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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 of schools through educational professionals’ various cooperation-based learning experiences. Using the descriptive case study approach, the article investigates the question of how the cooperative learning approach, applied in a long-term professional development project for education professionals, develop individuals’ professional capital. The paper provides an overview of project interventions (i.e., 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, which is presented using Cohen’s *d* effect size measure. The measurement sample consisted of teachers ($n(I) = 5105$; $n(II) = 4683$) and school leaders ($n(I) = 439$; $n(II) = 405$) 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 relative smallest in the field of human capital.

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



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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. The importance of investment in the development of professional capital for education quality is recognised in the literature [1,2]. Professional capital as a synthesis of human capital, social capital and decisional capital is considered a powerful conception for constructing truly excellent education systems and is acknowledged to be a guiding concept that should shape education system development efforts [1].

We claim that cooperative learning among education professionals can be a powerful approach for the development of professional capital. Cooperative learning as a learning and teaching approach is structured and designed by educators to facilitate successful learners’ cooperation, maximising their own and each other’s learning. Five crucial criteria while planning and constructing a cooperative learning-based experiences should be followed: positive interdependence, individual accountability, face-to-face supportive interaction, interpersonal and small group skills, and group processing [3–5]. Cooperative learning has been extensively researched in the general education and higher education sectors, though much less studied in the adult professional development context. Studies on cooperative learning from pre-school to tertiary level are raising questions about the changing roles of teacher and student in the learning process, analysing the environments and contexts most favourable to cooperative learning, investigating the benefits of such

learning approaches for students and impacting learning outcomes across different subject domains [6–8]. Studies in this field demonstrate that cooperative learning has a favourable influence on students' academic achievement [9,10] and is beneficial to students' social learning and peer relationships, development of dialogue, consensus and teamwork, which are recognized as important cross-cutting competencies in today's society [11].

In the field of adult learning, the term "cooperative learning" has been used by [12–15]. Authors are raising the question that if the same principles of cooperative learning are valid with adult learners [13], how cooperative forms of adult play foster adult learners' social capital, i.e., enhances adult learners' engagement, cooperation and sense of connectedness with one another as well as with people, resources and information outside of their group [14], as well as what contextual elements impact cooperation and collaboration for learning both within and outside of "cooperative support group" activities [12].

There is a growing body of research demonstrating that cooperative learning can be an effective strategy for teacher professional development, which facilitates faster professional growth, can help to improve the quality of instruction and ultimately enhance student learning outcomes [16,17]. The social nature of learning in teachers' collaborative teams and communities of practice with active, contextual and engaging learning experiences is considered to result in deeper learning and development of new professional practices [17]. Recent studies in cognitive science and neuroscience also support the idea that learning is a social process, and social interactions are treated as the medium through which learning occurs [18]. The above-mentioned cooperation-based teacher learning experiences, analysed by [12–14], were mostly focused on a single teacher professional development event/programme and there is little research on the impact of the application of cooperation-based learning principles in the more complex, long-term and national-wide professional development projects that include a variety of cooperation-based learning activities in different peer learning groups.

Following this, our paper investigates the question of how the cooperative learning approach, applied in a long-term professional development project for education professionals, develops individuals' professional capital. Choosing the descriptive case study approach, the paper explores cooperative learning principles [19] in the context of the long-term national project "Time for leaders 3" (Lithuania) and provides statistical data on how cooperative learning experiences develop professional capital of educational professionals.

As case studies usually incorporate multiple streams of data combined in creative ways [20] and do not have a widely accepted reporting format [21], our paper begins with a description of the cooperative learning concept and its foundational theories. This is followed by an explanation of the national project's "Time for leaders 3" activities that stimulated cooperative learning experiences for educational professionals, serving as a case context. These activities were cooperative-based learning in a municipal change team, cooperative-based learning in a non-formal educational leadership programme and cooperative-based learning in regional, national and inter-municipal forums. In the Results section, cooperative learning principles [12] are described and explored in the frame of the mentioned project's activities, i.e., in the context in which they occur [22] together with the qualitative data examples from participants' feedback as supporting evidence of cooperative learning experiences during the project. In the final part of the Results section statistical evidence about the development of professional capital during the project is provided, as it was measured at the beginning and the end of the project.

2. Materials and Methods

According to [22], descriptive case study design attempts to present a description of a phenomenon within the context it occurred by incorporating multiple sources of evidence such as interviews, documentation, archival records, direct observations, participant-observation and physical artefacts [20]. Case studies are designed to bring out the details from the viewpoint of the participants [21] to describe the real-life context. The role of

the investigator is described as gathering and combining evidence about the case and contextualising the findings [20].

In this paper, following the descriptive case study approach, data were collected from a variety of sources. For the exploration of the cooperative learning phenomena in the long-term complex project, the contextual information was revealed from the formal project management documents: Project Plan, Project Participation Agreement and Project activity Reports. These documents were the sources of the context-specific details used in the paper for the description of cooperative learning principles [12] applied in the project “Time for leaders 3”. A secondary content analysis with a deductive approach was used for participants’ feedback data analysis to provide supporting evidence as voices from the field, illustrating the cooperative learning principles. Secondary qualitative analysis is an approach when the same data set is used to explore other questions than in the original research [23]. The deductive approach means analysing qualitative data on a researchers’ predetermined structure (in our case, cooperative learning principles) [12]. Participants’ feedback data were taken from the answers to an open-ended question at the end of the professional capital questionnaire [24]. The original purpose of the open-ended question was to get participants’ feedback on the project “Time for leaders 3”.

To answer the question of how cooperation-based learning activities in the project develop professional capital of the participants, the magnitude of change in professional capital values at the beginning and the end of the project was evaluated. Professional capital, a synergy of interrelated human, social and decisional dimensions, was measured following the [1] professional capital index. 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 [25]. For the measurement of professional capital, 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 ($n(I) = 5105$; $n(II) = 4683$) and school leaders ($n(I) = 439$; $n(II) = 405$) 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.

The study adheres to the general ethical requirements of social research [26,27]: the legitimacy of the research, the clarity and disclosure of the aims of the research to the participants, the voluntary nature of participation in the survey, the preservation of the privacy and confidentiality of the participants, the avoidance of deception and manipulation and the scientific integrity.

Quantitative data analysis was carried out using descriptive and 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 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 im-

portance 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 suggest that decisional capital consists of the following components: self-reflection-based decisions (systematic allocation of time for reflection and subsequent performance improvement) and data-driven decisions (reliance on research data, scientific innovations, good practices). Reliability and validity of the scales are provided in the Table 1.

Table 1. Reliability and validity of professional capital scales (I Measurement).

	Number of Items	CR	AVE	Alpha
Human capital				
Opportunities for professional growth	4	0.83	0.55	0.80
The pursuit of professional development	2	0.79	0.65	0.63
Professional power	3	0.73	0.49	0.59
Professional pessimism	4	0.84	0.56	0.62
Social capital				
Enabling cooperation	5	0.79	0.51	0.76
Active cooperation	4	0.78	0.50	0.73
Effectiveness of professional interaction	2	0.80	0.76	0.81
Decisional capital				
Self-reflection-based decisions	4	0.82	0.54	0.62
Data-driven decisions	3	0.75	0.51	0.71
Dimensions of Professional capital				
Human capital	4	0.76	0.45	0.63
Social capital	3	0.89	0.74	0.84
Decisional capital	2	0.86	0.68	0.78

CR—composite reliability, AVE—Average variance extracted, Alpha—Cronbach's alpha.

The internal consistency is confirmed by calculating Cronbach's alpha to test the scale's reliability. The satisfactory threshold value for Cronbach's alpha is that it should be >0.6 [28]. In the Table 1 the components of Human capital, Social capital and Decisional capital have Cronbach's alpha values varying from 0.59 to 0.81, which confirms the reliability of the survey instrument. Cronbach's alpha of second order scales is 0.63 for Human capital, 0.84 for social capital and 0.78 for Decisional capital. The Cronbach's alpha coefficient for the factors with a total scale of Professional capital reliability is 0.80. It shows that the constructs are internally consistent.

The criteria for convergent validity, which require the average variance extracted (AVE) to be greater than 0.5, have a standardized factor loading of all items of no less than 0.5 and composite reliability (CR) of no less than 0.7 [28]. The AVE values corresponding to the components of Human capital, Social capital and Decisional capital vary from 0.5 to 0.76. Factor loadings of all items of the scales are above 0.5. The composite reliability value for component varies from 0.73 to 0.84. Such values show sufficient convergent validity of the scales.

The magnitude of change in the professional capital was assessed by calculating the standardised difference in means between the groups (Measurements I and II) using Cohen's *d* effect size. The following rule of interpretation for the Cohen's *d* was applied: $d = 0.2$ for low effect, $d = 0.5$ for medium effect, $d = 0.8$ for high impact [29].

3. Theoretical Foundations of Cooperative Learning

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 [8,30]. Cooperative learning and other collaborative learning approaches share the goal of facilitating student learning through interactions among students. The groups are typically framed

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 group member and specific guidelines for how the group should function. Other collaborative learning approaches, such as project-based learning, problem-based learning and inquiry-based learning, also involve learners 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 [31].

Cooperative learning as a philosophy and interaction style is based on constructivist learning and social learning theories [19,32]. According to social interdependence theory, people are impacted by their own actions as well as the actions of others [33]. Cooperative learning is based on the premise that education should be a process in which persons are active in the learning process and knowledge is socially created [34]. The nature of learning is intrinsically collaborative, and learning cannot be separated from its social environment. Social discourse is treated as 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, compared with competitive or individualistic efforts, promotes basic self-acceptance as a competent person, while 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 learners' motivation [35–38]. 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 [15,39,40]. Cooperative learning has been viewed as a base for a new culture of adult learning, especially from the lifelong learning perspective [41] and treated as an important issue for current teacher education [42]. It is stated that large bodies of knowledge co-created in a specific time and place context [43] are especially needed for teacher professional development as the rising complexity of educational challenges necessitates the skills, contributions and participation of a diverse range of professionals on the team.

4. Description of the Case Context: National Project “Time for Leaders 3”

The project “Time for leaders” was a long-term (ten-year) initiative, going both deep and wide and gradually covering the whole of Lithuania, aiming to make a systematic change in education through the development of leadership and networking of education professionals. The third project stage, “Time for leaders 3” (2017–2021) focused on the development of professional capital through various cooperation-based learning experiences, centred around the municipality-initiated educational change project. In total, 45 municipal education change projects were implemented, with one in each municipality participating in the third project stage.

The municipalities were divided into three “streams” (Southern, Western and North-Eastern), thus creating cooperative clusters of neighbouring municipalities. Each group was involved in the project activities at different time periods (the Southern municipalities in 2017–2018, the Western in 2018–2019 and the North-Eastern in 2019–2020).

Various education professionals participated in cooperation-based learning experiences during the project, including heads, deputy heads and teachers from general education schools, vocational training and non-formal education institutions, as well as education managers at national and municipal level institutions. The participants were experts from various disciplines, having different subject-matter bases 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, while some of the participants had innovative ideas for improvements but lacked a platform or support for engaging in educational innovations. Most participants were eager to partic-

ipate in the change for better education quality and higher student achievement in their school/municipality.

In the project “Time for leaders 3”, educational professionals from participating municipalities were offered a rich set of cooperative learning experiences to better prepare 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. Project activities that were structured in a cooperative learning manner were working and learning in a municipal change team, a non-formal educational leadership programme and networking with other municipalities through collaborative events in regional, national and inter-municipal forums.

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 which all other learning activities aimed to achieve. The municipal change team was made up of 10–15 persons with a wide range of experience from various educational institutions (general education schools, kindergartens, parents and municipal politicians, teachers, student support specialists and specialists from the education and training department). During the project “Time for leaders 3”, 630 unique participants were learning together in 45 municipal change teams 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. In total, 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, the scope of the participants involved and the activities implemented.

Cooperative learning in the non-formal educational leadership programme. 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 was 6 months (248 academic hours, of which 48 academic hours—contact learning, 200 academic hours—*independent learning*). The number of unique programme attendants was 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 purposes of this group-forming principle were (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. Two 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 applied between the contact meetings were action research, literature analysis, learning diary, conversations with a learning friend and self-evaluation.

Regional, national, and inter-municipal forums as cooperation events between different municipalities have created multi-directional interactions of participants, supporting leadership and networking of educational communities. 45 municipalities were merged into three “streams” (three networks, each consisting of participants from 15 municipalities), clustered according to geographical area (Southern, North-Eastern and Western). This

was another type of cooperative learning experience, as regional forums aimed to discuss education issues and share valuable experiences between municipalities. 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. In total, 2 national, 3 regional forums and 24 inter-municipal forums were organised during the project “Time for leaders 3”.

5. Results

5.1. Cooperative Learning Principles in the Long-Term National Project “Time for Leaders 3” (Lithuania)

This section provides a description of how the essential characteristics of cooperative learning, that is, positive interdependence, individual accountability, face-to-face supportive interaction, interpersonal and small group skills, and group processing [12], [3–5], were realised in a long-term complex project “Time for Leaders 3” for the development of professional capital. The theoretical basis of each principle is commented upon in the light of project activities and enriched with the supporting statements of participants to the open-ended question in the research carried out during the project [24].

5.1.1. 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. Positive interdependence is present when people think that they may reach their goals if and only if the other individuals with whom they are cooperatively related attain their goals. To accomplish the group’s objectives, members of a group that exhibit positive interdependence encourage and facilitate each other’s efforts [39]. 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 [39,44]. 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 [45]. As a result, when a team has significant task dependency, its members rely heavily on one another to do their work efficiently [46]. Additionally, when task dependency is strong, team members cooperate more to accomplish individual or team goals [46]. Task interdependence is a crucial component of group dynamics and encourages team communication and collaboration, which are necessary for team creativity and innovativeness [47]. Teams that have significant task dependency are likely to have greater collaboration and share more diversified resources [48]. Resource interdependence makes it necessary for the group members to share them to be successful. This type of positive interdependence is promoted by sharing instructional materials and learning materials (e.g., room, chalkboard, writing supplies, computers and other information devices). Role interdependence includes learners taking on predetermined, assigned roles, such as task or group maintenance duties. 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 [44].

In the project “Time for leaders 3”, 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 parallel and diverse groups 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 of tasks was also a feature of the non-formal education leadership programme and 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 leadership programme, and consultations were offered for the municipal change team and regional forums. It was planned that action research outcomes of group members participating in the non-formal educational leadership 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 (e.g., leader of the municipal change team), either a task role or group maintenance role (e.g., having a particular role in the learning interactions during non-formal educational leadership programme, 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 of stimulating positive interdependence was realised through the “public” recognition of the group achievements and announcement of their success to others in different formats, such as publications on group achievements in the project and national education web portals, social media and in the serial journal of the Ministry of Education and Science “Analysis of Education Problems” (“Švietimo problemos analizė”

in Lithuanian) and presentations of the team success stories in the regional forums, where feedback and support from other participants acted as a reward. Overall, this reinforced the idea that participants' success was 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.

5.1.2. Face-to-Face Interaction

When learning occurs with other people, it is defined as 'social learning' [49] or interactive learning [50]. Research data suggest that social interaction acts as a catalyst for adult learning as it supports the acquisition of new knowledge [18,50]. 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, [51] posits 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 stated:

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 [51].

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 [39]. 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 ultimately contribute towards promoting higher quality decision making [39].

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 [52], 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 [52].

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 programme, 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!

Additionally, 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 [53].

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 educational leadership programmes and 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 [15].

5.1.3. Individual Accountability

According to [54], the goal of cognitive growth is the transformation of the person. Learning could be thought of as a constant transformation. 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 [55]. 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 educational leadership studies and regional forums, facilitators and non-formal programme instructors were responsible for managing the group work, observing the group process and facilitating it, as advised by [39].

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 educational leadership studies, individual learners' accountability was stimulated by splitting learners into even smaller groups [39] 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 ref. [39] 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 improving 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. Some examples of the issues raised include: "Improvement of teacher collaboration in school", "Individualised learning of 5th-grade students", "Annual reflection. How to perform it with the class?" and "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 a non-formal educational leadership programme 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 educational leadership 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.

5.1.4. 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; names these social skills [56]. It is recognised that the development of social skills, such as

turn taking and active listening, is as important as cognitive development [57] 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 group member 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.

At the end of each session in the non-formal leadership studies and 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. Group members become responsible and accountable for others through regular reflection, which creates an environment of positive interdependence [18].

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 so that participants were also developing time management and leadership skills, including setting goals, prioritising tasks, meeting deadlines, taking leadership to guide the group towards its goals and 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.

5.1.5. 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 processes plays an essential role in cognitive engagement [58,59]. When assessing group processes in cooperative learning of adults, it is important to use various methods, including feedback from group members [60] 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 [39], can identify their strengths and weaknesses and make improvements on the concerns in the future [47]. Through reflection, group

members can define what member activities are useful or unhelpful and judge which methods to alter or continue by reflecting on the success of the learning process [61].

Reflection was a crucial part of cooperative learning activities throughout the project, as it allowed the participants to deepen their learning and improve their performance. After each meeting session in the non-formal educational 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 in-depth analysis of the selected theoretical concept on the chosen 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 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.

5.2. Statistical Evidence of the Development of Professional Capital in the Cooperative Learning-Based Project

All the above-described cooperative learning-based project activities were set up to develop professional capital [1] of the participants and the whole education system. To check statistically if such a variety of cooperation-based learning experiences affect professional capital, participants were asked to complete surveys measuring professional capital before and after the project. The change in professional capital was measured by taking the person as the unit of analysis and comparing the values of professional capital during Measurement I (pre-project) and Measurement II (post-project). As was presented in the introduction section, in this part of the paper, results of statistical data on the change of professional capital are provided.

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 Decisional Capital ($d = 0.32$), with the lowest change in Human Capital ($d = 0.21$). See Table 2.

Table 2. Change of Professional capital.

	I Measurement		II Measurement		Cohen's d
	M	SD	M	SD	
Human capital					
Opportunities for professional growth	4.05	0.88	4.20	0.70	0.19
The pursuit of professional development	4.72	0.62	4.63	0.54	−0.15
Professional power	3.74	0.74	3.83	0.61	0.24
Professional pessimism	2.83	0.90	2.72	0.82	−0.13
Social capital					
Enabling cooperation	3.72	0.90	4.03	0.72	0.38
Active cooperation	3.67	0.85	3.91	0.69	0.31
Effectiveness of professional interaction	3.96	0.95	4.15	0.70	0.22
Decisional capital					
Self-reflection-based decisions	4.16	0.75	4.32	0.55	0.24
Data-driven decisions	3.54	0.89	3.81	0.69	0.33
Second order scales					
Human capital	3.65	0.58	3.77	0.53	0.21
Social capital	3.78	0.76	4.03	0.62	0.36
Decisional capital	3.98	0.65	4.17	0.51	0.32

M—mean, SD—standard deviation.

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 more highly the school leaders' attention to teachers' collaboration, the conditions for professional dialogue in their school and the intensity of collegial interactions. Data show that participation in various cooperative learning experiences during the project increases participants' collegial interactions, teachers became more open to colleague feedback and more frequent activities promoting collegial learning at school. Education professionals state that they are encouraging other colleagues more often to try out approaches together that improve students' learning, and similarly, collaboration with colleagues from other schools has increased. The data show a slightly higher rating of the effectiveness of collegial interactions ($d = 0.22$).

The findings show that 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 human capital are relatively small but statistically significant; after the end of the project, teachers have a higher perception of their professional power ($d = 0.24$).

6. Discussion and Conclusions

This study revealed how principles of cooperative learning, applied in a more complex, long-term national-wide professional development project for educational professionals in Lithuania, have developed professional capital.

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, as opposed to 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 environments, which was a case in the analysed project.

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 and enhanced teacher engagement in professional dialogues, and it encouraged learners to reach out to other colleagues to try the methods to improve students’ learning together. Furthermore, such multi-level and multi-agent cooperative learning resulted in more active collegial feedback on professional issues, more frequent sharing of professional advice and support and higher recognition of the importance of collegial insights. Qualitative data also support the evidence of the development of social competencies (participants reflect on the increase in the competencies of successfully conveying ideas, respecting the viewpoints of others, achieving an agreement through collective discussion and feedback). The findings of our study confirm the idea that cooperative learning improves the social competencies of learners, fosters relationships [62] and helps build professional networks, which is essential in today’s education system, where multi-disciplined networking of teachers has become increasingly important [63]. Other studies also find that engagement in professional dialogues of teachers from various disciplines and networking outside the boundaries of the school fosters a deeper understanding of complex concepts and real-world applications [64] and allows for the sharing of innovative teaching pedagogies and methodologies, by learning from one another’s experiences and experimentation with new approaches in their classrooms [65,66]. It enables educators to share challenges, seek advice and brainstorm solutions. Collaborative networks can offer a sense of community and help teachers feel empowered and motivated, leading to improved job satisfaction and overall well-being [67].

Our study shows that cooperative learning needs the structures of learning [68]. In line with [69] we state that adult learning interactions are valuable when structured in advance, considering principles of cooperating learning: positive interdependence, individual accountability, face-to-face supportive interaction, interpersonal and small group skills and group processing. This implies that cooperative learning principles can be treated as representatives of how different learning environments and experiences can be designed in a long-term complex project to enhance collaboration among learners to reach the expected aims of the project. It is evident that cooperative learning requires an arrangement of learners’ relationships, careful planning and preparation [70]. At the same time, our research shows that freedom to contextualise and specify the learning path by choosing the personally and organisationally relevant learning content/topic is highly important.

The study reveals how crucial cooperative learning experiences are when incorporated into professional practice, as was evident in the case analysed by the change project, which had to be implemented in each municipality. Learning in groups, structured around shared real-world professional challenges, emphasised the importance of the interrelationship of the learners, interconnectedness and partner-based roles, which were needed for success, as well as the importance of translating professional development learning into actual changes in teaching practices and student learning outcomes in the classroom. The importance of designing context-relevant learning experiences, where knowledge and expertise which the teacher brings to professional development are valued and learning is based on experimentation, reflection and peer-support, is recognized as a motivation to try new practices and make changes to the curriculum and practical reality [71–73].

The results of this study allow us to conclude about the synergising effect of cooperative learning in different groups of learners when interrelated cooperative learning experiences within a school, on municipal and inter-municipal levels, generate a higher-order (school/municipal-level) educational change and growth of professional capital. It means that when adults learn in various cooperative environments, and their learning

interactions are not limited to a single group, the expected outcome could be more than developing personal competencies. This gives an insight that cooperative learning principles are worth applying in more complex and long-term professional development programmes where there is a need for more systemic change, resulting from a synergy of cooperative learning experiences of professionals. The practical implication of this result for professional development project planners and implementers could be foreseeing the means of collecting, cumulating and circulating cooperative learning results among different groups of learners to generate the expected project outcomes.

In terms of this study's limitations, results may be affected by the specifics of the project. The change of professional capital could have been determined by factors other than cooperative learning (for example, the content of the learning activities, oriented towards leadership development).

Cooperative learning principles were described using secondary data analysis (project management documents, participants' feedback to an open-ended question). Therefore, some contextual data could have been lost because they were not documented, although evident in practice.

Furthermore, as a limitation, we would name the methodological challenge of grasping the complex nature of learning relations and group learning dynamics. Future research could use complex-systems methodological approaches to analyse group learning dynamics to find and identify emerging cooperative learning results inside the groups, knowledge and experience circulation processes between the groups.

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