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Article

Education Professionals' Cooperative Learning for the Development of Professional Capital

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Abstract: This article presents the research results on developing professional capital in Lithuanian schools during the national project "Time for leaders". The longitudinal national initiative aimed to develop professional capital as the synergy of human, social and decisional components (Hargreaves and Fullan, 2019) of schools through educational professionals' various cooperation-based learning experiences. The article provides an overview of project interventions (activities that stimulated cooperative learning of educational professionals) in the light of cooperative learning principles. The assessment of change over two project years in education professionals' perceptions of professional capital is presented using Cohen's *d* effect size measure. The measurement sample consisted of teachers ($n_1=5105$; $n_2=4683$) and school leaders ($n_1=439$; $n_2=405$) from 189 schools in 30 Lithuanian municipalities. The findings show a statistically significant medium positive change in professional capital. The most considerable change was estimated in the social and decisional capital dimensions and the relatively smallest - in the field of human capital.

Keywords: cooperative learning; professional capital; learning of education professionals; long-term project

1. Introduction

Professional capital refers to the collective expertise, knowledge, and skills of educators and the capacity of the education system to improve teaching and learning. By collaborating and sharing their knowledge and expertise, education professionals can enhance their individual and collective capabilities and ultimately improve student learning outcomes.

Cooperative learning among education professionals can be a powerful tool for the development of professional capital. There is a growing body of research demonstrating that cooperative learning can be an effective approach for teacher professional development, which facilitates faster professional growth, can help to improve the quality of instruction and ultimately enhance student learning outcomes.

The 21st century requires cooperative and collaborative work relationships and environments. Within cognitive science and neuroscience, human learning is mainly studied in isolation, where learning is treated as an individual activity, and social interaction has rarely been explicitly taken as a variable of interest, despite being the channel via which learning happens [1].

More significant numbers of adults necessitate acquiring knowledge about the world from and with others. Adult learning is shifting from transmittal techniques such as lectures to socially interactive, cooperation-based experimental techniques that make use of the learner's experience", help learners to contextualise new information and relate it to their own experiences.

Cooperative learning has been extensively examined in the literature as a student-centred teaching and learning technique, primarily from a teaching standpoint. Studies on cooperative learning emphasise the changing roles of teacher and student in the learning process, analyse the environments and contexts most favourable to cooperative learning, and investigate the benefits and other effects for students on learning outcomes in various disciplines [2–4].

Meta-analyses demonstrate that cooperative learning has a favourable influence on students' academic achievement [5,6]. Cooperative learning is also beneficial to students' social learning and peer relationships³. In today's society, dialogue, consensus, and teamwork (as reinforced in cooperative learning environments) are seen as cross-cutting competencies [7].

Cooperative learning is much less studied in the adult context. The term has been used in the context of adult learning by [8–11]. [9] examined cooperative learning in the field of adult learning, concluding that with adult learners, the key elements of cooperative learning must be implemented as with children (positive interdependence, individual accountability, face-to-face interaction, careful grouping of participants, and appropriate use (and, if necessary, learning) of social skills for cooperation).

[8] investigated adult learning in a cooperative learning environment (while engaging in assigned "cooperative support groups" of the course intended for teachers to assess contemporary learning theory while expressing their learning theory to build classroom applications). Utilising the "cooperative support group" as a case study, [8] investigated contextual elements that impact cooperation and collaboration for learning both within and outside of group activities.

For the purpose of fostering adult learners' social capital, [10] looked into cooperative forms of adult play. They claimed that play enhances adult learners' engagement, cooperation, and sense of connectedness with one another as well as with people, resources, and information outside of their group. [11] analysed the use of Zoom in un-meeting (a participant-driven collaborative learning experience) as an educational approach to provide experienced clinical research professional adult learners with a collaborative learning space to learn more about current challenges in academic medical centre clinical research employee development and to collaborate on developing solutions.

The aim of this paper is by using a descriptive case study to explore how the application of cooperative learning principles in a long-term project for adult education professionals can build their professional capital.

This descriptive case study investigates education professionals' experiences in the light of cooperative learning principles [12] during the long-term national project "Time for leaders 3" (Lithuania).

This research is a descriptive case study as it investigates in depth and describes the cooperative learning of educational professionals for the development of professional capital during the project "Time for leaders 3" (Lithuania).

According to [13], descriptive case study design attempts to present a description of a phenomenon within the context it occurred. One of the important requirements of a descriptive case study is that the researcher must begin with a descriptive theory to support the description of a phenomenon. The depth and scope of the case under study are better explained using a theory.

2. Materials and Methods

Data for this study was collected from a variety of sources. Using the lens of the theoretical framework of cooperative learning principles, the contextual information is revealed from the formal project management documents: Project Plan, Project Participation Agreement, and Project Activity Reports. Participants' feedback (qualitative data) about the learning experiences during the project was analysed using secondary content analysis with a general inductive approach. This data was taken from the answers to an open-ended question in the professional capital questionnaire [14] and is used in this paper to provide supporting evidence as voices from the field illustrate the context of cooperative learning principles [12]. According to [15], one of the purposes of secondary qualitative analysis might be to use the same data to explore other questions. This paper presents an aspect of professional capital development that has not been analysed in the above-mentioned study [14] by showing the cooperative nature of learning activities in the project.

The professional capital was measured following the [16] professional capital index. The online questionnaire survey was conducted at the beginning of the project "Time for Leaders 3" (Measurement I, November-December 2017) and at the end of the project (Measurement II, February-March 2020). The measurement sample during measurements I and II consisted of teachers (n1=5105;

n2=4683) and school leaders (n1=439; n2=405) from 189 schools in 30 Lithuanian municipalities. The data of fifteen municipalities have not been included in the summarised results of Measurement II due to the fact that the project activities had started in September 2019 (during the COVID-19 pandemic) and took place under exceptional conditions of distance learning and social contact restrictions; therefore, the project implementation situations cannot be compared.

Quantitative data analysis was carried out using descriptive, probabilistic, and multivariate statistical analysis methods. The principal components analysis with varimax rotation was used to identify the components of each dimension of professional capital. The magnitude of change in the professional capital is assessed by calculating the standardised difference in means between the groups (Measurements I and II) using Cohens d effect size. The following rule of interpretation for the Cohens d was applied: d = 0,2 for low effect, d = 0,5 for medium effect, d = 0,8 for high impact [17].

It should be noted that the questionnaire was prepared in the Lithuanian language as well as the qualitative data were also in Lithuanian. Here in the article, English-translated statements are provided.

Cooperative learning and foundation theories

Cooperative learning is described as an evidence-based teaching and learning approach in which learners work in small, independent groups for common educational goals. In cooperative learning, learners' interactions are structured and prepared for cooperation in advance so that individuals support each other's learning processes [4,19]. Cooperative learning and other collaborative learning approaches share the goal of facilitating student learning through interactions among students. The groups are typically structured in a way that promotes individual accountability, positive interdependence, and equal participation among members. Cooperative learning activities are often highly structured, with clear roles assigned to each member of the group and specific guidelines for how the group should function. Other collaborative learning approaches, such as project-based learning, problem-based learning, inquiry-based learning, also involve students working together to achieve a common goal or solve a problem. However, these approaches may not always involve the same level of structure as cooperative learning [19].

Cooperative learning as a philosophy and interaction style is based on constructivist and social learning theories [12,21]. According to social interdependence theory, people are impacted by their own actions as well as the actions of others [21]. Cooperative learning is based on the premise that education should be a process in which persons are active in the learning process, knowledge is socially created [22]. The nature of learning is intrinsically collaborative, and learning cannot be separated from its social environment. Social discourse is a driver for the development of cognitive processes and knowledge. The collaborative learning environment provides an opportunity for knowledge co-creation, allows individuals to learn from each other, and encourages conceptual growth through modelling, perspective-taking, and cognitive challenges. Knowledge, or how humans perceive their experiences and reality, is co-constructed through the frameworks of language and culture in interpersonal relationships. Cooperative learning has been viewed as a base for a new culture of adult learning, especially from the lifelong learning perspective [23] and treated as an important issue for current teacher education [24]. Cooperative learning, compared with competitive or individualistic efforts, promotes basic self-acceptance as a competent person, encouraging higher levels of reasoning, critical thinking, facilitating problem-solving skills, promoting self-understanding, improving interpersonal skills, making learners take a more active role, and increasing adult motivation [25–28]. The social domain, indicating the positive interdependence promoted by constant group work and the development of social skills, is mentioned as the most evident benefit of cooperative learning [11,29,30].

Large bodies of knowledge co-created in a specific time and place context [31] are especially needed for teacher education and professional development as the rising complexity of educational challenges necessitates the skills, contributions, and participation of a diverse range of professionals on the team.

Description of the case. National project "Time for leaders 3"

The "Time for leaders" was a long-term (a ten-year) initiative, going both deep and wide, gradually covering the whole of Lithuania. The third project stage, "Time for leaders 3" (2017-2021) focused on the implementation of 45 municipal education change projects and, at a national level, on the networking of education professionals.

The project's target - the municipal education system and schools as the integral units of the education network, consolidating the existing potential for achieving a higher quality of education, considering the specific social, cultural, and economic context of a particular municipality.

In the project "Time for leaders 3", the 45 participating municipalities were offered a rich set of cooperative learning environments to prepare better and implement education changes in the municipal education system, to grow and strengthen the competencies of educational leaders and to develop professional capital throughout the system.

The municipalities were divided into three "streams" (Southern, Western and North-Eastern) and were involved in the project activities at different time periods (the Southern municipalities 2017-2018, the Western in 2018-2019, and the North-Eastern in 2019-2020). For the development and implementation of the municipal change projects, 22 months were dedicated.

Development of professional capital was one of the main conceptual aims of the project "Time for leaders 3". It created and tested a complex framework of support for municipal education communities, with the aim to develop professional capital of education system with the expected effect of improving students' learning.

The national project "Time for leaders 3" provided an opportunity for education professionals to learn continuously, to feel being a part of a large, supportive community, to experience professional growth in a complex set of cooperative learning environments and to make real changes in the day-to-day professional work.

The target learners of the programme were - heads, deputy heads and teachers from general education schools, vocational training and non-formal education institutions, and education managers at national and municipal level institutions. Participants were experts from various disciplines, having different subject-matter base and/ or managerial experience. Some of them were more experienced, with in-depth knowledge of institutional policies, organisational culture, and understanding of the infrastructure of the institution, some of the participants were those who had innovative ideas for improvements but lacked a platform or support for engaging in innovations. Most programme participants loved their work and were eager to participate in the change for better education quality and higher student achievement in their school/municipality.

The project provided participants an opportunity to participate in formal and non-formal educational leadership study programmes, networking with other municipalities through collaborative events and regional forums, professional consultancy and facilitation of municipal change teams, and measurement of each municipality's professional capital before and at the end of the project.

In this paper, project activities which stimulated the cooperative learning of participants are presented.

Cooperative learning in a municipal change team. The municipality's change team, with the help of consultants and researchers, was developing and implementing an integral change project focused on students' learning success, involving systemic changes in education management processes in the municipality and in the educational institutions in its territory. The municipal change project was the central project activity for the success of which all other activities served. A total of 45 municipal systemic education change projects were developed and implemented during the project period.

The municipal change team was responsible for change project development, and implementation was made up of 10-15 persons with a wide range of experience. They include representatives from various educational institutions (general education schools, kindergartens, parents and municipal politicians, teachers with various teaching experience, student support specialists, and specialists from the education and training department). During the project "Time for

leaders 3" 630 unique participants in 45 municipal change teams were learning together in the process of development and implementation of a municipal change project.

Municipal change teams were learning with professional consultancy support. Each team was supported by 1-2 certified consultants whose role was to ensure the team's long-term learning process to achieve the goals of the change project. Many cooperative learning principles were applied in team working meetings and consultations. Totally each municipal change team received 12 consultant-facilitated sessions. In addition, the municipal change team members were meeting for change planning, implementation and progress discussions in between the consultant-facilitated meetings (1-2 meetings per month).

The municipalities' change projects differed in terms of their themes and the scope of the participants involved, and the activities implemented.

Cooperative learning in the non-formal educational leadership program. 10-14 education professionals from each municipality were learning in a non-formal educational leadership programme. The programme was designed to develop the management and leadership competencies of experienced and potential managers of educational organisations, teachers, and other education professionals. The duration of the learning programme - 6 months (248 academic hours, of which 48 academic hours - contact learning, 200 academic hours - independent learning). The number of unique programme attendants - 935.

The learning in a non-formal educational leadership program took place in parallel groups of participants from neighbouring municipalities (+/- 40 participants in a group). The purpose of this group-forming principle was: (1) to encourage cooperation and learning between education professionals within a municipality; and (2) to develop professional networks of cooperation and learning between schools in neighbouring municipalities. 2 facilitators facilitated each learning group. The non-formal educational leadership programme consisted of 1 compulsory and 4 optional modules. Learning methods applied in contact (face-to-face) learning meetings were: presentations, discussions, case studies, simulations, learning diaries, feedback, and reflection. Participants' individual learning methods (between the contact meetings): action research, literature analysis, learning diary, conversations with a learning friend, self-evaluation.

Regional and national, inter-municipal forums as cooperation events between different municipalities have created multi-directional interactions of participants, supporting leadership and educational networking of communities. 45 Municipalities were merged into three groups (three networks of 15 municipalities) according to geographical area (Southern, North-Eastern and Western) for another type of cooperative learning experience - regional forums to discuss education issues, and share valuable experiences. Each forum raised its learning topic (for example, "Cooperation versus competition in education" (Southern Lithuania forum), "Contemporary education: opportunities and challenges of experiential learning" (North-Eastern Lithuania forum), and "Experiential learning" (Western Lithuania forum). Supporting the idea that learning is social, regional forums created an environment for learners' exposure to external ideas, thus expanding their perspectives. Short presentations in the large group, followed by opportunities to exchange ideas in small-group breakout sessions during the forums, were available for participants. Totally 2 national, 3 regional forums, 24 inter-municipal forums were organised during the project "Time for leaders 3".

3. Results

3.1. Cooperative learning principles in the long-term national project "Time for leaders 3" (Lithuania)

Further, the discussion on how the basic characteristics of cooperative learning: positive interdependence, individual accountability, face-to-face supportive interaction, interpersonal and small group skills, and group processing [32-34] were realised in a long-term complex project "Times for Leader 3" for the development of professional capital is provided. The theoretical basis of each principle is commented in the light of project activities and enriched with the statements of participants to the open-ended question about the impact of the project in the professional capital research [14].

3.1.1. Positive interdependence

Interdependence is a fundamental construct in cooperative learning and other group/peer learning approaches. Positive interdependence is the idea that everyone in the group can benefit from working together and that the outcomes of both individualised learning and group collaboration will be positive. It means that group members perceive that working together is individually and collectively beneficial. When persons think that they may reach their goals if and only if the other individuals with whom they are cooperatively related attain their goals, positive interdependence is present. In order to accomplish the group's objectives, members of a group that exhibits positive interdependence encourage and facilitate each other's efforts [29]. Individual and collective benefits and success deeply depend on the engagement of all members. Four categories of positive interdependence techniques are most frequently mentioned in the literature: commonality of goals, tasks, roles, resources, and rewards [29,35]. Goal interdependence is achieved when learners share the same goals and believe that working together is essential to attain these goals. These could include both social and academic goals. Task interdependence provides the foundation for interaction behaviours, which assist teams in collaborating and communicating effectively [36]. As a result, when a team has significant task dependency, its members rely heavily on one another to do their work efficiently [37]. Also, when task dependency is strong, team members cooperate more to accomplish individual or team goals [37]. Task interdependence is a crucial component of group dynamics and encourages team communication and collaboration, which are necessary for team creativity and innovativeness [38]. Teams that have significant task dependency likely to have greater collaboration and share more diversified resources [39]. Resource interdependence makes it necessary for the group members to share them in order to be successful. Positive interdependence is promoted by sharing instructional materials, and learning materials (room, chalkboard, writing supplies, computers, and other information devices). Role interdependence include learners taking on predetermined, assigned tasks, such as task or group maintenance duties. As compared to other similar group techniques, such as collaborative learning and problem-based learning, cooperative learning is defined as the group learning approach with the most structured interdependence [35].

In the project "Time for leaders3", positive interdependence was supported by the commonality of goals. Participants in all project activities (formal educational leadership master studies, non-formal educational leadership programme, municipal change teams, leadership forums) had a common goal: to initiate and implement a meaningful change in their professional practice (class, school, municipal education system levels) for the advancement of student learning. In such a way (supported by a common purpose), learning activities even taking place in a parallel and diverse group of cooperative learning interactions, had a significant impact on changing educational practice.

It worked out that we [all municipal schools] were all working on the same subject area, so we could help each other, consult and discuss with each other.

We were learning from each other and were sharing our experiences to achieve the main goal of raising students' subject and general competencies.

Project "Time for leaders 3" has inspired new ideas and sharing experiences on how to diversify lessons to make them more engaging for pupils, more likely to succeed, and inspire them to achieve better learning outcomes.

Commonality tasks – were also a feature of the non-formal education programme, collaboration events as well as regional forums. Task interdependence occurs when group members' tasks are divided so that one group member's learning action must be completed by another group member's action. Among the techniques fostering positive interdependence, structured learning tasks and assignments were offered for the participants in the non-formal educational programme, consultations for the municipal change team, and regional forums. It was planned that action research outcomes of group members participating in the non-formal education programme would serve as inputs to the municipal education change process.

By participating in action research during the non-formal studies, educational practitioners experienced and discovered for themselves what educational changes benefit their professional practice for better student achievement.

It was a great experience that pushed me to do more than I thought I could. My responsibility for my students, my colleagues and my own work has grown considerably. It was great to share my experience with teachers from other schools to "test" the quality of my work.

In fostering positive interdependence between the participants of the project in different project activities, role dependency was planned. Each member participating in the project had a pre-set role (ex., leader of the municipal change team), either a task role or group maintenance role (ex. having a particular role in the learning interactions during non-formal studies, responsibility for the change implementation in a specific school, etc.).

{name of the consultant}, the consultant of the municipality's creative team, always gives us "homework" - to present the thoughts and ideas discussed in our municipal change team to our school community. I understand and accept this way of organising work.

Team members talked in their school communities. Schools grouped in pairs, teams of teachers went to visit their colleagues or teams of teachers from two schools met in a non-formal environment for a joint discussion. The head of our team also met with representatives of the district's pupil government to find out what problems pupils see, what expectations and wishes they have when they come to school, what they need most, and what they want to take with them when they leave school.

The reward aspect, stimulating positive interdependence, was realised through the "public" recognition of the group achievements and announcement of their success to others in different formats: publications on group achievements in the project and national education web portals, social media, in the serial journal of the Ministry of Education and Science "Analysis of Education Problems" (lith. "Švietimo problemas analizė"), presentations of the team success stories in the regional forums, were feedback and support from other participants acted as a reward, reinforcing the idea that their success is dependent on each other and the group as a whole.

Perhaps the most enjoyable part of the forum was the discussion, which used the "World Café" method. It showcased the municipalities' change projects, sharing the achievements and experiences of the municipal change teams.

The sharing of experiences by the participants of the "Time for leaders" project was meaningful, exciting and rewarding.

3.1.2. Face-to-Face Interaction

When learning occurs with other people, it is defined as 'social learning' [40] or interactive learning [41]. Research data suggests that social interaction acts as a catalyst for adult learning as it supports the acquisition of new knowledge [1,41]. Face-to-face interaction is an essential aspect of cooperative learning. It stimulates active participation, social connections, peer learning, cooperation, and the development of communication skills. Highlighting the value of face-to-face interaction, [42] posit that in face-to-face interactive learning experiences, when participants are physically together, it is more difficult to give in to all kinds of distractions, group dynamics operate much more, it is easier to keep participants focused on a task. Project participants are stating:

We were learning to work together according to the principles of sociocracy. It helped us not to deviate from the project's goal. We discussed real situations, looked for the answers to real working questions, were thinking, creating, and forgetting time...

When people meet face-to-face to work in small groups, they are more likely to participate in discussions, ask questions, and share ideas. It provides group members with the opportunity to discuss, clarify and explain the content they are learning. It also creates the conditions that enable learners to critique one another's ideas and performances and provide appropriate feedback, support and encouragement [42].

Face-to-face interaction allowed project participants to learn from each other. Learners shared their knowledge, skills, and expertise and helped each other to understand challenging issues.

In particular, we have improved our communication and cooperation competencies. We have learned to debate and express our thoughts and views without offending our colleagues.

Face-to-face interaction allows learners to exchange needed resources, such as information and materials, and process information more effectively [29]. Helping and assisting group members, being driven to seek mutual gain, influencing one another's efforts to attain the group's objectives, being able to explore different points of view, and challenging each other's reasoning and insights to promote higher quality decisions making [29].

Participating in the project activities encouraged the more daring and open expression of ideas, and teamwork.

We shared information and experience openly and sincerely. We provided help to / accepted from others to achieve common results.

According to [43] deep learning occurs when individuals are given the time, space, and support to investigate the significance of the concepts in the context of their own experiences and challenges. "Investigation" means the ability to honestly explain where the learners are in any given area, as well as the opportunity to get criticism — and be pushed — from colleagues in their group. Deep learning brings concepts to life in both meaningful and context-specific ways [43].

In the "Time for Leaders 3" project, learning and collaboration activities were planned in a face-to-face format (except during the Covid-19 period). In the non-formal Educational Leadership Studies, each learning session had 6 days of live participant meetings. Municipal change teams also gathered for face-to-face meetings for change planning and implementation discussion sessions that were supported by certified consultants.

I am grateful to have met so many wonderful colleagues.

This was a great opportunity to interact with colleagues who are full of ideas, determination, and enthusiasm and who encourage you to move and act towards new changes. Thank you!

Also, team members were meeting with colleagues from their own schools or organising face-to-face meetings with other schools in order to discuss common issues and look for possible solutions.

Team members talked with their school communities. Schools grouped in pairs, teams of teachers went to visit their colleagues or teams of teachers from other schools met for a joint discussion.

The project held three regional forums where in face-to-face meetings, education professionals from neighbouring municipalities were invited to participate in discussions about the change projects, share ideas, and work together in small groups by supporting each other's learning processes [44].

It was very interesting to hear what change is being created by colleagues in other municipalities. We shared our experiences and got advice from our colleagues. Then, at the meetings, we presented our change theme and shared our understanding of that.

The most exciting thing is to cooperate with members of municipal change teams from other districts to share our experience, especially when we see that our chosen change direction is relevant almost everywhere.

Face-to-face interaction helped to build social connections. Project participants developed professional friendships that helped to create a positive learning environment and promoted success in their professional change initiatives.

Face-to-face interaction helped learners to develop communication skills. When people work in small groups, they must learn to communicate clearly and effectively in order to achieve their goals.

Non-formal studies, consultant-facilitated municipal change team meetings were intentionally structured cooperative learning environments that encouraged participants' interdependence, encouraging them to concentrate on a particular professional issue and integrate a free flow of ideas through brainstorming and open discussions, laying the groundwork for future collaborative actions [11].

3.1.3. Individual Accountability

According to [45], the goal of cognitive growth is the transformation of the person. Learning could be thought of as a constant transformation. The interactions with other learners lead to necessary changes in their professional behaviour as persons learn and develop.

In cooperative learning to meet group goals, each learner must be held responsible for both the group's overall task achievement and his or her personal learning and development [46]. It is agreed that if individual responsibility is not well planned or considered, learners may overlook the need for peer support and encouragement or opt to back off at the expense of their fellow group members' efforts.

In the non-formal leadership studies, as well as in regional forums and forum, facilitators and non-formal programme instructors were responsible for managing the group work, observing the group process, and facilitating it as advised by [29].

Our municipal change team "drivers" were professional consultants, and their help was very purposeful and necessary. We would probably have wasted a lot more time and damaged a lot more paper searching, discussing, and dreaming about change, and there was a good chance of losing our track... Through professional counselling, we turned dreams into reality and became more and more aware of the meaning of change.

During the non-formal studies, individual learners' accountability was stimulated by splitting learners into even smaller groups [29] for problem-solving. The groups of +/-40 people were divided into smaller groups (4-6 persons) to work on a selected professional problem using an action research framework. As [29] states, the smaller the group size, the greater individual accountability could be. Participants organised themselves into problem-solving teams on the particular topic (practical problem) relevant to their professional practice. They had to work collaboratively with their colleagues in the group to generate ideas for the improvement of the raised problem, implement mini-change, and evaluate the outcomes. The participants themselves raised the "hot" topics (problem questions). The possibility to "raise" the problem promoted learners' individual accountability as the problems addressed were relevant to the learner and the colleagues who joined the group. Here are some examples of the issues raised: "Improvement of teacher collaboration in school", "Individualised learning of 5th-grade students", "Annual reflection. How to perform it with the class?", "Using Google tools in education".

The project has helped me to find confidence and belief in what I do. It has given me a huge amount of professional knowledge, which I have been able to try out and put into practice.

The "Time for leaders 3" has given me a lot of knowledge, meetings, discussions, which have enriched me as a leader, as an educator, as a person. I felt very much that we started to communicate with each other as managers, that we were freed, that we were no longer afraid to talk about difficulties, problems, because we all have them.

Individual accountability in non-formal leadership courses was strengthened by the requirement of each person to take responsibility to bring input to the whole group learning by doing

the agreed "homework" (reading literature on the problem group is solving, collecting information taking real change actions in their schools, doing a survey, etc.).

The team advisor [...] always gives you personal "homework" to present the ideas and thoughts you have discussed to your school community.

The results of the participants' learning in various cooperative settlements had to be integrated into the change project in the municipality. This aspect also stimulated individual learners' accountability.

We were really looking forward to the project "Time for leaders 3" - to have open conversations about the current problems at all levels, to participate in formal and non-formal educational leadership study programmes, research, various pieces of training, to look for solutions, ways and forms of changing attitudes and approaches in schools to the process of education and children's progress.

During the contact meetings of the non-formal studies and consultant-facilitated municipal change team meetings, facilitators and consultants encouraged learners to actively participate in group discussions and activities by helping them take ownership of their learning and contribute to the group's collective understanding.

I am very impressed by their [consultants' names] positive communication, taking into account the opinions of the team members. The consultants did not impose their own opinion when choosing the topic of the change project, and their timely input empowered us to find our own way to make changes.

3.1.4. Interpersonal and group skills

Cooperative learning requires the development of interpersonal and small-group skills, such as communication, active listening, conflict resolution, teamwork, and leadership; [47] names these social skills. It is recognised that the development of social skills, such as turn taking active listening, is as important as cognitive development [48] or focusing only on academic goals. The project "Time for leaders 3" purposefully was focused on the development of social competencies in the learning processes as this was clearly specified, articulated in the project aims, and supported by the learning processes taking place during the project. During the non-formal educational leadership programme, participants were stimulated to develop their interpersonal and small group skills: learners were divided into smaller groups to complete specific tasks in each face-to-face meeting session. Each member of the group was responsible for their assigned task, but they also needed to communicate and collaborate with their group members to ensure the overall success of the task. Participants needed to communicate their ideas, listen to others, negotiate and compromise to reach a consensus, and provide constructive feedback to their peers.

I think each team member brings a lot to the team with his/her own experience: by listening to everyone's opinion and discussing, we see the edges that need to be smoothed or sharpened.

They were able to combine their skills and expertise to achieve a common goal. Eleven members of the municipality's creative team develop their competencies by working as a team, sharing their knowledge, experience, and insights from books and articles they have read.

Group members become responsible and accountable for others through regular reflection, which creates an environment of positive interdependence [18]. At the end of each session in the non-formal leadership studies, as well as in consultant-facilitated change team meetings, consultants and facilitators invited participants to reflect on their group interactions, share their experiences, and provide feedback to each other. This helped learners to identify their strengths and areas for improvement and develop a greater understanding of how to work collaboratively in a group.

Working with a consultant in a team, we learned to listen to others' ideas and colleagues' arguments, to raise and analyse the school's problems, to explore the issues raised and to look at the problem from different perspectives, to express and justify our own opinion on the issue at hand, to accept a different opinion, and to reflect with colleagues. We have learned to distinguish more clearly between the essentials and the most critical things on the whole. We strengthened our teamwork skills.

The tasks and exercises were planned in the way that participants were also developing time management and leadership skills, as this included setting goals, prioritising tasks, and meeting deadlines, taking leadership to guide the group towards its goals, inspiring others when necessary.

To achieve group goals, group members needed to develop trust for one another, communicate, accept and support each other, and resolve conflicts if such were rising.

3.1.5. Group processing

Group processing is an important component of cooperative learning, which involves reflecting on and discussing the group's processes, interactions, and performance. The purpose of group processing is to help group members improve their communication, collaboration, and problem-solving skills and to promote a positive and supportive group environment. Assessment of group process plays an essential role in cognitive engagement [49,50]. When assessing group processes in cooperative learning of adults, it's important to use various methods, including feedback from group members [51], and self-reflection. During group processing, learners are encouraged to discuss their experiences working in the group, share their perspectives, and provide feedback to each other. This can be done in various ways, such as through group discussions, peer evaluations, or written reflections. In a cooperative learning situation, group members evaluate and analyse how effectively they are learning as a group [29], can identify their strengths as well as their weakness and make improvements on the concerns in the future [38]. Through reflection, group members can define what member activities are useful and unhelpful and judge which methods to alter or continue by reflecting on the success of the learning process [52].

Reflection was a crucial part of cooperative learning activities throughout the project, which allowed the participant to deepen their learning and improve their performance. After each meeting session in the non-formal leadership programme, participants were invited to reflect on their experiences, identify areas for improvement, and provide insights into their learning from their experiences.

Thanks to the LL3 project, I have gained the knowledge and skills to reflect on my work, and I am teaching my students to do the same.

The project has helped to bring schools in the district even closer together to communicate and share, provided useful new experiences, and the [project] reports are worth reflecting on. More projects like this!

Formative assessment was used to provide feedback and evaluate learning progress in the non-formal educational leadership program. Assessment activities were implemented at different stages of the learning process and were structured as the combination of the instructor, the learner's, and the group peers' contributions. Group tasks used in this non-formal programme demanded close connections between the group discussion and academic content (for example, the selection of the area of improvement ("Feedback as an effective tool for student learning") required more depth analysis of the selected theoretical concept on the selected topic).

"Time for Leaders 3" brought together communities from different schools to learn from excellent speakers and each other. We have been deeply involved in the topic "Feedback" and continue to implement it successfully in the classroom.

Group products were not gradable as it is suggested in the traditional cooperative learning principles. Instead of this, constructive and encouraging interdependence was encouraged. The final

product of a non-formal educational leadership programme was a written research report followed by an oral presentation on the outcomes of the problem analysis in the face-to-face meeting. All groups participated in the evaluation session. The group presentations were followed by questions and remarks from the other groups' members as well as feedback and insights from the facilitators.

The "Time for Leaders 3" project has inspired new ideas, and the shared experiences have given us ideas on how to make lessons more engaging, more successful, and more inspiring for students to achieve better learning outcomes.

By sharing my own insights and listening to the opinions of other participants and instructors, I grew as a manager.

The project has helped me to continue to grow and develop both as a person and as a school head. I really appreciate the knowledge and experience I have gained through the training and the cooperative activities.

3.1.6. Cooperative learning for the development of professional capital

As mentioned above, one of the critical conceptual goals of the project "Time for Leaders 3" was the development of professional capital, and each of the 45 Lithuanian municipalities was learning in various cooperative environments and implemented a unique change project intending to develop professional capital [16].

Professional capital [16,53] as a synergy of interrelated human, social and decisional dimensions [53] and its development is considered one of the attributes of an organisation's adaptive potential (ability to transform proactively in constantly changing contexts). These three types of capital converge into robust professional capital when competencies are developed at all levels and peer-to-peer collaboration is fostered with a focus on systemic change for advanced student learning [54].

In this section, the answer to the question of how pre-project professional capital (Measurement I) is related to post-project professional capital (Measurement II), keeping in mind that all project activities were structured in a cooperative learning manner.

The change in professional capital was measured by taking the person as the unit of analysis and comparing the values of professional capital during Measurements I and II.

Using the principal components analysis method, the following components of human capital have been distinguished: opportunities for professional growth (institutional conditions for professional development), the pursuit of professional development (intentions to improve teachers' professional knowledge and skills), professional power (recognition of mastery and expertise, assurance that they can enhance each child's learning outcomes and mentor other colleagues) and professional pessimism (a component that reflects the opposite properties of human capital: mistrust in own professional abilities, uncertainty about own ability to influence students' achievements and decisions being made at school, negative attitude towards a colleague experiencing difficulties in professional activities). Social capital has been found to define: enabling cooperation (institutional conditions for facilitated cooperation), active cooperation (teacher engagement in professional dialogues, encouraging colleagues to try together the methods to improve students' learning, expressing opinions on professional issues, recognising of importance of professional advice and support) and effectiveness of professional interaction (recognition of the impact of collegial cooperation in improving student learning). The data collected during the study suggests that decisional capital consists of the following components: self-reflection-based decisions (systematic allocation of time for reflection and subsequent performance improvement), data-driven decisions (reliance on research data, scientific innovations, good practices) and value-based decision-making (following the school values in making professional decisions).

3.1.7. Changes in the dimensions and components of professional capital

When assessing professional capital at the beginning and at the end of the project, there is a minor statistically significant difference $F(1, 9050)=282.3, p<0.001, \eta^2=0.03, d=0.35$. The study samples

are large, and the differences in the values of the dimensions of professional capital are statistically significant, $p < 0.01$. The most considerable change is observed in Social Capital ($d = 0.36$) and Decision Capital ($d = 0.32$), with the relatively lowest change in Human Capital ($d = 0.21$).

Analysing the development of professional capital at the component level, the most significant changes are seen for empowerment to work together ($d = 0.38$) and in the area of active participation ($d = 0.31$). This means that at the end of the project, project participants are rating higher the school leaders' attention to teachers' collaboration, the conditions for professional dialogue in their school, and the intensity of collegial interactions. Data show the increase in collegial interactions, teachers became more open to colleague feedback, and more frequent activities promoting collegial learning at school. Education professionals state that they are more often encouraging other colleagues to try out together approaches that improve students' learning, also collaboration with colleagues from other schools has increased. The data shows a slightly higher rating of the effectiveness of collegial interactions ($d = 0.22$).

The findings show that the cooperative learning-based project activities have encouraged teachers to rely more on data when taking professional decisions ($d = 0.33$). Teachers are more likely to reflect on their own performance ($d = 0.24$), and consider the school's values when making decisions more often. Changes in the area of human capital are relatively small but statistically significant: after the end of the project, teachers have a higher perception of their professional power ($d = 0.24$).

4. Discussion

The novel aspect of this article is that the cooperative learning of adults and its impact on the development of professional capital is analysed in the frame of a complex long-term project perspective – not a single cooperative learning occasion in a class or other education setting. The complexity view of the learning process overcomes the hierarchical closed-structure approach of learning and class as a learning system, replacing it with more open, cooperatively constructed learning processes, structures, and environment, which was a case in the analysed project.

Cooperative learning focuses on the structures of learning [55]. In line with [56] we state that adult learning interactions are valuable when they are structured in advance, taking into account principles of cooperating learning: positive interdependence, individual accountability, face-to-face supportive interaction, interpersonal and small group skills, and group processing can be treated as representatives how different learning environments can be created to enhance collaboration among learners and reach the expected aims. It is evident that cooperative learning requires an arrangement of learners' relationships, careful planning and preparation [57], especially in such long-term adult learning projects, but at the same time, emphasising the importance of freedom to contextualise and specify the learning path by choosing the personally, organisationally relevant learning content.

The results show that the analysed cooperative learning-based project had an impact on the development of professional capital, with the most significant effect on social capital. The cooperative learning experiences during the project "Time for leaders 3" has encouraged school managers to improve institutional conditions for teacher cooperation, enhanced teacher engagement in professional dialogues, and encouraged learners to reach out to other colleagues to try together the methods to enhance students' learning. Also, such multi-level and multi-agent cooperative learning resulted in more active collegial feedback on professional issues, more frequent sharing of professional advice, support and higher recognition of its importance. Qualitative data also support the evidence of the development of social competencies (successfully conveying ideas, respecting the viewpoints of others, and achieving an agreement through collective discussion and feedback). The same result has also been reported in other research supporting the idea that cooperative learning improves social competencies, fosters relationships [58], and helps build professional networks.

This study shows that when adults learn in various cooperative environments, the expected outcome could be more than the development of personal competencies. Cooperative learning structures can provide and enhance cooperation within a school, municipality and national levels, i.e. it can result in the development of the professional capital of the system. This study proves that cooperative learning principles are worth applying in more complex and long-term adult learning

initiatives where there is a need for more systemic change resulting from a higher number of adults learning in a particular professional setting.

It is crucial that cooperative learning structures are incorporated into professional practice, as was evident in the case analysed by the change project, which had to be implemented in each municipality. This principle emphasised the importance of the interrelationship of the learners, interconnectedness, and partner-based roles, which were needed for success. The space and time for self-articulation and reflection on the learning activities allowed participants to take personal responsibility for their learning.

Looking at cooperative learning through the complex systems' lens may help understand how fruitful the cooperative learning approach may be for the theory and practice of teaching and learning for achieving higher-order – system-level professional growth.

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