managers. There is a lack of a systemic approach to management in Lithuanian educational institutions and a lack of attention to management itself. Too little attention is paid to the lack of transposition and application of international good management practices, or when systemic management is applied, it is applied in a superficial way, usually through processes initiated by consultants, rather than by the managers of the educational institution itself. Successful application of management methodologies is likely to help to address the management problems of the educational establishment and to improve the quality of education.

Based on successful experiences in foreign countries, we can say that the introduction of LEAN or Continuous Improvement in educational institutions systematises and standardises the educational process, as the whole community of the institution works in one direction, and educators develop a tool to monitor the progress of the student. Pupils are empowered to track and take responsibility for their results. A standard for problem solving is created, and student outcomes improve (Zighan and Ahmed, 2020; Netland and Powell, 2016).

Theory and hypotheses

LEAN philosophy and principles

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LEAN methodology originated in Japan as the Toyota Production System. The LEAN methodology dates back to 1937, when Kiichiro Toyoda, the founder of Toyota Motor, came up with the idea of delivering parts to the factory using the just-in-time principle. Toyota Motors Co. developed a high-level production management system (Womack, Jones, and Roos, 1990) by taking the already known individual process management methods and supplementing them with solutions specifically tailored to Toyota's production.

In Japan and Western countries, LEAN is primarily a philosophy and a way of life based on flexible, efficient process management within an organisation. The LEAN Enterprise Institute is a social organisation of LEAN pioneers and experts. It defines the term as a set of concepts, principles and tools for creating and delivering the greatest value to the customer (from the customer's perspective) with the fewest possible resources (Womack, Jones, and Roos, 1990).

Experts agree that the concept of LEAN is more than a conventional method or tool. It is also an organisation's culture and philosophy, which aims to increase value for the customer, reduce operational costs and waste. The LEAN culture involves every employee, who is encouraged to speak up, make suggestions and thus continuously improve processes and achieve long-term success (Liker & Meier, 2007).

It is argued that LEAN management principles and practices differ from other management philosophies and their underlying methodologies in that (Gelbūda et al., 2014):

- adopts a "serving customers" perspective, aiming to optimise the value received by stakeholders, customers.
- continuous performance improvement involves all employees, all stakeholders and is a long-term process.
- the process of implementing Continuous Improvement is developed.
- process performance measurements are used to assess progress.
- waste is eliminated.

The LEAN culture methodology consists of different approaches such as Kaizen, PDCA, 5S, SMED, TPM, Kanban, Hoshin and others.

Continuous Improvement methodology for educational institutions

The Continuous Improvement approach will be analysed on the basis of the work of various authors and the experience of foreign educational institutions. The Continuous Improvement method is found in many literature sources as a part of LEAN management or as a synonym of LEAN management (Pugačiauskaitė-Butrimienė, 2018). Continuous Improvement methodology is an adapted version of LEAN for education. This version of LEAN is applied in advanced countries such as: the USA, Netherlands, Denmark, etc.

The analysis of the Continuous Improvement methodology in the Netherlands shows that it is applied at 3 levels: municipalities, organisations (administration and teachers) and classrooms. In this study we will analyse the implementation of the Continuous Improvement methodology at a classroom level. We will discuss the links between the Continuous Improvement Methodology and the Good School Concept.

The Continuous Improvement Methodology consists of 8 parts: mission, rules, data centre, objectives, student binder/folder/portfolio, student-teacher-parent/guardian meetings, PDSA.

Continuous Improvement involves a dynamic, knowledge-based and customer-oriented process that eliminates waste and creates value (Silva et al., 2013). Thus, the philosophy of such thinking can be used in any segment, as in the education sector.

The Good School concept aims to enable the raising of the level of quality of the performance of the country's schools implementing general education programmes, to provide direction, guidance and empowerment to the school. It aims to highlight the characteristics of a school that are considered valuable and desirable in the country, to stimulate creativity among school communities and to encourage long-term improvement initiatives in different types of schools. The Concept is aimed at all interest groups (The Good School Concept, 2015).

Thus, both the Continuous Improvement Framework and the Good School Concept focus on value creation, Continuous Improvement, involving staff in the management of the organisation, and making suggestions. The methodology of Continuous Improvement is close to the Good School concept.

The Continuous Improvement Methodology: Mission

Every organisation has a mission or purpose, whether or not it is formally articulated. The mission is the primary purpose of the organisation, which justifies its establishment and existence, and distinguishes it from other organisations, including those that are similar in terms of their production profile (Hunt, 1992; Hampton, 1994), not the exception of the educational organisation. Each educational organisation develops its own distinctive

mission and declares it in its strategic documents. Most often in educational organisations, the mission is developed spontaneously, without involving the community in the development of the mission. There is no practice in educational organisations to develop missions in groups/classes.

In the Continuous Improvement methodology an educational organisation, each group/class develops its own mission. This is done by the students of that class/group. The mission statement describes the purpose for the teacher, students, parents and group members: "what we aim to achieve as a group and how we want to achieve it this year". When the students and teacher are clear about what the group wants to achieve during the school year and how they will achieve it, productivity, efficiency and togetherness and fun seem to improve by leaps and bounds. (Klasse.pro, 2021)

According to Roy, Donaldson, Baker and Kerr (2014), an organisation's ability to fulfil its mission is likely to depend on a range of internal and external factors (Roy et al., 2014). It is important for organisations to be competitive, sustainable and increase interest in organisations that focus on a social mission or social value creation (Tykkyläinen, Ritala, 2021), in this case continuous educational improvement. Such organisations work hard to improve their identity, value, social mission, employee behaviour and service quality (Lin, et al., 2021). Therefore, it is reasonable to assume that any organisation can use its mission (social mission) and high service quality to improve public perception of its identity (Lin, et al., 2021).

The Continuous Improvement Methodology: Rules

In the Continuous Improvement methodology, the rules are created by the students, just like the mission. Students not only create the rules, but also supervise and reflect on how they are followed. Periodically, students return to the rules to see how they have done and to discuss what is needed to improve compliance.

Making group rules is one of the first group activities aimed at creating a sense of group. Rules are the norm for group behaviour, followed by teachers and pupils, the guidelines that bring the group together. The process of setting group rules emphasises the importance of listening to each other with respect and tolerance (Klasse.pro, 2021)

Leaders of Continuous Improvement organisations bring a learning mindset to their work (Park et al., 2013). The concept of Continuous Improvement demonstrates that the process is one of Continuous Improvement and forms a chain that effectively solves problems that arise.

"Leadership and management: empowering. These values are characterised by the following features: a clear, unifying, inspiring vision (known to all, accepted by all, aimed to be implemented, based on humane values); a culture of dialogue and consensus (participation of all members of the school community in decision-making)" (The Good School Concept, 2015).

The Continuous Improvement Methodology: Objectives

The school community is reflective: it discusses its activities, evaluates itself, and can learn from experience and to plan in an informed way. School members jointly formulate goals, develop a vision, and align personal goals with the goals of the school community (Good School Concept, 2015).

Park et al. (2013) identified goals for Continuous Improvement in educational services: Manage and optimise resources for improved academic performance.

- Align a rigorous curriculum, instructional delivery and assessment to continuously improve student achievement.
- Develop, expand and deliver literacy-based initiatives from pre-school to grade 12.
- Develop, test, and expand secondary content, instruction, and program enhancements that support students' active participation in learning.
- Use student, staff, school and system performance data to monitor and improve student achievement.
- Promote and maintain systems that support and improve staff performance in partnership with staff associations.
- Strengthen family-school relationships and continue to expand civic, business and community partnerships that contribute to improved student achievement.

The Continuous Improvement Methodology: Data Centre

The school focuses on the use of student data to support the improvement of classroom instruction. The educational process is largely based on the analysis of student data. Given that the ultimate goal is for teachers to

use data to improve instruction and classroom processes, this focus drives bottom-up (i.e., classroom to school and sometimes district level) changes in infrastructure and changes in practice (Park et al., 2013).

The data hub is reflected at all layers of the school organisation: classroom, school and school community. They are linked by a common vision, further defining the mission, values and goals, and planned actions. The team's data centre plays an important role. Visual data centres are a powerful tool for clearly communicating the picture of the classroom, the school. As soon as you enter a school, you can immediately see what the school and the different groups are doing and what they want to achieve with it (Klasse.pro, 2021)

It is important that the data centre is as visual as possible to provide visual information to the student. The data centre should reflect the change that the pupil can see and be able to compare the overall achievements of his/her group/class with personal achievements.

The Continuous Improvement Methodology: Student binder/folder/portfolio

A portfolio is defined as a collection of a pupil's work that shows the pupil's educational progress and achievements. There are several ways of using traditional and digital folders. Portfolios are commonly used to present achievements. The folder then contains the best work, which can be assessed by external observers. However, folders are often used throughout the educational process. Traditionally, they have four main purposes (The Glossary of Education reform, 2016):

- information gathering - where the folder stores all the material created or discovered during the educational process;
- selection, where only the work that best meets the educational objectives is selected and placed in the folder;
- reflection, where the folder contains reflections and evaluations on the work, progress and other aspects of the educational process;
- assessment, where the folder contains work that demonstrates progress or final results.

The portfolio is continuously updated by the pupils, corrected, etc., and the children draw charts of their achievements.

The Continuous Improvement Methodology: Pupil-teacher-parent/guardian meetings

The model of tripartite meetings facilitates dialogue between parents and pupils to take more responsibility for their learning and to monitor their academic progress. Fortunately, the student-led meeting is a positive alternative to the traditional parent-teacher meeting.

The objectives of the Pupil-Teacher-Parent/Guardian Meeting:

- To encourage students to take personal responsibility for their academic performance;
- to teach students the process of self-evaluation;
- to facilitate pupils' organisational development and to develop oral communication skills and self-confidence;
- encourage pupils, parents and teachers to engage in an open and frank dialogue;
- increase parental attendance at meetings." (Hackmann, 1997)

The Continuous Improvement Methodology: Pupil-led classroom time

Student-led class periods are a common practice for teachers who want to create a caring and open communication environment. Classroom time provides a safe place for pupils to raise concerns, listen to others' perspectives, analyse options and outcomes, and decide what is best for everyone. While teachers can and do raise concerns, students generate most of the topics for discussion. When students are ready to lead their peers, the group decides who will lead the discussion (Leachman & Victor, 2003).

The Continuous Improvement Methodology: PDSA

Once you have identified the big challenges that will affect your students' achievement, the next step is to plan Continuous Improvement cycles that will test and refine each change. The Plan-Do-Study-Act (PDSA) is a process that outlines the steps for planning an improvement cycle, including how data will be collected as it is implemented (Race, 2019).

When conducting PDSA cycles on the Common Core State Standards, teachers select a standard to focus on the components of the standard to set a goal with their students. What they would like to achieve as it relates to the lower standard and then identify and test a variety of instructional approaches to help students achieve the goal. Each PDSA learning cycle runs for approximately seven to ten days, during which time teachers collect student data to monitor their progress towards the goal, as well as student feedback on which teaching strategies have been helpful, need to be adjusted or should be abandoned altogether. The data is published in the classroom data centre

and encourages students to focus not only on their own learning but also on supporting their peers' learning (Park et al., 2013).

The Shewhart-Deming cycle of plan-do-check-study-act' is a continuous process that is recommended for use in performance quality and other process improvement practices. The cycle is abbreviated as PDCA or PDSA.

Change of organisation

Implementing Continuous Improvement is an organisational change. It is therefore important to understand the main models of organisational change.

Managing innovation or new change in the education sector is complex. In the public sector, established norms and standards often prevail, and resistance factors are often encountered during change. It is important to understand the nature and purpose of change. In today's environment, change is becoming more and more important and essential. Change management is necessary to ensure the success of change, because effective change management becomes a value that determines the success of an institution in achieving results and progress.

One of the main difficulties in implementing change is hasty, unprepared implementation and staff resistance. Change upsets routines and a sense of security is lost. Other disadvantages of change (Bracci et al., 2016):

- It is difficult to convince employees that change is necessary;
- Potential high costs, resource constraints;
- Requires ongoing management support and conviction of the need for change;
- Change can be stressful for employees;
- Insufficient staff skills;
- Executive staff not up-to-date with the latest processes, working methods, technologies.

The Cotter Model

Managing new change in the education sector is challenging because the public sector is often dominated by established norms, standards, and the perceived resistance that is encountered when introducing change. Change management is necessary to ensure the success of change in educational organisations, as effective change management becomes a value that determines successful outcomes.

J.P. Kotter (1995) described eight stages in the change management model, identifying actions that enable an organisation to achieve a higher level of quality. It also identifies eight key mistakes that are commonly made when implementing change. The essence of the eight-stage change model is presented in Table 1 (Hughes, 2016).

Table 1. Assumptions and mistakes in implementing Kotter's change model

Prerequisites for successful change implementation	Key mistakes in change implementation
1. The organisation creates an atmosphere of urgency for change - analysing user needs, discussing possible crises or new opportunities.	1. Too much satisfaction with the status quo. Rushing through change without convincing employees to accept the change.
2. A strong change coordination group is formed, involving the top management of the organisation.	2. Lack of a strong change team.
3. A clear vision is developed to give direction to the change, strategies are developed to achieve the vision.	3. The importance of the vision is not appreciated.
4. The vision and strategy are communicated to the organisation using communication tools.	4. Insufficient communication of the vision.
5. Enabling the vision - removing barriers, updating systems.	5. Leaving obstacles to the implementation of the vision.
6. Short-term suggestions for improving performance are developed.	6. No systematic planning and no intermediate achievements.
7. Combining performance improvements with the creation of larger changes - continuously assessing and rejecting ways of implementing change that are not in line with the organisation's vision.	7. Ending change prematurely.
8. New approaches are evaluated.	8. Change is not embedded in the culture.

Cited: Compiled by the authors according to Hughes, 2016.

In summary, the preconditions for implementing change are: user demand, forming a strong change coordination group, creating a vision for the organisation, using modern communication tools, empowering the organisation to act on the vision, creating short-term goals to achieve the vision, combining short-term goals with long-term goals, and evaluating new ways of working.

Materials and Methods

Novelty of the topic: it is difficult to find successful examples of LEAN and Continuous Improvement in Lithuania, or only fragments of it, so it was decided to implement fragments of Continuous Improvement in a selected Educational Organisation X. The empirical study will aim to find out and identify the factors that have a positive and a negative impact on the implementation of the LEAN approach. Theoretical and practical insights will be provided. A LEAN Continuous Improvement Management Implementation Plan adapted to organisation X will be developed and other practical insights will be presented.

The object of the thesis is the application of a new management system in a Lithuanian educational institution with an open/democratic organisational culture.

The aim is to identify the factors that can influence the success of LEAN implementation and to take them into account when implementing a LEAN management system. To assess the attitudes and perceived barriers of the X organisation community towards the introduction of LEAN management at the start of the initiative and three months later. Based on the data on reactions, identify the factors that will have a positive or negative impact on the systematic implementation of LEAN.

Clarification of concepts. The LEAN quality system covers the whole organisational system, culture, philosophy and it is more focused on administration and production, sometimes LEAN is found in the health system or in municipal administrations. And distance learning is an adaptation for educational institutions, but these are related systems.

The objectives are as follows:

- To prepare an instrument to measure the reaction to the idea of implementing Continuous Improvement Management.
- To present the principles and examples of Continuous Improvement Management to the community of x organisation.
- To analyse the initial reaction of teachers to the idea of a Continuous Improvement initiative.
- Implement the Continuous Improvement Methodology, an adapted Continuous Improvement Management approach for educational institutions.
- To analyse and evaluate the reactions to the introduction of the Continuous Improvement approach.
- To compare the reactions of teachers in organisation x after the introduction of the Continuous Improvement Management with the reactions after the introduction of the Continuous Improvement Management approach.

Data Collection

Organisation X is a non-profit preschool and primary education institution of Vilnius Municipality, which assists parents in carrying out their children's educational functions. The institution's activities are based on the Constitution, the Law on Education, the Law on Protection of Children's Rights, Government Decrees, the Ministry of Education and Science and other legal acts. It is also based on the principles of a democratic school, positive education, motivated pupils and teachers, and a stimulating culture.

Children in Organisation X are educated from 1.5 to 11 years of age.

The study will use a case study approach and will collect data using quantitative and qualitative methods:

1. The survey instrument is designed to assess teachers' reactions to the idea of implementing Continuous Improvement Management.
2. A survey instrument designed to assess teachers' reactions to the experimental implementation of Continuous Improvement.
3. A semi-structured interview designed to elicit the factors for changes in reactions and to gain further insights into the survey results.

Measures

Quantitative approach. A survey to assess teachers' attitudes towards the implementation and use of LEAN in the school. The first questionnaire was carried out on 23 August, 2021 and the follow-up questionnaire, which aimed to find out the change in teachers' attitudes, was carried out on 13 December, 2021.

Organisation of the study. The questionnaire "LEAN implementation and application in the school" consists of 14 questions. The questionnaire is based on studies analysed in the scientific literature. Closed-ended questions with

multiple-choice answers - 1;3;5;12;13;14. Open-ended questions -2;4;6;7;8;9;10;11. The survey was conducted in August and December 2021.

The research methods chosen for the study are listed below:

- 1) analysis of scientific literature sources (data comparison, abstraction and generalisation methods);
- 2) semi-structured interviews;
- 3) content analysis.

Results

Quantitative study

To summarise the results of the study, it can be said that the concept of Continuous Improvement has progressed. Respondents also indicated that there is still a lack of practical examples, a need for more precise information on how to measure a child's progress, and a desire for results too quickly. Respondents initially saw the need for Continuous Improvement as more important and necessary. All respondents identified the need for CI for the following reasons: modern approach; motivator; helps to improve performance, develop competences; helps to make learning meaningful for the learner; promotes development; promotes empowerment of learners in learning activities. In a survey conducted after 3 months of implementation activities, all respondents also indicated that the implementation of Continuous Improvement is needed in the organisation. Reasons given included: holding students accountable for their learning outcomes; involving management in improving the learning process; encouraging planning of activities; creating value through activities; achieving common goals; improving the quality of education and children's progress; assessing progress for the whole class as well as for each individual student; and being a user-friendly method. A higher proportion of respondents believe in the success of Continuous Improvement after the implementation phase. The reasons why the Continuous Improvement approach would succeed or fail in the organisation; negative reasons were identified: lack of experience and motivation of teachers; lack of practical examples. Positive reasons: pursuit of common goals; pursuit of innovation; facilitation of work; gradual introduction with monitoring of the process; theoretical basis. In the following survey, absolutely all teachers say that the method is successful and there are no more negative opinions. The following positive opinions on the application of the Continuous Improvement Process are highlighted: the idea of the data centre has been implemented; the mission, vision, rules, results to be achieved have been defined; the common goal has been pursued; the implementation of the Continuous Improvement Process has been defined as an annual objective. Respondents expressed challenges that were present in the implementation phase of the Continuous Improvement and during the process, the challenges for the organisation are more specific during the process, and it is more often questioned whether the children understand the visualisation of the diagrams and the essence of the method. During the Continuous Improvement process, additional personal challenges were raised by the respondents in relation to explaining the charts to the children, excessive work, and explaining the methods of measuring the progress of pre-school children to children. The benefits expressed by the respondents during the Continuous Improvement process mostly included benefits for children; the teachers see the application of the Continuous Improvement methodology as beneficial for children, promoting their planning, strategic thinking, problem solving and responsibility skills. Both in the initial phase of the implementation of the Continuous Improvement Methodology and during the process, teachers see the benefits for the quality of education, with an emphasis on the pupils and the benefits of cooperation and community. During the process, respondents value elements such as visions, missions, rules, and goal achievement. The subjects of the Continuous Improvement methodology, such as vision, mission, goals, rules, are identified with benefits for the organisation. Respondents confirmed that the Continuous Improvement Methodology and the Good School Concept are very close. In the survey conducted during the process of implementing the Continuous Improvement Methodology, a higher proportion of respondents indicated that the culture is close to the usual culture in educational institutions in Lithuania. A higher proportion of respondents also indicated that the culture of Continuous Improvement is close to the organisation in which they work. Similarly, a higher proportion of respondents indicated that the application of the Continuous Improvement methodology would be successful in the respondents' organisation.

Theoretical insights

Based on the quantitative survey data and understanding the limitations of the study, the following theoretical propositions are tentatively formulated:

Claim 1. In open culture educational institutions in Lithuania, if sufficient attention is paid to the presentation of the NT methodology, most of the staff will gain a sufficient initial understanding of the methodology.

Claim 2. After the first presentation, Open Culture Education Institutions in Lithuania will tend to believe in the success of the implementation of the Continuous Improvement Methodology.

Claim 3: Educators in Open Culture Lithuania are unlikely to perceive the Continuous Improvement Methodology as being close to the 'typical' culture of a Lithuanian educational institution.

Claim 4: Educators in open culture educational institutions in Lithuania will tend to have a positive attitude towards the Continuous Improvement initiative.

Claim 5: Educators in open culture educational institutions in Lithuania will tend to see a lot of similarities between the Continuous Improvement methodology and the organisational culture of their institution.

Claim 6 Educators in Open Culture institutions in Lithuania will tend to see the need for a Continuous Improvement methodology initiative.

Claim 7: In Open Culture Education Institutions in Lithuania, a Continuous Improvement initiative is likely to be successful when there is strong managerial commitment.

Qualitative research

The study was conducted to investigate the characteristics of the LEAN methodology of Continuous Improvement in an educational organisation. Educators who have implemented the Continuous Improvement approach in their organisation were interviewed.

Implementation of the LEAN methodology Continuous Improvement approach in an educational institution. The aim is to find out how educators evaluate the introduction of the Continuous Improvement Method.

Quality of preparation for the introduction of Continuous Improvement

The coding of all informants' interviews resulted in the following sub-categories:

1. Sufficiently clear initial information.
2. Additional explanations from managers.
3. In-depth discussions among staff.
4. Lack of practical examples.
5. Pro-active information-seeking (when knowledge is lacking).

Below is an example of coding for the first sub-category only (Table 2).

Table 2. Sub-category: Sufficiently clear initial information

No.	Informant	Quote (unit of meaning)	Label
1.	A	'Yes, the information is complete. The implementation of the Continuous Improvement fragment is rated 8.'	The information is comprehensive;
2.	B	B "The information was sufficient. Rating 8-9."	Information on LEAN was sufficient;
3.	C	"Information was sufficient, but would have liked more in-depth analysis. Rating 8."	Information on LEAN was sufficient;
4.	D	"There was a lot of information. I can't say that there was enough information at all, but for the most part it was sufficient. Score 8."	There was a lot of information;
5.	F	"There was enough information, the information was vivid, concrete. I rate it 10. There was no lack of information."	Information was sufficient
6.	H	"There was enough information, the practical part was missing. In practice everything worked out. I rate it 8."	There was enough information.

Explanation of sub-categories - additional explanations by supervisors; in-depth discussions amongst staff; lack of practical examples; Pro-active information seeking (when knowledge is lacking). The coding data shows that teachers received sufficient information about the Continuous Improvement methodology. Also, the majority highlighted that supervisors provided additional information, and even more understanding came from discussions with colleagues. One negative aspect is the lack of examples, but this is understandable as the implementation is done on one's own without experienced consultants. On the other hand, when the staff in the educational

establishment felt a lack of knowledge, they actively sought it out by contacting managers, colleagues and by conducting targeted searches on the internet.

This model shows the importance of practical examples. Ideally, more examples should be provided to see how this methodology works in practice.

Category: Smooth enough mission development

In the process of developing the mission, the children were empowered to shape the mission and had positive emotions about it. Methods such as 'Rain of Thoughts', 'Thinking Map', and supporting questions were used. The informant suggests that the process of forming the mission should be complemented by a vote, where the pupils could choose the majority opinion on their own. It was observed that too many questions were asked. Some of the students understood the essence of the mission, some of them would need more time, reminders, repetition. There was also a need for a longer period of mission formation so that a larger proportion would understand the essence of the mission, and not forget about the mission. Pupils implement what is set. They are able to answer the questions "Who are they" and "Who did they come here for". Sub-categories are distinguished:

1. Inclusive approaches to mission development.
2. Satisfaction with the content of mission development.
3. Disciples living the mission.
4. Suggestions for improving the mission development process.
5. The complexity of the concept of mission for students.

Category: remote development rule making process

The analysis of the rule development process for Continuous Improvement showed that it was difficult to turn negative rules into positive ones by avoiding the words "Don't" or the prefix "No"- "Don't make noise". Pupils understand what the rules are, why they have to be obeyed and the association with traffic rules is raised. However, not all pupils succeed in following the rules. Pupils feel they are leaders in creating rules. In the rule-making process, the children had positive emotions when the rules were validated with fingerprints. Pupils encourage others to follow the rules and point out the rules on the notice board. Children learn the rules by heart and know their numbers.

Informants commented that there should be common rules between classes. They would use a voting method to select the rules. It was also noted that there should be a longer period of time for the development and selection of rules. The need for fewer rules was seen. A study informant stated that he would change the visual presentation of the rules, without the need for drawings.

Substantive sub-categories were identified:

1. Inclusive/successful rule-making process.
2. Empowering students to follow the rules through rule making.
3. Awareness of the importance of rules in the life of the group/class.
4. Challenges of rulemaking.
5. Good preparation for rule making.

Category: Successful enough data centre deployment

The responses indicate that the process of implementing the data centre was more problematic compared to developing a mission statement or rules. The data centre is identified as a novelty, an innovation. The data centre implementation process has set objectives, a target class average and areas for improvement. Most students understood the essence of the data centre. Pupils were enabled to understand or draw diagrams. Pupils check results after each test. Continuous Improvement of results is encouraged. Children teach other children.

Need is seen for longer term process development, mastery, understanding. Suggested change in data centre visualisation.

Sub-categories within this category:

1. Challenges during the development of the data centre.
2. The importance of visual representation of the data centre.
3. Innovation in education.
4. Using the data centre to monitor progress.
5. Good preparation for data centre development.

Summarising the results of the study, it can be said that the teachers' individual understanding of the information varied; while most of the informants had enough information and only lacked practical examples, others needed help from colleagues, supervisors, and searched for research articles on LEAN in a database. Problems arose from tasks that required mathematical, statistical calculations, diagrams.

In the process of forming the mission statement, the children were empowered to form the mission statement and had positive emotions about it. Methods such as "Rain of Thoughts", "Thinking Map" and supporting questions were used. The informant suggests that the process of forming the mission should be complemented by a vote, where the pupils could choose the majority opinion on their own. It was observed that too many questions were asked. Some of the students understood the essence of the mission, some of the students would need more time, reminders, repetition. There was also a need for a longer period of mission formation so that a larger proportion would understand the essence of the mission, and not forget about the mission. Pupils implement what is set. They are able to answer the questions "Who are they" and "What did they come here for".

The analysis of the process of creating rules in the framework of Continuous Improvement showed that it was difficult to turn negative rules into positive ones, avoiding the words "Don't" or the prefix "No" - "Don't make noise". Pupils understand what the rules are, why they have to be obeyed and the association with traffic rules is raised. However, not all pupils succeed in following the rules. Pupils feel they are leaders in creating rules. In the rule-making process, the children had positive emotions when the rules were validated with fingerprints. Pupils encourage others to follow the rules and point out the rules on the notice board. Children learn the rules by heart and know their numbers. Informants commented that there should be common rules between classes. They would use the voting method to select the rules. It was also noted that there should be a longer period of time for the development and selection of rules. The need for fewer rules was seen. A study informant stated that he would change the visual presentation of the rules, without the need for drawings.

The responses indicated that the process of implementing the data centre was more problematic compared to the development of the mission statement or rules. The data centre is identified as a novelty, an innovation. The implementation process of the data centre has set objectives, a target grade average and areas for improvement. Most students understood the essence of the data centre. Pupils were enabled to understand or draw diagrams. Pupils check results after each test. Continuous Improvement of results is encouraged. Children teach other children.

Need is seen for longer term process development, mastery, understanding. Suggested change in data centre visualisation.

Study informants identified what should be changed in the presentation to make the processes smoother. They mentioned the need for a longer period of time, more meetings, consultations with managers, longer preparation consultations, lack of practical examples, lack of good practice from other institutions. Teachers had questions in practice, lack of experience, and could benefit from the experience of another teacher from a Lithuanian school on the implementation of a student data centre.

Limitations of the Quantitative Study and Future Research

1. Limited number of respondents
2. Limited number of organisations for objective reasons
3. Limited analysis, no more sophisticated quantitative data processing methods applied
4. Validated constructs are not used.

Conclusions

The initial reaction of teachers to the idea of a LEAN initiative was analysed. The results of the study showed that there is a progression of the concept of Continuous Improvement. Respondents indicated that there is also still a lack of practical examples, a need for more precise information on how to measure a child's progress, and a desire for results too quickly. Respondents initially saw the need for Continuous Improvement as more important and necessary. All respondents identified the need for the following reasons: modern approach; motivator; helps to improve performance, develop competences; helps to make learning meaningful for the learner; promotes development; promotes empowerment of learners in learning activities.

Reactions to the introduction of LEAN have been analysed and evaluated. Teachers' individual, different perceptions of the information; while for most informants the information was sufficient and only practical examples were missing, others needed help from colleagues, supervisors, and searched for scientific articles on LEAN in the database. Problems arose from tasks that required mathematical, statistical calculations, diagrams. To compare the reactions of the teachers in organisation X after the introduction of LEAN management with the reactions after the introduction of the LEAN management approach. In a survey conducted after 3 months of process implementation

activities, also all respondents indicated that the implementation of Continuous Improvement is needed in the organisation. The reasons given were: students are accountable for their learning outcomes; involves management in improving the learning process; encourages the planning of activities; creates value through activities; achieves common goals; improves the quality of education and the children's progress; assesses the progress of the whole class as well as of each individual student; user-friendly method. A higher proportion of respondents believe in the success of Continuous Improvement after the implementation phase. The reasons why the Continuous Improvement approach would succeed or fail in the organisation; negative reasons were identified: lack of experience and motivation of teachers; lack of practical examples. Positive reasons: pursuit of common goals; pursuit of innovation; facilitation of work; gradual introduction with monitoring of the process; theoretical basis. In the following survey, absolutely all teachers say that the method is successful and there are no more negative opinions. The following positive opinions on the application of the Continuous Improvement Process are highlighted: the idea of the data centre has been implemented; the mission, vision, rules, results to be achieved have been defined; the common goal has been pursued; the implementation of the Continuous Improvement Process has been defined as an annual objective. Respondents expressed challenges that were present in the implementation phase of the Continuous Improvement and during the process, the challenges for the organisation are more specific during the process, and it is more often questioned whether the children understand the visualisation of the diagrams and the essence of the method. Factors of attitude change were assessed. In the process of Continuous Improvement, additional personal challenges for the respondents included explaining the charts to the children, excessive work, and explaining the methods of measuring the progress of pre-school children to children. The benefits expressed by the respondents in the Continuous Improvement process mostly included benefits for the children; the teachers see that the application of the Continuous Improvement methodology benefits the children, fostering their planning, strategic thinking, problem solving and responsibility skills. Both in the initial phase of the implementation of the Continuous Improvement Methodology and during the process, teachers see the benefits for the quality of education, with an emphasis on the pupils and the benefits of cooperation and community. During the process, respondents value elements such as visions, missions, rules, and goal achievement. The subjects of the Continuous Improvement methodology, such as vision, mission, goals, rules, are identified with benefits for the organisation. Respondents confirmed that the Continuous Improvement Methodology and the Good School Concept are very close. In the survey conducted during the process of implementing the Continuous Improvement Methodology, a higher proportion of respondents indicated that the culture is close to the usual culture in educational institutions in Lithuania. A higher proportion of respondents also indicated that the culture of Continuous Improvement is close to the organisation in which they work. Similarly, a higher proportion of respondents indicated that the application of the Continuous Improvement methodology would be successful in the respondents' organisation.

Claim 1: In Open Culture Education Institutions in Lithuania, if sufficient attention is paid to the introduction of the NT methodology, most employees will have a sufficient initial understanding of the methodology.

Claim 2. After the first presentation, Open Culture Lithuania will tend to believe in the success of the implementation of the Continuous Improvement Methodology.

Claim 3: Educators in Open Culture Lithuania are unlikely to perceive the Continuous Improvement Methodology as being close to the 'typical' culture of a Lithuanian educational institution.

Claim 4: Educators in open culture educational institutions in Lithuania will tend to have a positive attitude towards the Continuous Improvement initiative.

Claim 5: In open culture educational institutions in Lithuania, educators will tend to see many similarities between the Continuous Improvement methodology and the organisational culture of their institution.

Claim 6 Educators in Open Culture institutions in Lithuania will tend to see the need for an initiative to implement the Continuous Improvement methodology.

Claim 7: In Open Culture Education Institutions in Lithuania, a Continuous Improvement initiative is likely to be successful when there is strong managerial commitment.

Recommendations

The study provides practical recommendations for those wishing to implement LEAN and similar methodologies.

- To start implementing a Continuous Improvement methodology, an organisational culture that is open to new ideas and innovation is needed.
- Continuous Improvement Methodology requires preparation, theoretical background, if there is an opportunity to learn from international experts.

- Successful implementation and adaptation of the Continuous Improvement Methodology requires a strong belief in the methodology by the managers of the educational institution, their involvement in the implementation process and their belief in the success of the implementation.
- Provide plenty of practical examples during the presentation so that educators can get a clear and visual sense of how the methodology works.
- The person responsible for the implementation of the methodology should always be available to provide additional information, knowledge and examples to the educators if needed.
- The motivation of the educators to start implementing the Continuous Improvement Methodology must be high.
- Successful implementation of the Continuous Improvement Methodology requires the preparation of teachers and pupils for the implementation of the change and the formation of a change management team.
- Successful implementation of the Continuous Improvement Methodology requires a systematic, step-by-step approach.
- Allow sufficient time for the implementation of the change to ensure that both educators and students understand the essence, culture and philosophy of the methodology.

Ethics Statement

- Privacy - the demographic block of the survey instrument does not require information that identifies the participants in the survey. Codes (e.g. A,B,C,D,E...) are assigned to describe each participant.
- Participants took part in the research on a voluntary basis.
- Participants were familiarised with the purpose of the study, the content and the format of the results.

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