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Knowledge creation for the future of integrated health and social services: Vague visions or an expansion of activity?

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ABSTRACT

This article analyses multi-professional knowledge creation in relation to the future of health and social services in Finland. The empirical data were collected from a workshop and it was carried out in cooperation between the representatives of higher education and working life. Workshop gave to its participants the possibility for multi-professional knowledge creation exercise to expand on future integrated health and social services. Participants saw digitalisation as enabling clients to use services and as offering more holistic help in incorporating clients' service histories and needs. The analytical framework is based on the cultural-historical activity theory (CHAT) and the knowledge creation approach, which directs attention to creation of the future object of client-centred services and knowledge artefacts by means of which future visions are collectively imagined and concretised. The activity-theoretical analysis of the elements of the envisioned service activity brought into daylight contradictions between the present and the future, as well as the possibility of overcoming the siloed services, and acknowledge the diversity of the clients' situations. These challenges may be difficult to grasp by means of a knowledge creation exercise alone. However, the realization of future activity requires solving the contradictions of the present service and care.

1. Introduction

Ageing populations, new flows of migration and the growing costs of welfare systems are among the issues European countries are addressing when trying to answer to the public demand for the equity of and access to safe, quality welfare services (European Federation of Nurses Associations, 2015). The political processing of service system reform aims at managing challenges within the public health and social care system by transferring the responsibility for the organization of services from local and municipal authorities to larger units of service providers. This way, politicians claim to ensure resources for capacity building and to tackle increased costs. The developments on both the international and national levels challenge the multi-professional health and social

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sector and the field of education to engage with innovative knowledge creation (hereinafter KC) for future services (Nolin & Killackey, 2004; Vuorenkoski, 2008).

In Finland, the future of the health and social sector has long been a topic of socio-economic, political and professional debate and development. However, due to multiple challenges, the reform of health and social services is proceeding slowly (Keskimäki et al., 2018; Saltman & Teperi, 2016). Finnish health and social care have been characterized by decentralised decision making and relatively weak central government steering mechanisms. Services are rather integrated and organised such that municipalities have overseen the bulk of primary care and run services together with other municipalities and hospital districts that organise public specialised care services. Private-sector services are part of the service system and are offered particularly in occupational health (Keskimäki et al., 2018). One of the fundamental changes in the reform concerns the decreasing role of local municipalities as service producers, while the main responsibility will be transferred to regions. From the perspective of the professionals, this has significant consequences for their collaborative practices and KC.

Digital services are emphasising individual decision making, and the principle of client orientation is at the centre of the reform (Ministry of Social Affairs and Health, 2015). Citizens will increasingly produce information about their health and wellbeing and become experts on their wellbeing. Digital transformation ensures that information flows smoothly and effectively among service providers (e.g., Islind & Snis, 2017; Nummela et al., 2019).

Considering the pending reform in Finland, the public and private actors in the sector and funding agencies on the national and European levels have invested significantly in the development of system-level transformation. Moreover, higher educational institutions are running projects aiming to improve the future digital and co-creation skills of health and social care services in the interfaces of education and working life (e.g., Ahonen et al., 2017; Värri et al., 2019). The Multidisciplinary Competencies for Health Care and Social Welfare Services in Finland (SotePeda 24/7) project presented in this article is a case in point. SotePeda 24/7 was set up to specify what kind of competences will be needed in multidisciplinary health and social care in the future.

The project drew on the digital pedagogy expertise of educational institutions and expertise based on the KC of health and social work professionals. Six regional workshops were organised in which multi-professional small groups were invited to discuss the conduct of future work in the health and social care sector. These participants were third sector representatives, citizens, students and teachers in the health and social care, economics, media and technical fields, as well as private sector representatives and experts from Finnish health and social care organisations. The project was coordinated by Laurea University of Applied Sciences (UAS) with 22 partner organisations from other higher educational institutions and was funded by the Finnish Ministry of Education and Culture.

The integration of health and social care has been studied widely in the fields of multidisciplinary, interprofessional and multi-professional care and collaboration (e.g., Boon et al., 2009; Frost et al., 2005; Leichsenring, 2004; Nummela et al., 2019; Rämgård et al., 2015; Rantala, 2018) and interprofessional education and learning (Ahonen et al., 2017; Ahonen et al., 2018; Guile, 2014; McFadyen et al., 2010; Myron et al., 2018; Värri et al., 2019). However, there is a limited understanding of knowledge creation in terms of the future integration of health and social care. The SotePeda 24/7 workshops offered a forum for this discussion, not only for collective reflection but also for the expansive remediation of activity in transformation (Virkkunen & Kuutti, 2000). This required that facilitators provided tools for collective KC by means of which new activity can be envisioned and made visible. 'Multi-professional' highlights the collective engagement in knowledge-building for novelty in contrast to professionals' individual contributions from their own work contexts (See Boon et al., 2009; Paavola et al., 2004; Pöyry-Lassila, 2015; Rantala, 2018). The analysis applies cultural-historical activity theory (CHAT) to reveal the developmental expansions and contradictions of the envisioned activity (Engeström, 2015).

In the next section, we discuss the theoretical framework and define the analytical concepts of this research by combining the KC approach with the activity-theoretical concepts of activity system, expansions and contradictions of activity. Then, the workshop setting, the data and the method of analysis are presented. In the results section, we present the findings of the analysis concerning a workshop discussion on the future services for children and young people. The discussion and conclusion sections close the study.

2. Theoretical framework

2.1. Competence requirements in health and social care in the era of digitalisation

To start with, workshop's participants defined discussion areas of competence, which are acknowledged as important in future multidisciplinary health and social care. They covered, for example, basic information and communications technology (ICT) competencies, online interactive competencies, service competencies in digital health and the social care sector, person-centred guiding competencies in a digital environment and service design and ethical competencies (Värri et al., 2020).

Professionals need to support clients in choosing the most suitable services and technologies to reach their health and wellbeing goals (e.g., Fox et al., 2005; Van Olmen et al., 2010). Citizens' empowerment is the goal for future care, and citizens must be able to use technology. Still today, however, part of the population lacks permanent access to the Internet, and digitalisation seems alien to many (e.g., Breit & Salomon, 2014; Holgersson & Söderström, 2019; Van Olmen et al., 2010; Watling, 2011).

In turn, professionals are expected to develop new multidisciplinary knowledge in digital health and social care services. This requires cooperation in educational planning among various professions and educators in health and social care, business, service design and IT to keep up with the development of digitalisation (Ahonen et al., 2017; Rajalahti et al., 2020). Employees' future competencies relate to the ability to process, manage, communicate and apply knowledge across varied fields of expertise (Fellows & Edwards, 2016).

Finally, collaborative learning, in which a range of professionals and even clients learn from one another and develop skills,

supports competence development (Myron et al., 2018). Societies' complexity and the pressure to create and learn to create new knowledge in various areas of life are reflected in contemporary theories of learning (Illeris, 2018). The knowledge-creation metaphor of learning is a contribution to the learning theories of fostering knowledge work practices (Karlgren et al., 2020).

2.2. Knowledge creation (KC) approach

The knowledge-creation metaphor of learning has been proposed as an approach that captures the nature of intelligent activity and innovation in the knowledge societies (Paavola et al., 2004). This approach recognises the social process and conceptual artefacts as equally important mediators in sharing and searching for knowledge for innovation. Artefacts are knowledge-laden "objects" produced by humans, and they enable collaboration and development process both among participants and between participants and their operational environment (Ibid.). We prefer using 'knowledge artefact' to make the distinction between the concept of the epistemic/knowledge object (Knorr, 1999; Rheinberger, 2005) of the knowledge-creation approach and the activity-theoretical concept of the object of activity (Leontiev, 1978). The former refers to the power of material artefacts used in collective knowledge development; the latter is an essential element of activity representing the collective motive of given activity in society (Nicolini et al., 2012). Hakkarainen et al. (2013) point out that the knowledge-creation metaphor remains an umbrella term for otherwise quite different sociocultural theories and approaches to collaborative learning. Bereiter and Scardamalia (2014) question the metaphorical understanding and define KC as a deliberate, conscious action, that produces knowledge embodied in public ideas and artefacts.

Organizational KC theorists have described interactions among participants with different backgrounds in which individuals bring different domains of knowledge and interests to the dialogue (Nonaka & von Krogh, 2009). Knowledge is related to the organization's data production, information, procedures and experience, as well as to the education of personnel. The focus of KC is on the development of 'knowing' rather than 'knowledge' as an outcome, highlighting collective action and social relatedness of engaging participants in collaborative and problem-based cultural activities. Knowing is not a separate activity, but intertwines with thinking, learning, working, and innovating (Gherardi, 2001; see also Cuel, 2020; Paavola & Hakkarainen, 2005). This idea guided the organization of the workshops where the professionals joined collective discussion about future health and social care services.

Collaborative KC represents a learning opportunity whereby non-explicit knowledge is explicated through collaborative and iterative processes (Batatia et al., 2012; Nonaka & Takeuchi, 1995; Paavola et al., 2004). An example is a study by Damsa and Muukkonen (2020) focusing on higher education students' collaborative work in small groups, where they constructed shared knowledge objects. Knowledge objects were concrete entities that materialized knowledge collected and constructed during the interactions of the groups. Collaborative KC enhanced learning and was instrumental in achieving the results. Students learned by engaging in a knowledge practice that involved activities to enable a shared understanding, joint actions and a balance between working with knowledge and managing the process. The researchers bring out many possibilities of a pedagogy drawing on object-oriented collaborative learning.

The mentioned examples of the KC approach suggest that the operationalizations of KC serve to analyze KC phenomena both as pedagogical processes and their outcomes, which the researchers have characterized as dialogical and "trialogical" (Paavola et al., 2004). We argue that exploring the future potential of the outcomes of the KC exercises calls for developmental and dialectic methodology, and we propose the activity-theoretical operationalization (Section 2.3) to serve this purpose.

2.3. Activity system as the unit of analysis

To operationalise KC in the following analysis, we draw on the framework of cultural-historical activity theory (CHAT), particularly the conceptual model of an activity system (Engeström, 2015). In this framework, the members of communities are considered learners and transformers of culture (Engeström & Sannino, 2010). An activity system is a model of collective activity and is thus applicable to the analysis of actors with diverse backgrounds, roles, positions and perspectives. Activity systems are networked and therefore culturally and historically multi-layered (Engeström, 2015; Foot, 2014), and they evolve through contradictions and expansions.

In this study, the *subject* of activity is formed by the agencies that work in the health and social care service sector by using various *tools*—in future, more and more digitalised ones. Ideally, an active client, who is the user of services, is expected to become the subject and co-producer of services (e.g., Nummela et al., 2019; Värri et al., 2020). The subject's activity is directed to the *object*, the production of good services for citizen-clients. In the stimulating material presented in the project workshop, the object was described as an integrated service centre to be developed for client care. The *rules* of the activity include the principles of service provision, and more. The *community* consists of the public, private and third sector actors, and the living communities who are involved in the service production and consumption. *Division of labour* in the health and social care is profession-based and regulated.

The CHAT approach to activity systems opens up the possibility of exploring developmental contradictions and expansive transformations in and between the elements (subject, object, etc.) of activity. The acting subjects of activity contribute to the transformation with their knowledge; the creation of new activity is a process of expansive learning (Engeström, 2015). The theory of expansive learning models learning as a dialectical cycle that proceeds step by step through agentive subjects' actions of solving developmental contradictions. Engeström (2015) defined four levels of contradictions: the primary contradiction within the elements of a current activity, the secondary contradiction emerging between the changing elements, the tertiary contradiction between the entire system of a dominating activity and the new activity developing or being developed, and the quaternary contradiction between the new activity and neighbouring activities.

Analysing KC for the future integrated health and social care services by multi-professional experts, we focus on the emerging expansive and contradictory connections between the elements of activity that the professionals produce in their workshop discussion.

However, knowledge is not only an outcome of the contradiction solving and expansion of experience but requires abstracting, analysis and generalization, which permits revealing the internal connections of the objects of cognition (Davydov, 1990). This is our methodological starting point.

3. Methods and data

3.1. Research questions

The two research questions are:

RQ1: What kind of future activity for the health and social care services do professionals envision mediated by the canvas knowledge creation artefact?
RQ2: What are the expansive and contradictory connections of the future service activity produced in the knowledge creation exercise?

The study aims to analyze multi-professional knowledge creation in a major historical change regarding the provision of services in health and social care. The challenges involve professionals' competence to face digitalisation and create new multidisciplinary knowledge in health and social care related to future circumstances in work and education. Professionals' discussions of services in the workshops form the data, which will be analysed in the theoretical framework combining the knowledge-creation approach with the activity-theoretical analysis of the elements of activity (RQ1) and their expansive and contradictory connections (RQ2).

3.2. Data collection

The data were collected in December 2018 from the small group discussion held in multi-professional workshop of the SotePeda 24/7 project. Six facilitated workshops were organised in different regions of Finland, each focusing on a specific regionally chosen theme of relevance: the wellbeing of children and young, mental health care, problems of alcohol and drug abuse, and the care for elderly people. The small groups were given case examples based on the topic in question as background material. To stimulate discussion, participants were shown video clips of future services in which digitalisation plays a significant role—for example, how digital services, such as robotics, might be applied to health and social care.

After being divided into small groups, the participants started discussing the current state and future challenges of the service system and envisioning solutions in view of the year 2030. They were asked to use their imagination to suggest ideas, which served as the material for the project developers' work towards the project goals. The purpose was not to solve the problems formulated or to commit to the implementation of a new model of activity, which would characterise activity-theoretical Change Laboratory type of work (Virkkunen & Newnhamn, 2013).

Concrete questions were formulated on a canvas knowledge artefact (Fig. 1), which the participants filled in when engaging in the 'canvas discussion'. The canvas was an activating tool for collaborative knowledge building. Tools relate to the existing culture (Brown
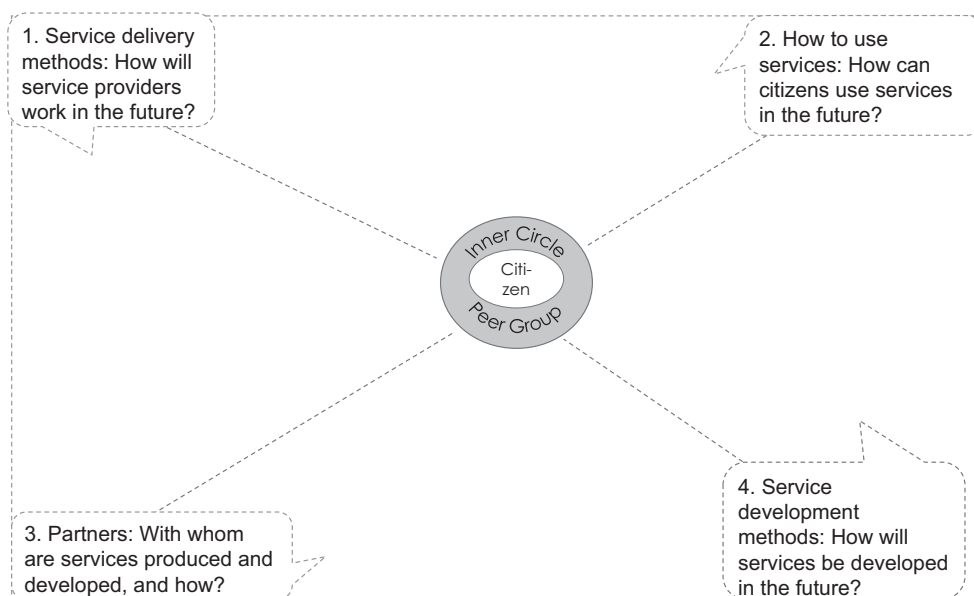

Fig. 1. Canvas as the knowledge artefact in the small group discussion.

et al., 1989) and carry information about how they are used in cultural and authentic actions (Mustonen & Hakkarainen, 2015). The participants shared the culture of health and social care, knew the context and the working environment, and were familiar with the topic. Workshop facilitators provided guidelines and information about the schedule, however, the small groups were otherwise self-directed, which emphasized the active role of the canvas as a guide in knowledge creation.

The questions on the canvas were:

1. Service delivery methods: How will service providers work in the future?
2. How to use services: How can citizens use services in the future?
3. Partners: With whom will services be produced and developed, and how?
4. Service development methods: How will services be developed in the future?

One small group discussion from a regional workshop representing service for children and young people was selected to the case study of this article. The research data includes all utterances related to the canvas questions. The audio-recording of the discussion by four members representing health and social sector professionals, is 24 min of length. The transcription consists of five pages text (font Arial, size 11). The data excerpts have been translated from Finnish to English.

3.3. Method of analysis

We applied a multi-phase theory-driven content and concept analysis (e.g., Braun & Clarke, 2006). In the first phase, we extracted 56 utterances from the transcribed canvas discussion related to future services. Canvas question 4 *(How will services be developed in future?)* collected the most utterances (31) and canvas question 3 *(*With whom will services be produced and developed, and how?*)* collected the least (4). Discussion utterances are *discursive actions* by means of which the participants formed their understanding of the future activity, the service in question.

In the second phase, the utterances related to the four canvas questions were categorized based on the elements of activity (subject, object, tools, rules, community, division of labour; definitions in Section 2.3; Table 1).

We realized that the utterances related to our specific topic of future activity typically expressed expansive, contradictory or, in some cases, neutral links between the element discussed (e.g., 'subject') and some other elements of the activity envisioned. The 'expansive connections' and 'contradictory connections' will extend and enrich the information value of the findings compared to merely classifying the utterances into the elements of activity. Neutral expressions were excluded from the analysis because their information value was low and quantity small (5 utterances).

The discursive markers of expansion were the expressions of improvement, empowerment, new possibilities, etc.; the markers of contradictions were problems, obstacles, counter arguments, critical questions, criticism, etc., related to the development of future services. In this phase, the canvas questions provided the necessary context for the utterances linking the brief expressions to the service practices discussed in the small groups. The key words and expressions were identified, and their categorisation in this phase of analysis is summarised in Table 2. Key words and expressions were cut out of the utterances that formed the data for the researchers' interpretation and they remained empty of context and meaning until the contents of each element and its connections were described in the findings.

The following example is an utterance in the discussion related to canvas question 4: How will services be developed in the future? (Key words are bolded.)

> "Year 2030, we still have **families**, we must not forget, we have [**citizens with disabilities**] who are **unable to use technology**. People with dementia cannot [use], even though they have other ability to function, they have other limits. We still have **families, children, adults and seniors**, who are **not capable and who do not have devices**."

The participants were discussing the most vulnerable service-users. We interpreted this as speech about the *object (the service-users)* expressing *contradictory connections* to the *rules* of activity *(unfair for citizens with disabilities)* and future *tools (inaccessible technology)*.

This example is one of 11 utterances categorized as the 'object'. As an outcome of the analysis of all 11 utterances and their synthesis the future object were named *Services for families in one place,* and the findings concerning the expansive and contradictory connections of the object of activity to other elements were summarised.

Table 1
Number of utterances.

Canvas question	Number of utterances/elements of activity						Total
	Subject	Object	Tools	Rules	Community	Division of labour	
1 Service delivery methods: How will service providers work in the future?	0	2	1	1	1	4	9
2 How to use services: How can citizens use services in the future?	1	3	5	3	0	0	12
3 Partners: With whom will services be produced and developed, and how?	0	1	0	1	1	1	4
4 Service development methods: How will services be developed in the future?	2	5	9	2	9	4	31
Total	3	11	15	7	11	9	56

Table 2
Key words and expressions, representative examples.
S = subject, O = object, T = tools, R = rules, C = community, D = division of labour
Researcher's clarifications in square brackets.

1. Element of activity	2. Key words	3. Key expressions of expansive connections	4. Key expressions of contradictory connections
Subject	"Personal trainer". All who can help; all actors together. Client.	To take a grip on the whole case. (O) Must be optional; client chooses. (R)	I am against [total digitalisation of services]. (T) [Client's] other problems at home will not be recognised. (O)
Object	Needing service; offering service. Issues of wellbeing and health. Personal health services; health control. Citizens with disabilities. Immigrants, refugees, foreign background. Families' needs. Officer meets parents, child	Shared interest [to cooperate]. (D) One-counter services, easy to use. (R) [Use of] robotics. (T)	Only for those who can use [digital services]. (R) Who cannot use, do not have devices, they still must use. (T) I do not know, not [in one place] but in some net? (T) [National languages] are not enough. (T) Labour force is diminishing. (S) Who organizes, manages? (D) Client runs in many places, we do not notice. (D)
Tools	Digital platform. Video contact. Learning tasks. Games. Digitalisation. Net mediated. Utilising technology. Artificial intelligence.	[Client] history becomes visible. (O) Applications for weight control; nurture; cleaning. (O) [Media, games] targeted to young. (O) Everything goes to the net 24/7. (R) Service produced universally. (O)	[Building only on electronic services is out of the question]. (O, R) I am scared of artificial intelligence. (S)
Rules	Low-threshold services, near clients. One-counter services. Society to take care of accessible services to all. Needs of service system transformed to money; politicians save. Time allocated to [client groups].	[Use of] technology multi-professionally. (T) Reserving time for those who cannot use. (O) Must have two models [for clients with and without technology capacity]. (O)	Without change of attitudes, nothing is possible to achieve. (O) Society must take care of… but this will not happen. (O) Politicians do not admit… interested only in Euros. (O) Service needs are [seen only] in terms of money. (O) Problems in aiming only at electronic [systems]. (T)
Community	Small locality, big growth centre, home. Contact centre. Tutor to family. Experts by experience. Volunteers. Social Insurance Institution, employment office, public employment and business services, youth work, sports and culture, authorities	Digitalisation helps in moving from home. (T) Contact centre would always be on call (D) [Support persons] have [additional] capacity and knowledge (D), can work wonders. (O) We cannot know 2030, but I can imagine… this would help families… big results with small actions…. [different contributions together]. (O, D)	[Access to services] in a small locality compared to a bigger growth centre. (O)
Division of labour	Specialised services. Networked services. Multi-professionally in collaboration. [Specialised role of] coach, tutor, trainer	Must be networked services. (C) Service multi-professionally, from one counter (O), utilising IT. (T) Multi-professional expert coaches families to change. (S, O)	[The system] cannot afford to maintain sectorised [division of labour] anymore. (R)

We synthesised descriptions of each element of activity and its expansive and contradictory connections to other elements, and they are reported in the findings of this article. The elements and the developmental potential of the future service are the focus. The context of the services for the wellbeing of children and young people is explained. Contextual linkage to the canvas questions is not indicated, as the description summarises the findings across all questions. The canvas knowledge artefact, as a whole, forms the local context of the discussion.

3.4. Research ethics

The SotePeda 24/7 project research was pre-evaluated by the ethics committee of the coordinating University of Applied Sciences. Participants signed an informed consent form. The case of Services for children and young people can be identified to a certain region in Finland in the context of the project; the professional position of the speakers is therefore anonymized.

4. Results

The results present our interpretation of the multi-professional group's discussion undertaken as a knowledge creation exercise to

envision future activity for health and social care services. The activity and its expansive and contradictory connections produced in the discussion, as mediated by the canvas knowledge artefact, were the focus of analysis.

4.1. Subject: multi-professional expert group and active client/citizen (3 utterances)

Example 1. We should bring together all who are needed in supporting the client's everyday life. Consider, for example, that this man is going to the employment office. His other problems at home won't be recognised except that he doesn't have a job!

Participants described the subject as a multi-professional team who serves the client together. Example 1 describes a father of a family who uses employment services but would, in fact, need other health and social services as well in his and his family's life situation. One of the group members put forth the idea of developing a special 'health and social care trainer', who would support families' holistic wellbeing and help citizens access special services from a (digital) health and social care centre. Some utterances also referred to clients as the subjects of their own care.

4.1.1. Expansive connections

The subject related to the *object* of service activity: holistic, integrated services in digital health and social care centres targeted to active citizens. We also interpreted expansive connections to the *division of labour,* in terms of the flexible and collaborative sharing of roles and responsibilities, and to the *rules*: the client as an active subject must have options and the possibility to choose whether to use digital or face-to-face services.

4.1.2. Contradictory connections

Participants described how the actions of the subject will encounter problems related to digitalisation *(tools)* serving all client groups regardless of whether they can use them or not. In addition, the multi-professional subject, alone, will not guarantee that clients' needs (object) will be holistically met.

4.2. Object: services for families in one place (11 utterances)

Example 2. The key to activating [clients] is to think differently and get good things happening; not that they fulfil the criteria of [government's] activation model. That we get all services gathered in one place, shared learning tasks to the whole family, and personally, multi-professional services at one counter.

Participants envisioned flexible integrated services gathered in one place. This kind of service space would construct the object of the professionals' work in the future. The benefits for the users would be multi-fold, as Example 2 describes. The vision was based both on the idea of an integrating place and on the possibility of complying with citizens' different life situations, vulnerabilities and special needs. At their best, integrated services would provide holistic health and wellbeing to entire families. But what would it mean to provide services in the common service centre, "under the same roof"? Would it be a combination of face-to-face and digital activities? Would both sectors with different histories work together for the clients' best interests?

4.2.1. Expansive connections

The future object will call for digital *tools* and means, such as robotics, that will both help clients to use the services and aid professionals in providing them efficiently. Centralised in one place, services will support the common client, e.g., the family, and expand the division of labour based on a shared interest. One-counter services will implement the easy-to-use principle (rules).

4.2.2. Contradictory connections

Discussion on the future object seemed to generate a number of contradictory connections. Participants suspected that the division of labour for the management of the network and a primary responsibility for responding to a client would be clear enough to support the integrated object of activity. In general, will there be enough workforce (subject)? Again, the total digitalisation of services was questioned both as the rule of activity (all must use) and as the tools (everything through digital technology).

4.3. Tools: technology (15 utterances)

Example 3. When [a client] takes a video connection, his/her history would be immediately displayed [to a service provider].

Participants discussed the meaning and great potential of digital tools in the future, including digital platforms, video contact, games, etc. Technology will offer clients the means for '24/7' support. Technology will allow for documenting clients' care history, thus expanding the scope of service provision (Example 3).

4.3.1. Expansive connections

Many of the utterances expressed the expansive potential of future technology in health and social services, particularly as related to the object. The tools and systems will display the history of a client's care. The platform would offer a learning environment activating clients towards a healthy lifestyle. The family could get personal learning tasks, and digital games might help them with

weight control, eating habits and house cleaning (*expansion of the object*). Digital services consider different service needs, as "everything goes to the net; 24/7" (*rules*). Altogether, digital tools were seen as enabling and materializing the expansive object of activity, the integrated services to different client groups.

4.3.2. Contradictory connections

Future tools were seen as problematic in relation to client groups who lack access to the necessary technology and would therefore need face-to-face services (the object). One participant even highlighted that artificial intelligence sounds strange and arouses fear in professionals (subject).

4.4. Rules: equality of services (7 utterances)

Example 4.   Society would have to make sure that everyone is provided with smartphones and devices when they are born, and even the weakest [members] are able to use [them]. And this will never happen.

Participants highlighted equality as the basic principle, including ease of use and equal access for citizens. This is summarised in Example 4; a speaker puts it bluntly that citizens would have to be born with all the devices needed to keep up with the rules of digitalisation, which is an impossible idea. Discussion focused on rules from different services users' points of view. It was noted that the rules were dictated by political decision-making, finances and other resources. The rules were in many respects contradictory to the object and to some extent to the tools of activity.

4.4.1. Expansive connections

Very little was said about the expansive connections of the rules. Multi-professional use of digital technology *(tools)* will support the system in providing citizens equal access to services. Equal access to digital services would release resources to face-to-face services for those, who are unable to utilize digital services (*object*).

4.4.2. Contradictory connections

Equality as the leading rule while leaning too much on electronic systems will cause many problems. Every citizen will not use digital devices and *tools*. Again, it was pointed out that some citizens need services that are physically nearby, therefore, face-to-face services will be needed in addition to digital health and social care service care centres. The rules were in contradiction with the *object* of activity in many respects, particularly on the levels of general attitudes, social policy, and financial decision making.

4.5. Community: local expert communities (11 utterances)

Example 5.   There is research-based knowledge about [experts by experience, support person to the family] indicating that they have so much competence and knowledge that cannot be read in books or bought from a store.

In the future, multi-professional health and social care teams will work in close collaboration with other agencies of the welfare state, such as employment and youth services, and with citizens as experts by experience. The workshop discussants saw many possibilities in the communities participating in service activities.

4.5.1. Expansive connections

When discussing the community or communities of future care, the workshop participants brought up multiple expansive connections. Example 5 describes the role of the volunteering citizens, the experts by experience, as part of the future community pointing out that the contribution of experience-based knowledge should be utilised *(division of labour)* to complement the care of families *(object)*. Future digital *tools* will provide community members with access to services and allow them to "move" from home.

4.5.2. Contradictory connections

The discussion on the diversity of future communities seemed to produce few contradictory arguments. One utterance juxtaposed a small locality with a bigger growth centre that becomes available to its residents *(object)*.

4.6. Division of labour: centralised and networked (9 utterances)

Example 6.   So, "with whom will services be produced and developed, and how?", that is: with all stakeholders in cooperation.

Participants discussed how future services will have to be at the same time centralised in a one-stop place and networked to connect multiple fields of speciality and expertise not available in rural areas, for instance. In Example 6, the speaker read question 3 on the canvas, summarised the discussion, and wrote down: *"with all stakeholders in cooperation"*.

4.6.1. Expansive connections

The demand for networked services links to future *communities* that can contribute to citizens' care. One-counter services *(object)* implemented by professionals and coaches *(subject)* would in the future form the basis for the division of labour supported by the

extensive use of IT *(tools)*.

4.6.2. Contradictory connections

The problems of cooperation and a meaningful division of labour go back to the Finnish history of health and social care. We interpreted the utterance *"[the system] cannot afford to maintain sectorised anymore"* in this context. The regulations as well as the professional traditions and cultures *(rules)* have tended to strengthen the siloed activities against the publicly pronounced goals of integration. Here, the rules contradict the simultaneously centralised and networked multi-professional division of labour.

5. Discussion

Digitalisation and digital competence is one of the key challenges in organising future integrated services, including health and social care. At the same time, other significant changes in welfare societies are taking place that require answers regarding how services will be provided for citizens in the future and what kind of competence and its development, training and knowledge creation will be needed. Research serves both in outlining future services for work practices and in providing information about the requirements of training future professionals. Digital competence in health and social care was first discussed in terms of basic ICT competencies, online interactive competencies, service providing and client-centred guiding competencies in digitalised environments and service design. Professionals must be ready for multidisciplinary knowledge creation and contribute to educational planning in a network of care professionals, educators, businesses, service design and IT (Ahonen et al., 2017; Rajalahti et al., 2020). This was the starting point for the SotePeda 24/7 project where health and social care professionals were invited to a knowledge-creation exercise on the future challenges of the service system. In this context, we wanted to explore *(RQ1) what kind of future activity for the health and social care services do professionals envision, and (RQ2) what are the expansive and contradictory connections of the future service activity produced in the knowledge creation exercise.* We argue for harnessing an activity-theoretical analysis of the expansions and contradictions of activity that is envisioned through multi-professional knowledge creation.

Digitalisation in the health and social care sector and in a wider society was a familiar topic to the participants. It was relatively easy for them to start a multi-professional discussion of the challenges in view of year 2030. We first analysed their utterances in the framework of the elements of activity system (Engeström, 2015). We interpreted the professionals' views to reflect expansive visions on the elements and their mutual connections in future service activities. Thus, *the subject* is considered as a multi-professional collective; new professional roles may appear, but also an active client is discussed as the subject, which is in line with the 'client-involvement' policies (Jones & Pietilä, 2018). *The object* is defined as an integrated service centre attentive to clients' needs, producing health and wellbeing for citizens as an outcome. The vision of the outcome was a better service system in which service integration would benefit both clients and professionals and in which digitalisation was a key aspect to guarantee the integration. *The tools* are technical and digitalised, as expected, and available both for professionals and clients; advanced information technology, robotics, remote connections, easy data management, utilization and access to data and smart devices were mentioned. They will enable smooth communication and the use of services at home. *Rules* are based on the principles of flexibility, accessibility, and equality among different service providers. The potentiality of revised *rules* to support the real-time communication technology for multi-professional cooperation, was recognised; according to research, digital service processes require an ongoing dialogue between professionals and clients (Rantala, 2018; Värri et al., 2020). The knowledge and capacity of *communities* is seen as containing significant potential embracing the contributions of professional groups, volunteers, residents, etc. *Division of labour* is at the same time centrally coordinated and networked. It is based on shared expertise and specialization facilitated by digitalisation.

Our first conclusion is that the results, even of this mini-scale exercise, were productive in terms of knowledge creation and the materialization of expansions for future services. This is supported by previous KC research highlighting that participative, artefactual processes (Paavola et al., 2004; Paavola & Hakkarainen, 2005) put participants' knowledge and expertise into dialogue (Nonaka & von Krogh, 2009) potentially offering a learning opportunity and an opportunity to explicate tacit knowledge (Batatia et al., 2012; Nonaka & Takeuchi, 1995; Paavola et al., 2004). The canvas was a mediating knowledge artefact for the members of the interactive collaborating group (Damsa & Muukkonen, 2020; Paavola & Hakkarainen, 2005) to put forth their ideas guided by four future-oriented questions.

The analysis further revealed contradictory connections emerging between each envisioned element and other elements of activity. First, the participants reacted positively to the digitalisation, novel communication technologies and robotics of future services, but they were sceptical about all citizens' capability to utilize advanced technology. Clients were discussed both related to *the object* (heterogeneous clients) and to *the subject* (clients' active engagement). The participants discussed two types of service users as the object of care, active and vulnerable citizens, whose needs differ. Future digital tools and technology were in contradiction to the capacities of the latter group of citizens (see Holgersson & Söderström, 2019; Van Olmen et al., 2010).

Second, participants emphasized the potential of multi-professional collaboration in producing integrated services by overcoming rigid professional hierarchies (Myron et al., 2018), but they expressed doubts about who organizes, who is responsible and how costs will be allocated. The questions related to the *division of labour* and the *rules* of activity reflecting the experienced hierarchies and bureaucracy in the field of health and social care services. The idea of *division of labour* (shared working culture and knowledge sharing) seemed to be difficult to imagine considering how fragmented the field still is today (see Keskimäki et al., 2018; Saltman & Teperi, 2016).

Finally, there were doubts about the digitalisation in itself. The ideal model of health and social (and other) services has long been to gather all services citizens need 'under the same roof'. Is this what digitalisation finally resolves and offers? Despite its huge potential, the participants questioned the consequences of digitalisation vis-à-vis the subject and communities of care. Are services with a

human face still possible? Can a digital health and social care centre become a *community* whose members share the same *object* and knowledge base? Altogether, *reconciling the promises of technology with the currently unresolved problem of universally provided, integrated and client-oriented care represented a real dilemma for professionals.*

Our theoretical conclusion is that the contradictions emerging related to the insightful visions of future services should be interpreted in the context of the current unresolved problems and limits experienced in service activities. These contradictions were reflected in the participants' utterances when they answered the questions and filled in the canvas artefact. However, unlike the expansions materializing through the canvas questions, the contradictions to be resolved materialized only through the activity-theoretical analysis we carried out retrospectively.

The contradictions between the innovative future activity and the problematic current activity emerged as the tertiary contradictions (between the old and the new activity) drawn from future to present. In activity-theoretical interventions, by contrast, the analysis of current problems and challenges is prerequisite to envisioning the new and defining the next steps of learning (Engeström, 2015). Our second theoretical conclusion and simultaneously a recommendation to future workshops entails combining, under facilitators' guidance, the activity-theoretical analysis of contradictions with the principles of KC practices (Paavola et al., 2011) to make the most of the valuable knowledge the experts can provide for future services and education. The pathway from vague visions to concrete steps of learning to be taken goes through solving the contradictions here and now.

6. Conclusion

The article focused on future health and social care services that are expected to become digitalised and integrated, building on citizens' active participation in pursuing their health and wellbeing. This calls for multi-professional knowledge creation. The analysis of expansions and contradictions of activity was used as a methodology to reveal the potential of such knowledge creation. Knowledge is needed both for the development of today's professional practices and for the education and training of future workers to support collaboration between sectors. The results of this case study showed that professionals are oriented towards the future challenges; they are prepared to develop their collaborative practices across the boundaries of expertise and see their clients and patients in the subject position. However, the realization of the future activity requires solving the contradictions of the present activities of service and care.

The study has several limitations that need to be addressed in further research. Following participants' knowledge creation in various contexts will confirm and enrich the findings. Thus far we have analysed one additional workshop data dealing with elderly care and reached results that seem to support our findings – even if the object of service activity also means differences. Beyond the implemented workshops, engaging diverse stakeholders would widen the perspectives, as homogeneous groups may tend to take organizational knowledge as self-evident. More diversity in terms of participants and a larger set of research data will be needed to validate and question these findings.

Declaration of competing interest

The Authors declare no conflicts of interest.

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